Seat	
No.	

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ENGINEERING MATHEMATICS – III

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 1

1)	$\frac{1}{D^2 + a^2} \cos ax$ is equal to	•	
	a) $\frac{x}{2a}\cos ax$	b)	$\frac{x}{2a}\sin ax$
	c) $\frac{x}{2a^2}\cos ax$	d)	$\frac{x}{2a^2}\sin ax$
2)	$\frac{1}{D^2}x^3$ is equal to		
	a) $e^x x^2$	b)	$e^{-x}x^{3}$
	c) $e^{x}\left(x^{2}+\frac{x^{3}}{3}\right)$	d)	$\frac{x^5}{20}$
3)	The general solution of $x \frac{d^2y}{dx^2} + \frac{dy}{dx} =$	= 0 is	·
	a) $y = c_1 + e^x$	b)	$y = c_1 + c_2 x^2$
	c) $y = c_1 x + c_2$	d)	$y = c_1 + c_2 \log x$
4)	The Laplace of $e^{-2t} + \sin 2t$ is a) 2 1	 b)	2 1
	a) $\frac{2}{s^2+2^2} + \frac{1}{s-2}$	0)	$\frac{2}{s^2 + 2^2} + \frac{1}{s+2}$
	c) $\frac{2}{s^2 - 2^2} + \frac{1}{s + 2}$		$\frac{2}{s^2-2^2}-\frac{1}{s-2}$
	5 2 5 2		5 2 5 2
5)	The value of $\int_0^\infty e^{-st} sint dt$ is		
	a) $\frac{1}{s^2 - 1^2}$	b)	$\frac{1}{s^2 + 1^2}$
	5 1		
	c) $\frac{1}{s^2+2^2}$	u)	$\frac{1}{s^2 - 2^2}$
6)	$L^{-1}\left\{\frac{s+2}{(s+2)^2-25}\right\} = \underline{\qquad}.$		
	a) $e^{2t} \cosh 5t$,	$e^{-2t} \cosh 25t$
	c) $e^{-2t} \sinh 5t$	d)	$e^{-2t} \cosh 5t$



Max. Marks: 70

7)	$L^{-1}\{\phi(s+a)\} = \underline{\qquad}.$	
	a) $e^{at}L^{-1}\{\phi(s)\}$	b) $e^{-at}L^{-1}\{\phi(s)\}$
	c) $-t L^{-1}{\phi(s)}$	d) $t L^{-1}{\phi(s)}$
8)	The solution of $q = 3p^2$ is	
	a) $z = ax + 3a^2y + c$	b) $z = 3ax + a^2y + c$
	c) $z = 3ax^2 + by$	d) $z = ax + \frac{a^2}{3}y + c$
9)	 Partial differential equation requires a) exactly one independent variable b) two or more independent variable c) more than or equal to one independent and d) equal number of dependent and 	es es endent variables independent variables
10)	The ROC of discrete unit step function	
	, , ,	 b) z < 1 d) None
11)	c) $ z = 1$ In z transform of $z\{a^k\}$ is for $ z > a$ a) $\frac{1}{a-z}$ c) $\frac{z}{z-a}$	
4.0)	$\frac{1}{z-a}$	
12)	z - a The cauchy's Riemann equations are a) $u_x = u_y$, $v_y = -v_x$	$u_{x} = -v_{x}, v_{y} = u_{y}$
	c) $u_x = v_y, u_y = -v_x$	d) $u_x = v_y$, $u_y = v_x$
13)	$\int \tan z dz, \text{Where c is circle } z = \frac{1}{2}$	·is
14)	Fourier expansion of $f(x) = x + x^2$ is a) sine terms only	b) π d) 0 n (-1, 1) has b) cosine terms only d) None of these

Set P

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Instructions: 1) All questions are compulsory

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Q.2 Solve any three of the following questions.

- **a)** Solve $(D^3 + 1)y = e^{x/2} \sin\left(\frac{\sqrt{3}}{2}x\right)$
- **b)** Solve $(D^3 3D^2 + 3D 1)y = xe^x + e^x$
- **c)** Solve $(D^3 3D + 2)y = x$
- d) Solve

$$(1+x)^2 \frac{d^2 y}{dx^2} + (1+x)\frac{dy}{dx} + y = [\log(x+1)]^4 + \cos[\log(1+x)]$$

e) Solve $x \frac{d^3y}{dx^3} + 2 \frac{d^2y}{dx^2} = x^2$

Q.3 Solve any three of the following questions.

- a) It $L\{evf\sqrt{t}\} = \frac{1}{s\sqrt{s+1}}$ find $L\{t \ erf 2\sqrt{t}\}$
- **b)** Find $L\left\{\frac{\cos 2t \sin 2t}{t}\right\}$
- c) Use Laplace transform to evaluate

$$\int_0^\infty e^{-t} \sin^2\left(\frac{3t}{2}\right) dt$$

d) Find
$$L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$$

e) Find
$$L^{-1}\left\{\tan^{-1}\left(\frac{2}{s}\right)\right\}$$

- Q.4 Solve any two of the following questions.
 - **a)** Find $L\left\{\int_0^t u^{-1}e^{-u}\sin u\,du\right\}$
 - **b)** Solve $(D^2 + 4D + 13)y = e^{-t} \sin t$ where y = 0, Dy = 0 at t = 0 with the help of Laplace transform.
 - c) The charge Q of a condenser of capacity C, discharged in a circuit of Resistance. R and self inductance L satisfies the differential equation. $L \frac{d^2Q}{dt^2} + R \frac{dQ}{dt} + \frac{Q}{C} = 0$

Solve the equation with initial conditions that $Q = Q_{0}$, and $\frac{dQ}{dt} = 0$. When t = 0 & $cR^2 < 4L$.

09

09

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Max. Marks: 56

Set P

Solve any three of the following questions. Q.5

a) Find P if $f(z) = r^2 \cos 2\theta + ir^2 \sin P\theta$ is analytic.

b) Evaluate
$$\int \frac{z+3}{2z^2+3z-2} dz$$
 Where C is circle $|z-i| = 2$

- c) Solve $pq = x^m y^n z^{2l}$
- **d)** Find z transform of $z\{(k + 1), a^k\}, k \ge 0$ **e)** Find half range sine series $f(x) = x^2$ in (0,1).

Solve any three of the following questions. Q.6

- a) Find Fourier Series of $f(x) = (4 x^2)$ in (0,2)
- **b)** Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
- Find k such that $\frac{1}{2}\log(x^2 + y^2) + i \tan^{-1}\frac{kx}{y}$ is analytic. C)
- Find inverse z transform of $f(z) = \frac{1}{z^2 5z + 6} |z| < 2$ d)
- e) Show that $u = y^3 3x^2y$ is harmonic function. Also find corresponding analytic function.

Q.7 Solve any two of the following questions.

- a) Find Fourier series for |x| in $(-\pi, \pi)$
- Solve partial differential equation $3x \frac{\partial z}{\partial x} 5y \frac{\partial z}{\partial y} = 0$ by method of separation b) of variables.
- **c)** Find $z\{2^k \cos(3k+2)\}$ for $k \ge 0$.

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Set

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The solution of $q = 3p^2$ is _____.

a) $z = ax + 3a^2y + c$	b) $z = 3ax + a^2y + c$
c) $z = 3ax^2 + by$	d) $z = ax + \frac{a^2}{3}y + c$

- 2) Partial differential equation requires _____
 - a) exactly one independent variables
 - b) two or more independent variables
 - c) more than or equal to one independent variables
 - d) equal number of dependent and independent variables
- 3) The ROC of discrete unit step function in z transform _____.

	a) $ z > 1$	b)	z < 1
	c) $ z = 1$	d)	None
4)	$k_{k} = t_{k} + t_{k$		

4)	In z transform of $z\{a^k\}$ is for $ z >$	a
	a) 1	b) <u>Z</u>
	$\overline{a-z}$	a-z
	c) <u>Z</u>	d) <u>1</u>
	z - a	$\overline{z-a}$
5)	The cauchy's Riemann equations	are
	a) $u_x = u_y$, $v_y = -v_x$	b) $u_x = -v_x$, $v_y = u_y$
	$c) u_x = v_y, u_y = -v_x$	d) $u_x = v_y$, $u_y = v_x$
6)	ſ	1
,	$\int \tan z dz, \text{Where c is circle } z $	$=\frac{1}{2}$ is
	С	
	a) 1	b) π
	C) πi	d) 0
7)	Fourier expansion of $f(x) = x + x$	c^2 in (-1, 1) has
	a) sine terms only	b) cosine terms only
	c) Both sine & cosine only	d) None of these

19

Q

Set

Max. Marks: 70

8) $\frac{1}{D^2 + a^2} \cos ax$ is equal to _____. b) $\frac{x}{2a}\sin ax$ a) $\frac{x}{2a}\cos ax$ c) $\frac{x}{2a^2}\cos ax$ d) $\frac{x}{2a^2}\sin ax$ $\frac{1}{D^2}x^3$ is equal to _____. 9) b) $e^{-x}x^3$ a) $e^{x}x^{2}$ d) $\frac{x^5}{20}$ c) $e^{x}\left(x^{2}+\frac{x^{3}}{2}\right)$ The general solution of $x \frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$ is _____. a) $y = c_1 + e^x$ b) $y = c_1 + c_2 x^2$ d) $y = c_1 + c_2 \log x$ 10) The Laplace of $e^{-2t} + \sin 2t$ is _____. 2 1 b) $\frac{2}{s^2 + 2^2} + \frac{1}{s+2}$ 11) d) $\frac{2}{s^2 - 2^2} - \frac{1}{s - 2}$ c) $\frac{2}{s^2 - 2^2} + \frac{1}{s+2}$ 12) The value of $\int_{0}^{\infty} e^{-st} sint dt$ is _____ b) $\frac{1}{s^2 + 1^2}$ a) $\frac{1}{s^2 - 1^2}$ c) $\frac{1}{s^2+2^2}$ d) $\frac{1}{s^2 - 2^2}$ 13) $L^{-1}\left\{\frac{s+2}{(s+2)^2-25}\right\} =$ _____. a) $e^{2t} \cosh 5t$ c) $e^{-2t} \sinh 5t$ b) $e^{-2t} \cosh 25t$ d) $e^{-2t} \cosh 5t$ 14) $L^{-1}{\phi(s+a)} =$ _____. b) $e^{-at}L^{-1}\{\phi(s)\}$ a) $e^{at}L^{-1}\{\phi(s)\}$ c) $-t L^{-1}{\phi(s)}$ d) $t L^{-1}{\phi(s)}$

SLR-FM-401

Set Q

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Q.2 Solve any three of the following questions.

- **a)** Solve $(D^3 + 1)y = e^{x/2} \sin\left(\frac{\sqrt{3}}{2}x\right)$
- **b)** Solve $(D^3 3D^2 + 3D 1)y = xe^x + e^x$
- **c)** Solve $(D^3 3D + 2)y = x$
- d) Solve

$$(1+x)^2 \frac{d^2 y}{dx^2} + (1+x)\frac{dy}{dx} + y = [\log(x+1)]^4 + \cos[\log(1+x)]$$

e) Solve $x \frac{d^3y}{dx^3} + 2 \frac{d^2y}{dx^2} = x^2$

Q.3 Solve any three of the following questions.

- a) It $L\{evf\sqrt{t}\} = \frac{1}{s\sqrt{s+1}}$ find $L\{t \ erf 2\sqrt{t}\}$
- **b)** Find $L\left\{\frac{\cos 2t \sin 2t}{t}\right\}$
- c) Use Laplace transform to evaluate

$$\int_0^\infty e^{-t} \sin^2\left(\frac{3t}{2}\right) dt$$

d) Find
$$L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$$

e) Find
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 - **a)** Find $L\left\{\int_0^t u^{-1}e^{-u}\sin u\,du\right\}$
 - **b)** Solve $(D^2 + 4D + 13)y = e^{-t} \sin t$ where y = 0, Dy = 0 at t = 0 with the help of Laplace transform.
 - c) The charge Q of a condenser of capacity C, discharged in a circuit of Resistance. R and self inductance L satisfies the differential equation. $L \frac{d^2Q}{dt^2} + R \frac{dQ}{dt} + \frac{Q}{C} = 0$

Solve the equation with initial conditions that $Q = Q_{0}$, and $\frac{dQ}{dt} = 0$. When t = 0 & $cR^2 < 4L$.

Max. Marks: 56

09

09

10



Set

Q

Solve any three of the following questions. Q.5

a) Find P if $f(z) = r^2 \cos 2\theta + ir^2 \sin P\theta$ is analytic.

b) Evaluate
$$\int \frac{z+3}{2z^2+3z-2} dz$$
 Where C is circle $|z-i| = 2$

- c) Solve $pq = x^m y^n z^{2l}$
- **d)** Find z transform of $z\{(k + 1), a^k\}, k \ge 0$ **e)** Find half range sine series $f(x) = x^2$ in (0,1).

Solve any three of the following questions. Q.6

- a) Find Fourier Series of $f(x) = (4 x^2)$ in (0,2)
- **b)** Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
- Find k such that $\frac{1}{2}\log(x^2 + y^2) + i \tan^{-1}\frac{kx}{y}$ is analytic. C)
- Find inverse z transform of $f(z) = \frac{1}{z^2 5z + 6} |z| < 2$ d)
- e) Show that $u = y^3 3x^2y$ is harmonic function. Also find corresponding analytic function.

Q.7 Solve any two of the following questions.

- a) Find Fourier series for |x| in $(-\pi, \pi)$
- Solve partial differential equation $3x \frac{\partial z}{\partial x} 5y \frac{\partial z}{\partial y} = 0$ by method of separation b) of variables.
- **c)** Find $z\{2^k \cos(3k+2)\}$ for $k \ge 0$.

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1)	The value of $\int_{a}^{b} e^{-st} sint dt$ is		
	a) $\frac{1}{s^2 - 1^2}$		$\frac{1}{s^2 + 1^2}$
	c) $\frac{1}{s^2+2^2}$	d)	$\frac{1}{s^2 - 2^2}$
2)	$L^{-1}\left\{\frac{s+2}{(s+2)^2 - 25}\right\} = \underline{\qquad}.$		
	a) $e^{2t} \cosh 5t$	b)	$e^{-2t} \cosh 25t$
	c) $e^{-2t} \sinh 5t$		$e^{-2t}\cosh 5t$
3)	$L^{-1}\{\phi(s+a)\} = \underline{\qquad}.$		
	a) $e^{at}L^{-1}\{\phi(s)\}$	b)	$e^{-at}L^{-1}\{\phi(s)\}$
	c) $-t L^{-1}{\phi(s)}$	d)	$t L^{-1}{\phi(s)}$
4)	The solution of $q = 3p^2$ is		
	a) $z = ax + 3a^2y + c$	b)	$z = 3ax + a^2y + c$
	c) $z = 3ax^2 + by$	d)	$z = ax + \frac{a^2}{3}y + c$
5)	Partial differential equation requires		·
	a) exactly one independent variab		
	b) two or more independent varialc) more than or equal to one inde		lont variables
	d) equal number of dependent an	-	
6)			•
6)	The ROC of discrete unit step funct a) $ z > 1$		z < 1
	() 2 × 1	5)	

c) |z| = 1 d) None

Set R

Max. Marks: 70

SLR-FM-401 Set R

In z transform of $z\{a^k\}$ is for |z| > a _____ b) $\frac{z}{a-z}$ 7) a) $\frac{1}{a-z}$ c) $\frac{z}{z-a}$ d) $\frac{1}{z-a}$ The cauchy's Riemann equations are 8) duations are _____. b) $u_x = -v_x$, $v_y = u_y$ a) $u_x = u_y$, $v_y = -v_x$ c) $u_x = v_y, u_y = -v_x$ d) $u_x = v_y$, $u_y = v_x$ $\int \tan z \, dz, \quad \text{Where c is circle } |z| = \frac{1}{2} \text{ is } \underline{\qquad}.$ 9) a) 1 b) π d) 0 C) πi 10) Fourier expansion of $f(x) = x + x^2$ in (-1, 1) has _ a) sine terms only b) cosine terms only c) Both sine & cosine only d) None of these 11) $\frac{1}{D^2 + a^2} \cos ax$ is equal to _____. b) $\frac{x}{2a}\sin ax$ a) $\frac{x}{2a}\cos ax$ d) $\frac{x}{2a^2}\sin ax$ c) $\frac{x}{2a^2}\cos ax$ 12) $\frac{1}{D^2} x^3$ is equal to _____. b) $e^{-x}x^3$ a) $e^x x^2$ d) $\frac{x^5}{20}$ c) $e^{x}\left(x^{2}+\frac{x^{3}}{3}\right)$ The general solution of $x \frac{d^2y}{dx^2} + \frac{dy}{dx} = 0$ is _____. a) $y = c_1 + e^x$ b) $y = c_1 + c_2 x^2$ b) $y = c_1 + c_2 x^2$ d) $y = c_1 + c_2 \log x$ 13) C) $y - c_1$. The Laplace of $e^{-2t} + \sin 2t$ is _____. a) $\frac{2}{s^2 + 2^2} + \frac{1}{s - 2}$ b) $\frac{2}{s^2 + 2^2} + \frac{1}{s + 2}$ c) $\frac{2}{--} + \frac{1}{s - 2}$ d) $\frac{2}{s^2 - 2^2} - \frac{1}{s - 2}$ 14)

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- **c)** Solve $(D^3 3D + 2)y = x$
- d) Solve

$$(1+x)^2 \frac{d^2 y}{dx^2} + (1+x)\frac{dy}{dx} + y = [\log(x+1)]^4 + \cos[\log(1+x)]$$

e) Solve $x \frac{d^3y}{dx^3} + 2 \frac{d^2y}{dx^2} = x^2$

Q.3 Solve any three of the following questions.

- a) It $L\{evf\sqrt{t}\} = \frac{1}{s\sqrt{s+1}}$ find $L\{t \ erf 2\sqrt{t}\}$
- **b)** Find $L\left\{\frac{\cos 2t \sin 2t}{t}\right\}$
- c) Use Laplace transform to evaluate

$$\int_0^\infty e^{-t} \sin^2\left(\frac{3t}{2}\right) dt$$

d) Find
$$L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$$

e) Find
$$L^{-1} \{ \tan^{-1} \left(\frac{2}{s} \right) \}$$

- Q.4 Solve any two of the following questions.
 - **a)** Find $L\left\{\int_0^t u^{-1}e^{-u}\sin u\,du\right\}$
 - **b)** Solve $(D^2 + 4D + 13)y = e^{-t} \sin t$ where y = 0, Dy = 0 at t = 0 with the help of Laplace transform.
 - c) The charge Q of a condenser of capacity C, discharged in a circuit of Resistance. R and self inductance L satisfies the differential equation. $L \frac{d^2 Q}{dt^2} + R \frac{dQ}{dt} + \frac{Q}{C} = 0$

Solve the equation with initial conditions that $Q = Q_{0}$, and $\frac{dQ}{dt} = 0$. When t = 0 & $cR^2 < 4L$.

Max. Marks: 56

Set

R

09

09

Q.5 Solve any three of the following questions.

a) Find P if $f(z) = r^2 \cos 2\theta + ir^2 \sin P\theta$ is analytic.

b) Evaluate
$$\int \frac{z+3}{2z^2+3z-2} dz$$
 Where C is circle $|z-i| = 2$

- c) Solve $pq = x^m y^n z^{2l}$
- **d)** Find z transform of $z\{(k + 1), a^k\}, k \ge 0$
- e) Find half range sine series $f(x) = x^2$ in (0,1).

Q.6 Solve any three of the following questions.

- a) Find Fourier Series of $f(x) = (4 x^2)$ in (0,2)
- **b)** Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
- **c)** Find k such that $\frac{1}{2}\log(x^2 + y^2) + i \tan^{-1}\frac{kx}{v}$ is analytic.
- **d)** Find inverse z transform of $f(z) = \frac{1}{z^2 5z + 6} |z| < 2$
- e) Show that $u = y^3 3x^2y$ is harmonic function. Also find corresponding analytic function.

Q.7 Solve any two of the following questions.

- **a)** Find Fourier series for |x| in $(-\pi, \pi)$
- **b)** Solve partial differential equation $3x \frac{\partial z}{\partial x} 5y \frac{\partial z}{\partial y} = 0$ by method of separation of variables.
- **c)** Find $z\{2^k \cos(3k+2)\}$ for $k \ge 0$.

09



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MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) The ROC of discrete unit step function in z transform _____.

	a) $ z > 1$	b)	z < 1
	c) $ z = 1$	d)	None
2)	In z transform of $z\{a^k\}$ is for $ z >$	а	
	a) <u>1</u>	b)	$\frac{z}{a-z}$
	a-z		
	c) $\frac{Z}{Z-a}$	d)	$\frac{1}{z-a}$
2)	z - a The cauchy's Riemann equations a) $u_x = u_y$, $v_y = -v_x$	aro	z-a
3)	The caucity's Riemann equations a) $y = y$ $y = -y$	are	
	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	d)	$u_x = v_x, v_y = u_y$
	$u_x = v_y, u_y = -v_x$	u)	$u_x = v_y$, $u_y = v_x$
4)	$\int \tan z dz, \text{Where c is circle } z =$	$=\frac{1}{-}$ is	
		2	·
	a) 1	b)	
	C) πi	d)	0
5)	Equipier expension of $f(x) = x + x$	$\frac{2}{10}$	1 1) has
5)	Fourier expansion of $f(x) = x + x$ a) sine terms only		
5)	 a) sine terms only 	b)	1, 1) has cosine terms only None of these
,	 a) sine terms only c) Both sine & cosine only 1 	b) d)	cosine terms only
5) 6)	a) sine terms onlyc) Both sine & cosine only	b) d)	cosine terms only
,	a) sine terms only c) Both sine & cosine only $\frac{1}{D^2 + a^2} \cos ax$ is equal to	b) d) 	cosine terms only None of these
,	 a) sine terms only c) Both sine & cosine only 1 	b) d) 	cosine terms only
,	a) sine terms only c) Both sine & cosine only $\frac{1}{D^2 + a^2} \cos ax$ is equal to a) $\frac{x}{2a} \cos ax$	b) d) b)	cosine terms only None of these $\frac{x}{2a}\sin ax$
6)	a) sine terms only c) Both sine & cosine only $\frac{1}{D^2 + a^2} \cos ax$ is equal to	b) d) b)	cosine terms only None of these
,	a) sine terms only c) Both sine & cosine only $\frac{1}{D^2 + a^2} \cos ax$ is equal to a) $\frac{x}{2a} \cos ax$ c) $\frac{x}{2a^2} \cos ax$	b) d) b)	cosine terms only None of these $\frac{x}{2a}\sin ax$
6)	a) sine terms only c) Both sine & cosine only $\frac{1}{D^2 + a^2} \cos ax \text{is equal to} ___$ a) $\frac{x}{2a} \cos ax$ c) $\frac{x}{2a^2} \cos ax$ $\frac{1}{D^2} x^3$ is equal to $___$.	b) d) b) d)	cosine terms only None of these $\frac{x}{2a} \sin ax$ $\frac{x}{2a^2} \sin ax$
6)	a) sine terms only c) Both sine & cosine only $\frac{1}{D^2 + a^2} \cos ax$ is equal to a) $\frac{x}{2a} \cos ax$ c) $\frac{x}{2a^2} \cos ax$ $\frac{1}{D^2} x^3$ is equal to a) $e^x x^2$	b) d) b) d)	cosine terms only None of these $\frac{x}{2a} \sin ax$ $\frac{x}{2a^2} \sin ax$
6)	a) sine terms only c) Both sine & cosine only $\frac{1}{D^2 + a^2} \cos ax \text{is equal to} ___$ a) $\frac{x}{2a} \cos ax$ c) $\frac{x}{2a^2} \cos ax$ $\frac{1}{D^2} x^3$ is equal to $___$.	b) d) b) d)	cosine terms only None of these $\frac{x}{2a}\sin ax$

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Max. Marks: 70

Marks: 14

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8)	$d^2 y dy$		
0)	The general solution of $x \frac{d^2y}{dx^2} + \frac{dy}{dx} =$		
	a) $y = c_1 + e^x$		$y = c_1 + c_2 x^2$
	c) $y = c_1 x + c_2$	a)	$y = c_1 + c_2 \log x$
9)	The Laplace of $e^{-2t} + \sin 2t$ is		
,	a) $\frac{2}{s^2+2^2} + \frac{1}{s-2}$	b)	$\frac{2}{s^2+2^2} + \frac{1}{s+2}$
	$\overline{s^2 + 2^2} + \overline{s - 2}$		$\overline{s^2 + 2^2} + \overline{s + 2}$
	c) $\frac{2}{s^2 - 2^2} + \frac{1}{s + 2}$	d)	$\frac{2}{s^2-2^2}-\frac{1}{s-2}$
	$s^2 - 2^2$ s + 2		$s^2 - 2^2 s - 2$
10)	The value of $\int_0^\infty e^{-st} sint dt$ is		
	a) $\frac{1}{s^2 - 1^2}$	0)	$\frac{1}{s^2 + 1^2}$
	c) $\frac{1}{s^2+2^2}$,	$\frac{1}{s^2 - 2^2}$
11)	$L^{-1}\left\{\frac{s+2}{(s+2)^2-25}\right\} = $		
	$L^{-1}\left\{\frac{1}{(s+2)^2-25}\right\} =$		
	a) $e^{2t} \cosh 5t$		$e^{-2t}\cosh 25t$
	c) $e^{-2t} \sinh 5t$	d)	$e^{-2t} \cosh 5t$
12)	$L^{-1}\{\phi(s+a)\} = \underline{\qquad}.$		
	a) $e^{at}L^{-1}\{\phi(s)\}$	b)	$e^{-at}L^{-1}\{\phi(s)\}$
	c) $-t L^{-1}{\phi(s)}$	d)	$t L^{-1}{\phi(s)}$
13)	The solution of $q = 3p^2$ is		
	a) $z = ax + 3a^2y + c$	b)	$z = 3ax + a^2y + c$
	c) $z = 3ax^2 + by$	d)	$z = ax + \frac{a^2}{2}y + c$
1 1)	Dertial differential equation requires		э

- Partial differential equation requires _____ a) exactly one independent variables 14) _____.

 - b) two or more independent variables
 - more than or equal to one independent variables c)
 - d) equal number of dependent and independent variables

Seat No.

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ENGINEERING MATHEMATICS – III

Day & Date: Saturday,07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory

- 2) Figures to the right indicate full marks.
- 3) Use of calculator is allowed.

Q.2 Solve any three of the following questions.

- **a)** Solve $(D^3 + 1)y = e^{x/2} \sin\left(\frac{\sqrt{3}}{2}x\right)$
- **b)** Solve $(D^3 3D^2 + 3D 1)y = xe^x + e^x$
- **c)** Solve $(D^3 3D + 2)y = x$
- d) Solve

$$(1+x)^2 \frac{d^2 y}{dx^2} + (1+x)\frac{dy}{dx} + y = [\log(x+1)]^4 + \cos[\log(1+x)]$$

e) Solve $x \frac{d^3y}{dx^3} + 2 \frac{d^2y}{dx^2} = x^2$

Q.3 Solve any three of the following questions.

- a) It $L\{evf\sqrt{t}\} = \frac{1}{s\sqrt{s+1}}$ find $L\{t \ erf 2\sqrt{t}\}$
- **b)** Find $L\left\{\frac{\cos 2t \sin 2t}{t}\right\}$
- c) Use Laplace transform to evaluate

$$\int_0^\infty e^{-t} \sin^2\left(\frac{3t}{2}\right) dt$$

d) Find
$$L^{-1}\left\{\frac{s^2}{(s^2+a^2)(s^2+b^2)}\right\}$$

e) Find
$$L^{-1}\left\{\tan^{-1}\left(\frac{2}{s}\right)\right\}$$

- Q.4 Solve any two of the following questions.
 - **a)** Find $L\left\{\int_0^t u^{-1}e^{-u}\sin u\,du\right\}$
 - **b)** Solve $(D^2 + 4D + 13)y = e^{-t} \sin t$ where y = 0, Dy = 0 at t = 0 with the help of Laplace transform.
 - c) The charge Q of a condenser of capacity C, discharged in a circuit of Resistance. R and self inductance L satisfies the differential equation. $L \frac{d^2Q}{dt^2} + R \frac{dQ}{dt} + \frac{Q}{C} = 0$

Solve the equation with initial conditions that $Q = Q_{0}$, and $\frac{dQ}{dt} = 0$. When t = 0 & $cR^2 < 4L$.

Max. Marks: 56

09

09

10



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Solve any three of the following questions. Q.5

a) Find P if $f(z) = r^2 \cos 2\theta + ir^2 \sin P\theta$ is analytic.

b) Evaluate
$$\int \frac{z+3}{2z^2+3z-2} dz$$
 Where C is circle $|z-i| = 2$

- c) Solve $pq = x^m y^n z^{2l}$
- **d)** Find z transform of $z\{(k + 1), a^k\}, k \ge 0$ **e)** Find half range sine series $f(x) = x^2$ in (0,1).

Solve any three of the following questions. Q.6

- a) Find Fourier Series of $f(x) = (4 x^2)$ in (0,2)
- **b)** Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
- Find k such that $\frac{1}{2}\log(x^2 + y^2) + i \tan^{-1}\frac{kx}{y}$ is analytic. c)
- Find inverse z transform of $f(z) = \frac{1}{z^2 5z + 6} |z| < 2$ d)
- e) Show that $u = y^3 3x^2y$ is harmonic function. Also find corresponding analytic function.

Q.7 Solve any two of the following questions.

- a) Find Fourier series for |x| in $(-\pi, \pi)$
- Solve partial differential equation $3x \frac{\partial z}{\partial x} 5y \frac{\partial z}{\partial y} = 0$ by method of separation b) of variables.
- **c)** Find $z\{2^k \cos(3k+2)\}$ for $k \ge 0$.

09



Set

Max. Marks: 70

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 1) No-load speed of which of the following motor will be highest?
 - No-load speed of which of the following motor will be highest? a) Shunt motor b) Series motor
 - c) Cumulative compound motor d) Differentiate compound motor
 - 2) Starters are used with D.C. motors because _____.
 - a) these motors have high starting torque
 - b) these motors are not self-starting
 - c) backe.m.f. of these motors is zero initially
 - d) to restrict armature current as there is no back e.m.f. while starting
 - In case of D.C. shunt motors the speed is dependent on back e.m.f. only because _____.
 - a) back e.m.f. is equal to armature drop
 - b) armature drop is negligible
 - c) flux is proportional to armature current
 - d) flux is practically constant in D.C. shunt motors
 - 4) In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be _____.
 - a) almost negligible b) rated full-load current
 - c) less than full-load current d) more than full-load current
 - 5) The insulating material used between the commutator segments is normally _____.
 - a) graphite c) mica

- b) paperd) insulating varnish
- 6) Compensating windings are used in D.C. generators _____
 - a) mainly to reduce the eddy currents by providing local short-circuits
 - b) to provide path for the circulation of cooling air
 - c) to neutralise the cross-magnetising effect of the armature reaction
 - d) none of the above
- 7) In D.C. generators the polarity of the interpoles _____
 - a) is the same as that of the main pole ahead
 - b) is the same as that of the immediately preceding pole
 - c) is opposite to that of the main pole ahead
 - d) is neutral as these poles do not play part in generating e.m.f.

Seat No.



Marks: 14

8) The armature of D.C. generator is laminated to _____. a) reduce the bulk b) provide the bulk C) insulate the core d) reduce eddy current loss In a step-down transformer, there is a change of 15 A in the load current. 9) This results in change of supply current of _____. a) less than 15 A b) more than 15 A 15 A d) none of the above C) 10) The efficiencies of transformers compared with that of electric motors of the same power are _____. about the same b) much smaller a) C) much higher d) somewhat smaller 11) The noise produced by a transformer is termed as _____. zoom b) hum a) c) ringing d) buzz 12) Which of the following protection is normally not provided on small distribution transformers? Overfluxing protection b) Buchholz relay a)

- c) Overcurrent protection
- d) All of the above
- 13) A good voltage regulation of a transformer means
 - a) output voltage fluctuation from no load to full load is least
 - b) output voltage fluctuation with power factor is least
 - c) difference between primary and secondary voltage is least
 - d) difference between primary and secondary voltage is maximum
- 14) Losses which occur in rotating electric machines and do not occur in transformers are _____,
 - a) friction and windage losses
 - b) magnetic losses
 - c) hysteresis and eddy current losses
 - d) copper losses

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S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Solve any Four.

Seat

No.

- a) With neat sketch explain the construction of DC machine.
- b) A 4- pole lap wound DC shunt generator has a useful flux / pole of 0.07 wb. The armature winding consists of 220 turns each of 0.004Ω resistance. Calculate the terminal voltage when running at 900 rpm. If the armature current is 50 Amp.
- c) An armature of 6-pole machine 75cm in diameter has 664 conductors each having an effective length of 30cm and carrying a current of 100A. if 70% of total conductors lie simultaneously in the field of average flux density 0.85wb/m2, calculate
 - 1) armature torque
 - 2) horse power output at 250 rpm
- d) With neat circuit diagram explain Swinburne's test and how efficiency of generator and motor are computed with this test. Write the advantages of this test.
- e) A long shunt compound generator delivers a load current of 50 A at 500 V and has armature, series, and shunt field resistance of 0.05Ω, 0.03Ω and 250Ω respectively. Calculate the armature current and generated e.m.f. Allow 1 V/brush for contact drop.
- f) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.

Q.3 Solve any Two.

- a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?
- **b)** A 220V shunt motor takes a total current of 80A and runs at 800 rpm. Shunt field resistance and armature resistance are 50Ω and 0.1Ω respectively. If iron and friction losses amount to 1600W, find
 - 1) copper losses
 - 2) armature torque
 - 3) shaft torque
 - 4) efficiency
- c) With the help of neat sketch explain the speed control methods of D.C. shunt motor.

Max. Marks: 56

16

Q.4 Solve any Four.

- a) With neat sketch explain open circuit and short circuit test of transformer. How equivalent circuit parameters and efficiency of a transformer are computed?
- **b)** The input current to a 3- phase step down transformer connected to an 11kV supply system is 14A. calculate the secondary line voltage and current for
 - 1) star-star
 - 2) delta-star if the phase turn ratio is 44
- c) Derive the expression for saving of copper in autotransformer.
- d) Explain with phasor diagram a practical transformer on load condition.
- e) A 230/2300V transformer takes a no load current of 6.5 A and absorbs 187W. if the resistance of the primary is 0.6 Ω . Find.
 - 1) the core loss
 - 2) no load power factor
 - 3) active component of current
 - 4) magnetizing current
- f) In a 50k VA transformer, the iron loss is 500W and full load copper loss is 800W. find the efficiency at full load and half full load at 08 power factor lagging.

Q.5 Solve any Two.

- a) Efficiency of 400kVA, 1- phase transformer is 98.77% when delivering full load of 0.8 power factor and it is 99.13% at half load unity power factor. Calculate
 - 1) iron loss
 - 2) full load copper loss
- **b)** With the help of neat diagram explain open delta connection of three phase transformer.
- c) A 5 kVA distribution transformer has a full load efficiency of 95% at which copper loss is equal to iron loss. Transformer is loaded for 24 hrs as under:- no load for 10 hrs, one forth full load for 7 hrs, half full load for 5 hrs and full load for 2 hrs. Calculate the all-day efficiency of the transformer. Assume unity power factor.



Electrical Engineering ELECTRICAL MACHINES – I Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM **Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. 2) Figures to the right indicate full marks. **MCQ/Objective Type Questions Duration: 30 Minutes** Choose the correct alternatives from the options and rewrite the sentence. The armature of D.C. generator is laminated to reduce the bulk b) provide the bulk a) d) reduce eddy current loss C) insulate the core In a step-down transformer, there is a change of 15 A in the load current. This results in change of supply current of _ less than 15 A a) b) more than 15 A c) 15 A

- The efficiencies of transformers compared with that of electric motors of 3) the same power are
- about the same
 - a) c) much higher

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No.

Q.1

1)

2)

- 4) The noise produced by a transformer is termed as _
 - b) hum a) zoom
 - d) buzz C) ringing
- Which of the following protection is normally not provided on small 5) distribution transformers?
 - Overfluxing protection a) c) Overcurrent protection
- 6) A good voltage regulation of a transformer means _____.
 - output voltage fluctuation from no load to full load is least a)
 - output voltage fluctuation with power factor is least b)
 - difference between primary and secondary voltage is least C)
 - difference between primary and secondary voltage is maximum d)
- 7) Losses which occur in rotating electric machines and do not occur in transformers are
 - friction and windage losses a)
 - b) magnetic losses
 - hysteresis and eddy current losses c)
 - copper losses d)
- No-load speed of which of the following motor will be highest? 8)
 - Shunt motor a) Cumulative compound motor c)
- b) Series motor
- d) Differentiate compound motor

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S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019

Max. Marks: 70

Marks: 14

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Q

- d) none of the above
- b) much smaller
- d) somewhat smaller

b) Buchholz relay

d) All of the above

- 9) Starters are used with D.C. motors because _____.
 - a) these motors have high starting torque
 - b) these motors are not self-starting
 - c) backe.m.f. of these motors is zero initially
 - d) to restrict armature current as there is no back e.m.f. while starting
- 10) In case of D.C. shunt motors the speed is dependent on back e.m.f. only because _____.
 - a) back e.m.f. is equal to armature drop
 - b) armature drop is negligible
 - c) flux is proportional to armature current
 - d) flux is practically constant in D.C. shunt motors
- 11) In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be _____.
 - a) almost negligible
- b) rated full-load current

Set Q

- c) less than full-load current d) more than full-load current
- 12) The insulating material used between the commutator segments is normally .
 - a) graphite

b) paper

c) mica

- d) insulating varnish
- 13) Compensating windings are used in D.C. generators _____.
 - a) mainly to reduce the eddy currents by providing local short-circuits
 - b) to provide path for the circulation of cooling air
 - c) to neutralise the cross-magnetising effect of the armature reaction
 - d) none of the above
- 14) In D.C. generators the polarity of the interpoles _____.
 - a) is the same as that of the main pole ahead
 - b) is the same as that of the immediately preceding pole
 - c) is opposite to that of the main pole ahead
 - d) is neutral as these poles do not play part in generating e.m.f.

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S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Solve any Four.

Seat

No.

- a) With neat sketch explain the construction of DC machine.
- b) A 4- pole lap wound DC shunt generator has a useful flux / pole of 0.07 wb. The armature winding consists of 220 turns each of 0.004Ω resistance. Calculate the terminal voltage when running at 900 rpm. If the armature current is 50 Amp.
- c) An armature of 6-pole machine 75cm in diameter has 664 conductors each having an effective length of 30cm and carrying a current of 100A. if 70% of total conductors lie simultaneously in the field of average flux density 0.85wb/m2, calculate
 - 1) armature torque
 - 2) horse power output at 250 rpm
- d) With neat circuit diagram explain Swinburne's test and how efficiency of generator and motor are computed with this test. Write the advantages of this test.
- e) A long shunt compound generator delivers a load current of 50 A at 500 V and has armature, series, and shunt field resistance of 0.05Ω, 0.03Ω and 250Ω respectively. Calculate the armature current and generated e.m.f. Allow 1 V/brush for contact drop.
- f) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.

Q.3 Solve any Two.

- a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?
- b) A 220V shunt motor takes a total current of 80A and runs at 800 rpm. Shunt field resistance and armature resistance are 50Ω and 0.1Ω respectively. If iron and friction losses amount to 1600W, find
 - 1) copper losses
 - 2) armature torque
 - 3) shaft torque
 - 4) efficiency
- c) With the help of neat sketch explain the speed control methods of D.C. shunt motor.

Max. Marks: 56

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Page **8** of **16**

Q.4 Solve any Four.

- a) With neat sketch explain open circuit and short circuit test of transformer. How equivalent circuit parameters and efficiency of a transformer are computed?
- **b)** The input current to a 3- phase step down transformer connected to an 11kV supply system is 14A. calculate the secondary line voltage and current for
 - 1) star-star
 - 2) delta-star if the phase turn ratio is 44
- c) Derive the expression for saving of copper in autotransformer.
- d) Explain with phasor diagram a practical transformer on load condition.
- e) A 230/2300V transformer takes a no load current of 6.5 A and absorbs 187W. if the resistance of the primary is 0.6 Ω . Find.
 - 1) the core loss
 - 2) no load power factor
 - 3) active component of current
 - 4) magnetizing current
- f) In a 50k VA transformer, the iron loss is 500W and full load copper loss is 800W. find the efficiency at full load and half full load at 08 power factor lagging.

Q.5 Solve any Two.

- a) Efficiency of 400kVA, 1- phase transformer is 98.77% when delivering full load of 0.8 power factor and it is 99.13% at half load unity power factor. Calculate
 - 1) iron loss
 - 2) full load copper loss
- **b)** With the help of neat diagram explain open delta connection of three phase transformer.
- c) A 5 kVA distribution transformer has a full load efficiency of 95% at which copper loss is equal to iron loss. Transformer is loaded for 24 hrs as under:- no load for 10 hrs, one forth full load for 7 hrs, half full load for 5 hrs and full load for 2 hrs. Calculate the all-day efficiency of the transformer. Assume unity power factor.



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Seat No.

> S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINES – I**

Day & Date: Tuesday, 10-12-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - 1) The insulating material used between the commutator segments is normally
 - graphite a) mica

- paper b)
- d) insulating varnish
- Compensating windings are used in D.C. generators 2)
 - mainly to reduce the eddy currents by providing local short-circuits a)
 - to provide path for the circulation of cooling air b)
 - to neutralise the cross-magnetising effect of the armature reaction c)
 - d) none of the above
- In D.C. generators the polarity of the interpoles 3)
 - is the same as that of the main pole ahead a)
 - is the same as that of the immediately preceding pole b)
 - is opposite to that of the main pole ahead c)
 - is neutral as these poles do not play part in generating e.m.f. d)
- The armature of D.C. generator is laminated to 4)
 - reduce the bulk a) C)
- b) provide the bulk
- insulate the core d) reduce eddy current loss
- In a step-down transformer, there is a change of 15 A in the load current. 5) This results in change of supply current of _____.
 - a) less than 15 A b) more than 15 A
 - 15 A d) none of the above C)
- The efficiencies of transformers compared with that of electric motors of 6) the same power are . b) much smaller
 - about the same a)
 - much higher d) somewhat smaller C)
- The noise produced by a transformer is termed as _____ 7)
 - a) zoom b) hum
 - d) buzz C) ringing
- Which of the following protection is normally not provided on small 8) distribution transformers?
 - Overfluxing protection a)
- b) Buchholz relay
- Overcurrent protection d) All of the above c)

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Max. Marks: 70

Marks: 14

- 9) A good voltage regulation of a transformer means _____.
 - a) output voltage fluctuation from no load to full load is least
 - b) output voltage fluctuation with power factor is least
 - c) difference between primary and secondary voltage is least
 - d) difference between primary and secondary voltage is maximum
- 10) Losses which occur in rotating electric machines and do not occur in transformers are _____,
 - a) friction and windage losses
 - b) magnetic losses
 - c) hysteresis and eddy current losses
 - d) copper losses

a)

- 11) No-load speed of which of the following motor will be highest?
 - Shunt motor b) Series motor
 - c) Cumulative compound motor d) Differentiate compound motor
- 12) Starters are used with D.C. motors because _____.
 - a) these motors have high starting torque
 - b) these motors are not self-starting
 - c) backe.m.f. of these motors is zero initially
 - d) to restrict armature current as there is no back e.m.f. while starting
- 13) In case of D.C. shunt motors the speed is dependent on back e.m.f. only because _____.
 - a) back e.m.f. is equal to armature drop
 - b) armature drop is negligible
 - c) flux is proportional to armature current
 - d) flux is practically constant in D.C. shunt motors
- 14) In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be _____.
 - a) almost negligible
- b) rated full-load current
- c) less than full-load current
- b) rated full-load current
- d) more than full-load current

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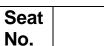
12

R

Max. Marks: 56

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S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Solve any Four.

- a) With neat sketch explain the construction of DC machine.
- b) A 4- pole lap wound DC shunt generator has a useful flux / pole of 0.07 wb. The armature winding consists of 220 turns each of 0.004Ω resistance. Calculate the terminal voltage when running at 900 rpm. If the armature current is 50 Amp.
- c) An armature of 6-pole machine 75cm in diameter has 664 conductors each having an effective length of 30cm and carrying a current of 100A. if 70% of total conductors lie simultaneously in the field of average flux density 0.85wb/m2, calculate
 - 1) armature torque
 - 2) horse power output at 250 rpm
- d) With neat circuit diagram explain Swinburne's test and how efficiency of generator and motor are computed with this test. Write the advantages of this test.
- e) A long shunt compound generator delivers a load current of 50 A at 500 V and has armature, series, and shunt field resistance of 0.05Ω , 0.03Ω and 250Ω respectively. Calculate the armature current and generated e.m.f. Allow 1 V/brush for contact drop.
- f) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.

Q.3 Solve any Two.

- a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?
- **b)** A 220V shunt motor takes a total current of 80A and runs at 800 rpm. Shunt field resistance and armature resistance are 50Ω and 0.1Ω respectively. If iron and friction losses amount to 1600W, find
 - 1) copper losses
 - 2) armature torque
 - 3) shaft torque
 - 4) efficiency
- c) With the help of neat sketch explain the speed control methods of D.C. shunt motor.

Page **12** of **16**

Q.4 Solve any Four.

- a) With neat sketch explain open circuit and short circuit test of transformer. How equivalent circuit parameters and efficiency of a transformer are computed?
- **b)** The input current to a 3- phase step down transformer connected to an 11kV supply system is 14A. calculate the secondary line voltage and current for
 - 1) star-star
 - 2) delta-star if the phase turn ratio is 44
- c) Derive the expression for saving of copper in autotransformer.
- d) Explain with phasor diagram a practical transformer on load condition.
- e) A 230/2300V transformer takes a no load current of 6.5 A and absorbs 187W. if the resistance of the primary is 0.6 Ω . Find.
 - 1) the core loss
 - 2) no load power factor
 - 3) active component of current
 - 4) magnetizing current
- f) In a 50k VA transformer, the iron loss is 500W and full load copper loss is 800W. find the efficiency at full load and half full load at 08 power factor lagging.

Q.5 Solve any Two.

- a) Efficiency of 400kVA, 1- phase transformer is 98.77% when delivering full load of 0.8 power factor and it is 99.13% at half load unity power factor. Calculate
 - 1) iron loss
 - 2) full load copper loss
- **b)** With the help of neat diagram explain open delta connection of three phase transformer.
- c) A 5 kVA distribution transformer has a full load efficiency of 95% at which copper loss is equal to iron loss. Transformer is loaded for 24 hrs as under:- no load for 10 hrs, one forth full load for 7 hrs, half full load for 5 hrs and full load for 2 hrs. Calculate the all-day efficiency of the transformer. Assume unity power factor.



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Seat No.

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The efficiencies of transformers compared with that of electric motors of the same power are _____.
 - a) about the same
 - c) much higher

- b) much smaller
- d) somewhat smaller
- 2) The noise produced by a transformer is termed as _____
 - a) zoom b) hum
 - c) ringing d) buzz
- 3) Which of the following protection is normally not provided on small distribution transformers?
 - a) Overfluxing protection
- b) Buchholz relayd) All of the above
- c) Overcurrent protection
- 4) A good voltage regulation of a transformer means _____
 - a) output voltage fluctuation from no load to full load is least
 - b) output voltage fluctuation with power factor is least
 - c) difference between primary and secondary voltage is least
 - d) difference between primary and secondary voltage is maximum
- 5) Losses which occur in rotating electric machines and do not occur in transformers are _____,
 - a) friction and windage losses
 - b) magnetic losses
 - c) hysteresis and eddy current losses
 - d) copper losses
- 6) No-load speed of which of the following motor will be highest?
 - a) Shunt motor b) Series motor
 - c) Cumulative compound motor d) Differentiate compound motor
- 7) Starters are used with D.C. motors because _____.
 - a) these motors have high starting torque
 - b) these motors are not self-starting
 - c) backe.m.f. of these motors is zero initially
 - d) to restrict armature current as there is no back e.m.f. while starting



Max. Marks: 70

Marks: 14

- 8) In case of D.C. shunt motors the speed is dependent on back e.m.f. only because
 - back e.m.f. is equal to armature drop a)
 - armature drop is negligible b)
 - flux is proportional to armature current c)
 - flux is practically constant in D.C. shunt motors d)
- 9) In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be ____
 - b) rated full-load current almost negligible a)
 - c) less than full-load current d) more than full-load current
- 10) The insulating material used between the commutator segments is normally
 - graphite a)

b) paper **SLR-FM-402**

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- d) insulating varnish c) mica
- 11) Compensating windings are used in D.C. generators
 - mainly to reduce the eddy currents by providing local short-circuits a)
 - to provide path for the circulation of cooling air b)
 - C) to neutralise the cross-magnetising effect of the armature reaction
 - d) none of the above
- In D.C. generators the polarity of the interpoles 12)
 - is the same as that of the main pole ahead a)
 - is the same as that of the immediately preceding pole b)
 - is opposite to that of the main pole ahead c)
 - is neutral as these poles do not play part in generating e.m.f. d)
- The armature of D.C. generator is laminated to _ 13)
 - reduce the bulk a)

- b) provide the bulk
- C) insulate the core
- d) reduce eddy current loss
- In a step-down transformer, there is a change of 15 A in the load current. 14) This results in change of supply current of _
 - less than 15 A a)

b) more than 15 A

C) 15 A d) none of the above

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Seat No.

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Solve any Four.

- a) With neat sketch explain the construction of DC machine.
- b) A 4- pole lap wound DC shunt generator has a useful flux / pole of 0.07 wb. The armature winding consists of 220 turns each of 0.004Ω resistance. Calculate the terminal voltage when running at 900 rpm. If the armature current is 50 Amp.
- c) An armature of 6-pole machine 75cm in diameter has 664 conductors each having an effective length of 30cm and carrying a current of 100A. if 70% of total conductors lie simultaneously in the field of average flux density 0.85wb/m2, calculate
 - 1) armature torque
 - 2) horse power output at 250 rpm
- d) With neat circuit diagram explain Swinburne's test and how efficiency of generator and motor are computed with this test. Write the advantages of this test.
- e) A long shunt compound generator delivers a load current of 50 A at 500 V and has armature, series, and shunt field resistance of 0.05Ω , 0.03Ω and 250Ω respectively. Calculate the armature current and generated e.m.f. Allow 1 V/brush for contact drop.
- f) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.

Q.3 Solve any Two.

- a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?
- b) A 220V shunt motor takes a total current of 80A and runs at 800 rpm. Shunt field resistance and armature resistance are 50Ω and 0.1Ω respectively. If iron and friction losses amount to 1600W, find
 - 1) copper losses
 - 2) armature torque
 - 3) shaft torque
 - 4) efficiency
- c) With the help of neat sketch explain the speed control methods of D.C. shunt motor.

Max. Marks: 56

Set

Q.4 Solve any Four.

- a) With neat sketch explain open circuit and short circuit test of transformer. How equivalent circuit parameters and efficiency of a transformer are computed?
- **b)** The input current to a 3- phase step down transformer connected to an 11kV supply system is 14A. calculate the secondary line voltage and current for
 - 1) star-star
 - 2) delta-star if the phase turn ratio is 44
- c) Derive the expression for saving of copper in autotransformer.
- d) Explain with phasor diagram a practical transformer on load condition.
- e) A 230/2300V transformer takes a no load current of 6.5 A and absorbs 187W. if the resistance of the primary is 0.6 Ω . Find.
 - 1) the core loss
 - 2) no load power factor
 - 3) active component of current
 - 4) magnetizing current
- f) In a 50k VA transformer, the iron loss is 500W and full load copper loss is 800W. find the efficiency at full load and half full load at 08 power factor lagging.

Q.5 Solve any Two.

- a) Efficiency of 400kVA, 1- phase transformer is 98.77% when delivering full load of 0.8 power factor and it is 99.13% at half load unity power factor. Calculate
 - 1) iron loss
 - 2) full load copper loss
- **b)** With the help of neat diagram explain open delta connection of three phase transformer.
- c) A 5 kVA distribution transformer has a full load efficiency of 95% at which copper loss is equal to iron loss. Transformer is loaded for 24 hrs as under:- no load for 10 hrs, one forth full load for 7 hrs, half full load for 5 hrs and full load for 2 hrs. Calculate the all-day efficiency of the transformer. Assume unity power factor.



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Set

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 - 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Which of the following instruments indicate the instantaneous value of the electrical quantity being measured at the time at which it is being measured?
 - a) Absolute instruments

Recording instruments

- b) Indicating instrumentsd) Integrating instruments
- In a 3-phase power measurement by two wattmeter method the reading of one of the wattmeter was zero. The power factor of the load must be _____.
 - a) Unity b) 0.5
 - c) 0.3 d) Zero
- 3) The two pressure coil of a single phase power factor meter have _____.
 - a) The same dimensions and the same number of turns
 - b) The same dimension but different number of turns
 - c) The same number of turns but different dimensions
 - d) None of the above
- 4) Systematic errors are _____.
 - a) Instrumental errorsc) Observational errors
- b) Environmental errorsd) All of the above
- 5) Megger is used for the measurement of _____.
 - a) Low valued resistances
 - b) Medium valued resistances
 - c) High valued resistances, particularly insulation resistance
 - d) All of the above
- 6) Which of the following are integrating instruments?
 - a) Ammeters
 - b) Voltmeters
 - c) Wattcmeters
 - d) Ampere-hour and watt-hour meter
- 7) The advantage of hay's bridge over Maxwell's inductance-capacitance bridge is because _____.
 - a) Its equation for balance do not contain any frequency term
 - b) It can be used for the measurement of inductance of high Q coils
 - c) It can be used for the measurement of inductance of low Q coils
 - d) None of the above

Seat No.

Max. Marks: 70

Marks: 14

Set P

Set 8) Time division multiplexing is used when _____. a) Data to be transmitted is slow changing b) Data to be transmitted has small band-width Data to be transmitted is slow changing and low band-width c) d) None of the above 9) For handling greater currents induction wattmeter's are used in conjunction with _____. a) Potential transformers b) Current transformers c) Power transformers Either of the above d) 10) Digital instruments have the input impedance of the order of: kΩ a) Ω b) c) M Ω d) mΩ 11) An acqadag is used in a CRO to collect _____. a) Primary electrons b) Secondary emission electrons c) Both Primary electrons and secondary emission electrons d) None of the above Moving iron and PMMC instruments can be distinguished from each other 12) by looking at: _____. a) Pointer b) Terminal size c) Scaled d) Scale range 13) An oscilloscope cannot be used to indicate ____ a) Frequency Peak signal voltage b) c) Energy d) Wave shape The vertical amplifier should be designed for _____. 14)

- a) Only a high gain
- b) Only a broad bandwidth
- c) A constant gain times bandwidth product
- d) All of the above

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Set

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S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section - I

Q.2 Solve any four.

- a) Write classification of measuring instruments.
- **b)** Define standard & explain types of standard.
- c) With neat sketch explain construction & working of attraction type MI instrument.
- d) Explain basic dc potentiometer with neat diagram.
- e) Explain measurement of insulation resistance with help of megger.

Q.3 Solve any two.

- a) Write neat sketch explain 1 Φ electrodynamometer power factor meter.
- **b)** Explain Kelvin's double bridge for measurement of low resistance.
- c) A bridge consist of the following
 - Arm ab :- A choke coil having resistance R₁ & inductance L₁

Arm bc :- A non-inductive resistance R₃

Arm cd :- A mica condenser C_4 in series with non-inductive resistance R4 Arm da :- A non-inductive resistance R2

When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

 R_2 = 2410 Ω, R_3 =750 Ω, C_4 = 0.35 μF, R4= 64.5 Ω

The series resistance of capacitor is 0.4 Ω . Calculate resistance and inductance of choke coil.

The supply is connected between a & c and detector is between b & d.

Q.4 Solve any four.

- a) Explain construction & working of strip chart recorder.
- b) Explain digital multimeter with block diagram. Also state its applications.
- c) Explain Single channel DAS with neat diagram.
- d) Explain following measurement with CRO
 - 1) Period
 - 2) current
- e) With the help of block diagram explain integrating type DVM.

Section - II

Q.5 Solve any two.

- a) Draw typical equivalent circuit & phasor diagram of a C.T & Derive equation for actual transformation ratio.
- b) Describe digital measurement of time with block diagram.
- c) A current transformer with bar primary has 300 turns in its secondary winding. The resistance & reactance of circuit are $1.5\Omega \& 1\Omega$ resp. including transformer winding with 5A flowing in secondary winding. The magnetizing mmf is 100AT and iron loss is 1.2W. Determine the ratio & phase angle error.

12

16



Max. Marks: 56

12

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

1)

7)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Time division multiplexing is used when
 - Data to be transmitted is slow changing a)
 - Data to be transmitted has small band-width b)
 - Data to be transmitted is slow changing and low band-width c)
 - d) None of the above

c) Power transformers

- 2) For handling greater currents induction wattmeter's are used in conjunction with .
 - a) Potential transformers b)
 - Current transformers Either of the above d)
- 3) Digital instruments have the input impedance of the order of: _____.
 - kΩ a) Ω b)
 - c) MΩ d) mΩ
- 4) An acqadag is used in a CRO to collect .
 - a) Primary electrons
 - b) Secondary emission electrons
 - Both Primary electrons and secondary emission electrons c)
 - d) None of the above
- 5) Moving iron and PMMC instruments can be distinguished from each other by looking at: _____.
 - Pointer a) b) Terminal size
 - Scaled Scale range c) d)

6) An oscilloscope cannot be used to indicate

- a) Frequency b) c) Energy d) Wave shape
- The vertical amplifier should be designed for _____.
 - a) Only a high gain
 - b) Only a broad bandwidth
 - c) A constant gain times bandwidth product
 - d) All of the above

Max. Marks: 70

Marks: 14

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Set

Peak signal voltage

- 8) Which of the following instruments indicate the instantaneous value of the electrical quantity being measured at the time at which it is being measured?
 - a) Absolute instruments
 - c) Recording instruments
- b) Indicating instruments Integrating instruments d)
- 9) In a 3-phase power measurement by two wattmeter method the reading of one of the wattmeter was zero. The power factor of the load must be .

0.5

- a) Unity b)
- c) 0.3 d) Zero
- 10) The two pressure coil of a single phase power factor meter have _____.
 - a) The same dimensions and the same number of turns
 - b) The same dimension but different number of turns
 - c) The same number of turns but different dimensions
 - d) None of the above
- 11) Systematic errors are _____.
 - a) Instrumental errors
- b) **Environmental errors**
- c) Observational errors All of the above d)
- 12) Megger is used for the measurement of _____.
 - a) Low valued resistances
 - b) Medium valued resistances
 - High valued resistances, particularly insulation resistance C)
 - d) All of the above
- 13) Which of the following are integrating instruments?
 - Ammeters a)
 - b) Voltmeters
 - c) Wattcmeters
 - d) Ampere-hour and watt-hour meter
- 14) The advantage of hay's bridge over Maxwell's inductance-capacitance bridge is because
 - a) Its equation for balance do not contain any frequency term
 - b) It can be used for the measurement of inductance of high Q coils
 - It can be used for the measurement of inductance of low Q coils c)
 - d) None of the above



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Seat No.

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section - I

Q.2 Solve any four.

- a) Write classification of measuring instruments.
- **b)** Define standard & explain types of standard.
- c) With neat sketch explain construction & working of attraction type MI instrument.
- d) Explain basic dc potentiometer with neat diagram.
- e) Explain measurement of insulation resistance with help of megger.

Q.3 Solve any two.

- a) Write neat sketch explain 1 Φ electrodynamometer power factor meter.
- **b)** Explain Kelvin's double bridge for measurement of low resistance.
- c) A bridge consist of the following
 - Arm ab :- A choke coil having resistance R1 & inductance L1

Arm bc :- A non-inductive resistance R₃

Arm cd :- A mica condenser C_4 in series with non-inductive resistance R4 Arm da :- A non-inductive resistance R2

When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

 R_2 = 2410 Ω, R_3 =750 Ω, C_4 = 0.35 μF, R4= 64.5 Ω

The series resistance of capacitor is 0.4 Ω . Calculate resistance and inductance of choke coil.

The supply is connected between a & c and detector is between b & d.

Q.4 Solve any four.

- a) Explain construction & working of strip chart recorder.
- b) Explain digital multimeter with block diagram. Also state its applications.
- c) Explain Single channel DAS with neat diagram.
- d) Explain following measurement with CRO
 - 1) Period
 - 2) current
- e) With the help of block diagram explain integrating type DVM.

Section - II

Q.5 Solve any two.

- a) Draw typical equivalent circuit & phasor diagram of a C.T & Derive equation for actual transformation ratio.
- b) Describe digital measurement of time with block diagram.
- c) A current transformer with bar primary has 300 turns in its secondary winding. The resistance & reactance of circuit are $1.5\Omega \& 1\Omega$ resp. including transformer winding with 5A flowing in secondary winding. The magnetizing mmf is 100AT and iron loss is 1.2W. Determine the ratio & phase angle error.

12

16



Max. Marks: 56

12

Set

Max. Marks: 70

Seat	
No.	

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Megger is used for the measurement of _____.
 - a) Low valued resistances
 - b) Medium valued resistances
 - c) High valued resistances, particularly insulation resistance
 - d) All of the above
- 2) Which of the following are integrating instruments?
 - a) Ammeters
 - b) Voltmeters
 - c) Wattcmeters
 - d) Ampere-hour and watt-hour meter
- 3) The advantage of hay's bridge over Maxwell's inductance-capacitance bridge is because _____.
 - a) Its equation for balance do not contain any frequency term
 - b) It can be used for the measurement of inductance of high Q coils
 - c) It can be used for the measurement of inductance of low Q coils
 - d) None of the above
- 4) Time division multiplexing is used when _____
 - a) Data to be transmitted is slow changing
 - b) Data to be transmitted has small band-width
 - c) Data to be transmitted is slow changing and low band-width
 - d) None of the above
- 5) For handling greater currents induction wattmeter's are used in conjunction with _____.
 - a) Potential transformers b)
 - b) Current transformers
 - c) Power transformers d) Either of the above
- 6) Digital instruments have the input impedance of the order of: _____.
 - a) Ω b) k Ω
 - c) M Ω d) m Ω

- 7) An acqadag is used in a CRO to collect _____.
 - a) Primary electrons
 - b) Secondary emission electrons
 - c) Both Primary electrons and secondary emission electrons
 - d) None of the above
- Moving iron and PMMC instruments can be distinguished from each other by looking at: _____.
 - a) Pointer

a) Frequency

c)

- b) Terminal size
- Scaled d) Scale range
- 9) An oscilloscope cannot be used to indicate _
 - b) Peak signal voltage

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Set

- c) Energy d) Wave shape
- 10) The vertical amplifier should be designed for _____.
 - a) Only a high gain
 - b) Only a broad bandwidth
 - c) A constant gain times bandwidth product
 - d) All of the above
- 11) Which of the following instruments indicate the instantaneous value of the electrical quantity being measured at the time at which it is being measured?
 - a) Absolute instruments
- b) Indicating instrumentsd) Integrating instruments
- c) Recording instruments d)
- 12) In a 3-phase power measurement by two wattmeter method the reading of one of the wattmeter was zero. The power factor of the load must be _____.
 - a) Unity b) 0.5
 - c) 0.3 d) Zero
- 13) The two pressure coil of a single phase power factor meter have _____.
 - a) The same dimensions and the same number of turns
 - b) The same dimension but different number of turns
 - c) The same number of turns but different dimensions
 - d) None of the above

14) Systematic errors are _____.

- a) Instrumental errors
- c) Observational errors
- b) Environmental errors
- d) All of the above

Seat	
No	

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

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Section - I

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- **b)** Define standard & explain types of standard.
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- e) Explain measurement of insulation resistance with help of megger.

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- c) A bridge consist of the following
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When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

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The series resistance of capacitor is 0.4 Ω . Calculate resistance and inductance of choke coil.

The supply is connected between a & c and detector is between b & d.

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- c) Explain Single channel DAS with neat diagram.
- d) Explain following measurement with CRO
 - 1) Period
 - 2) current
- e) With the help of block diagram explain integrating type DVM.

Section - II

Q.5 Solve any two.

- a) Draw typical equivalent circuit & phasor diagram of a C.T & Derive equation for actual transformation ratio.
- b) Describe digital measurement of time with block diagram.
- c) A current transformer with bar primary has 300 turns in its secondary winding. The resistance & reactance of circuit are $1.5\Omega \& 1\Omega$ resp. including transformer winding with 5A flowing in secondary winding. The magnetizing mmf is 100AT and iron loss is 1.2W. Determine the ratio & phase angle error.

Max. Marks: 56

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16

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Set

Max. Marks: 70

Seat	
No.	

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Digital instruments have the input impedance of the order of: _____.
 - a) Ω b) k Ω
 - c) M Ω d) m Ω
- An acqadag is used in a CRO to collect _____.
 - a) Primary electrons
 - b) Secondary emission electrons
 - c) Both Primary electrons and secondary emission electrons
 - d) None of the above
- 3) Moving iron and PMMC instruments can be distinguished from each other by looking at: _____.
 - a) Pointer b) Terminal size
 - c) Scaled d) Scale range
- An oscilloscope cannot be used to indicate _____
 a) Frequency b) Peak
 - b) Peak signal voltage
 - c) Energy d) Wave shape
- 5) The vertical amplifier should be designed for _____.
 - a) Only a high gain
 - b) Only a broad bandwidth
 - c) A constant gain times bandwidth product
 - d) All of the above
- 6) Which of the following instruments indicate the instantaneous value of the electrical quantity being measured at the time at which it is being measured?
 - a) Absolute instruments b) Indicatin
 - c) Recording instruments
- Indicating instruments
 Integrating instruments
- ng instruments d)
- 7) In a 3-phase power measurement by two wattmeter method the reading of one of the wattmeter was zero. The power factor of the load must be _____.
 - a) Unity b) 0.5
 - c) 0.3 d) Zero

- 8) The two pressure coil of a single phase power factor meter have _____.
 - a) The same dimensions and the same number of turns
 - b) The same dimension but different number of turns
 - c) The same number of turns but different dimensions
 - d) None of the above
- 9) Systematic errors are _____.a) Instrumental errors
- b) Environmental errors

Set S

- c) Observational errors d) All c
- d) All of the above
- 10) Megger is used for the measurement of _____.
 - a) Low valued resistances
 - b) Medium valued resistances
 - c) High valued resistances, particularly insulation resistance
 - d) All of the above
- 11) Which of the following are integrating instruments?
 - a) Ammeters
 - b) Voltmeters
 - c) Wattcmeters
 - d) Ampere-hour and watt-hour meter
- 12) The advantage of hay's bridge over Maxwell's inductance-capacitance bridge is because _____.
 - a) Its equation for balance do not contain any frequency term
 - b) It can be used for the measurement of inductance of high Q coils
 - c) It can be used for the measurement of inductance of low Q coils
 - d) None of the above
- 13) Time division multiplexing is used when _____
 - a) Data to be transmitted is slow changing
 - b) Data to be transmitted has small band-width
 - c) Data to be transmitted is slow changing and low band-width
 - d) None of the above
- 14) For handling greater currents induction wattmeter's are used in conjunction with _____.
 - a) Potential transformers
- b) Current transformers
- c) Power transformers
- d) Either of the above

Seat No.

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section - I

Q.2 Solve any four.

- a) Write classification of measuring instruments.
- **b)** Define standard & explain types of standard.
- c) With neat sketch explain construction & working of attraction type MI instrument.
- d) Explain basic dc potentiometer with neat diagram.
- e) Explain measurement of insulation resistance with help of megger.

Q.3 Solve any two.

- a) Write neat sketch explain 1 Φ electrodynamometer power factor meter.
- **b)** Explain Kelvin's double bridge for measurement of low resistance.
- c) A bridge consist of the following
 - Arm ab :- A choke coil having resistance R₁ & inductance L₁

Arm bc :- A non-inductive resistance R₃

Arm cd :- A mica condenser C_4 in series with non-inductive resistance R4 Arm da :- A non-inductive resistance R2

When this bridge fed from a source of 500 Hz, balance is obtained under following conditions

 R_2 = 2410 Ω, R_3 =750 Ω, C_4 = 0.35 μF, R4= 64.5 Ω

The series resistance of capacitor is 0.4 Ω . Calculate resistance and inductance of choke coil.

The supply is connected between a & c and detector is between b & d.

Q.4 Solve any four.

- a) Explain construction & working of strip chart recorder.
- b) Explain digital multimeter with block diagram. Also state its applications.
- c) Explain Single channel DAS with neat diagram.
- d) Explain following measurement with CRO
 - 1) Period
 - 2) current
- e) With the help of block diagram explain integrating type DVM.

Section - II

Q.5 Solve any two.

- a) Draw typical equivalent circuit & phasor diagram of a C.T & Derive equation for actual transformation ratio.
- b) Describe digital measurement of time with block diagram.
- c) A current transformer with bar primary has 300 turns in its secondary winding. The resistance & reactance of circuit are $1.5\Omega \& 1\Omega$ resp. including transformer winding with 5A flowing in secondary winding. The magnetizing mmf is 100AT and iron loss is 1.2W. Determine the ratio & phase angle error.

12

16

16

Max. Marks: 56

SLR-FM-404 Set

Seat No.

1)

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER PLANT ENGINEERING Max. Marks: 70

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Q.1

- Choose the correct alternatives from the options and rewrite the sentence. The equipment installed in power plants to reduce air pollution due to
 - smoke is Induced draft fans a)
 - Electrostatic precipitators c)
 - **Re-heaters**
- 2) Which of the following enters the super heater of a boiler?
 - Cold water Hot water b) a) c) Wet steam
 - d) Super-heated steam

b)

d)

De-super heaters

For high head and minimum discharge, the hydraulic turbine used is . 3)

- a) Kaplan turbine Francis turbine b)
- c) Pelton wheel None of the above d)

4) Which auxiliary of gas turbine consumes most of the power?

- a) Compressor Combustion chamber b)
- c) Burner d) Fuel pump
- A Thermalpower plant works on _____ 5)
 - Carnot cycle b) Brayton cycle a) Rankine cycle Dual cycle c) d)

Diesel engines for power plants are usually 6)

- Horizontal Supercharged b) a)
- Air cooled c) Slow speed d)
- 7) A surge tank is provided near ____
 - a) Penstock b) Trash rack Turbine
 - c) Spillway d)
- Running cost of which plant is least? 8)
 - a) Hydroelectric plant b) Thermal power plant c) Nuclear power plant d) Gas turbine plant
- 9) Water is supplied to a boiler
 - at atmospheric pressure a)
 - at slightly more than atmospheric pressure b)
 - at 100 cm/ kg² c)
 - d) at more than the steam pressure on the boiler

Ρ

Marks: 14

10) The function of reflector in a nuclear reactor is to .

- Bounce back most of the neutrons that escape from the fuel core a)
- Reduce the speed of the neutrons b)
- Stop the chain reaction C)
- d) None of the above

11) In a steam turbine cycle, the lowest pressure occurs in _____.

- a) turbine inlet b) condenser super heater
- c) boiler d)
- A graphical representation of the discharge and time is known as: _____. 12)
 - a) Load curve

SLR-FM-404

Set

- Load-duration curve b)
- d) Hydrograph c) Monograph
- 13) In a steam power plant water is used for cooling purposes in _____.
 - boiler a)

c) condenser

- economizer b)
- super-heaters d)
- Dam: Hydro plant:: _____. 14)
 - a) Chimney : Gases
 - c) Gas turbine : Steam turbine
- b) Coal : Steam plant
- d) Reactor : Nuclear plant

Seat No.

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER PLANT ENGINEERING

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section 2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four

- a) Draw typical layout of thermal power plant.
- b) Explain radioactive decay and half-life of radioactive material.
- c) Explain hydrograph & flow duration curve.
- **d)** Discuss the harmful effect of emission and steps taken for their impact in thermal power plant.
- e) Write short note on current power generation scenario in India.
- f) State advantages and disadvantages of nuclear power plant.

Q.3 Solve any two

- a) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
- **b)** Write short note on
 - 1) Coal handling plant
 - 2) boiler
 - 3) turbine
- c) Draw and explain neat labeled diagram of BWR and PWR in nuclear power plant.

Section – II

Q.4 Solve any four

- a) Explain in brief any three types of tariff.
- b) What are the advantages and disadvantages of wind power plant?
- c) The thermal power plant of 210MW capacity has maximum demand of 160MW. Its annual load factor is 0.6. The coal consumption is 1kg/kWh of energy generated and cost of coal is Rs.450/tonne. Calculate annual Revenue earned if energy is sold at Rs. 1/kWh. Also find capacity factor.
- d) Write short note on Cost of electricity generation.
- e) Define the following.

Diversity factor, Demand factor, Average load, connected load.

f) With brief layout explain open loop gas power plant.



SLR-FM-404

Set

12

16

Set P

12

Q.5 Solve any two

- a) With brief layout explain solar thermal power plant.
- A consumer takes steady load of 250K W at power factor of 0.8 lagging for 10 hours per day and 300 days per annum. Estimate the annual payment under each of the following tariffs
 - 1) Rs. 1.20/KWh + Rs. 1200/KVA/annum
 - 2) Rs. 1.20/KWh + Rs. 1200/KW/annum + Rs. 0.25/KVARh
- c) Draw typical layout of Diesel power plant & explain it briefly.

Set

Q

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	 _		 	

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER PLANT ENGINEERING

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Running cost of which plant is least?
 - a) Hydroelectric plant
 - c) Nuclear power plant
- b) Thermal power plant Gas turbine plant d)
- 2) Water is supplied to a boiler
 - at atmospheric pressure a)
 - at slightly more than atmospheric pressure b)
 - c) at 100 cm/ kg²
 - d) at more than the steam pressure on the boiler
- 3) The function of reflector in a nuclear reactor is to _____.
 - a) Bounce back most of the neutrons that escape from the fuel core
 - b) Reduce the speed of the neutrons
 - c) Stop the chain reaction
 - d) None of the above
- 4) In a steam turbine cycle, the lowest pressure occurs in _____.
 - a) turbine inlet b) condenser
 - c) boiler d) super heater
- 5) A graphical representation of the discharge and time is known as: _____.
 - a) Load curve b)
 - c) Monograph d)

6) In a steam power plant water is used for cooling purposes in _____.

- a) boiler
- c) condenser

- super-heaters d)
- 7) Dam: Hydro plant:: ____
 - a) Chimney : Gases
 - c) Gas turbine : Steam turbine
- 8) The equipment installed in power plants to reduce air pollution due to smoke is .

d)

- a) Induced draft fans b)
- c) Electrostatic precipitators d) **Re-heaters**
- Which of the following enters the super heater of a boiler? 9) b) Hot water
 - a) Cold water
 - c) Wet steam

- b) Coal : Steam plant
 - d) Reactor : Nuclear plant

Super-heated steam

- **De-super heaters**
- economizer b)
- Load-duration curve Hydrograph

Max. Marks: 70

Marks: 14

Set Q

SLR-FM-404

- a) Kaplan turbine Francis turbine b) c) Pelton wheel d) None of the above
- Which auxiliary of gas turbine consumes most of the power? 11)
 - a) Compressor b) Combustion chamber
 - c) Burner d) Fuel pump
- A Thermalpower plant works on _____. 12)

10)

- a) Carnot cycle Brayton cycle b)
- c) Dual cycle Rankine cycle d)
- Diesel engines for power plants are usually _ 13)
 - Supercharged b)

For high head and minimum discharge, the hydraulic turbine used is _____.

- c) Slow speed d) Air cooled
- A surge tank is provided near _____. 14)

a) Horizontal

- b) Trash rack a) Penstock c) Spillway
 - d) Turbine

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER PLANT ENGINEERING

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section 2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four

Seat

No.

- a) Draw typical layout of thermal power plant.
- b) Explain radioactive decay and half-life of radioactive material.
- c) Explain hydrograph & flow duration curve.
- **d)** Discuss the harmful effect of emission and steps taken for their impact in thermal power plant.
- e) Write short note on current power generation scenario in India.
- f) State advantages and disadvantages of nuclear power plant.

Q.3 Solve any two

- a) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
- **b)** Write short note on
 - 1) Coal handling plant
 - 2) boiler
 - 3) turbine
- c) Draw and explain neat labeled diagram of BWR and PWR in nuclear power plant.

Section – II

Q.4 Solve any four

- a) Explain in brief any three types of tariff.
- b) What are the advantages and disadvantages of wind power plant?
- c) The thermal power plant of 210MW capacity has maximum demand of 160MW. Its annual load factor is 0.6. The coal consumption is 1kg/kWh of energy generated and cost of coal is Rs.450/tonne. Calculate annual Revenue earned if energy is sold at Rs. 1/kWh. Also find capacity factor.
- d) Write short note on Cost of electricity generation.
- e) Define the following.

Diversity factor, Demand factor, Average load, connected load.

f) With brief layout explain open loop gas power plant.

SLR-FM-404

Max. Marks: 56

Q

12

16

Set Q

12

Q.5 Solve any two

- a) With brief layout explain solar thermal power plant.
- A consumer takes steady load of 250K W at power factor of 0.8 lagging for 10 hours per day and 300 days per annum. Estimate the annual payment under each of the following tariffs
 - 1) Rs. 1.20/KWh + Rs. 1200/KVA/annum
 - 2) Rs. 1.20/KWh + Rs. 1200/KW/annum + Rs. 0.25/KVARh
- c) Draw typical layout of Diesel power plant & explain it briefly.

	S	.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering	
		POWER PLANT ENGINEERING	
		e: Saturday,14-12-2019 Max. Marks: 70 0 AM To 01:00 PM	0
Insti	ructio	 ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. 2) Assume suitable data if necessary. 	
		MCQ/Objective Type Questions	
Dura	tion: 3	30 Minutes Marks: 1	4
Q.1	Cho 1)	ose the correct alternatives from the options and rewrite the sentence. 1 A Thermalpower plant works on	4
		a) Carnot cycleb) Brayton cyclec) Dual cycled) Rankine cycle	
	2)	Diesel engines for power plants are usually	
		a) Horizontal b) Supercharged	
	\sim	c) Slow speed d) Air cooled	
	3)	A surge tank is provided near a) Penstock b) Trash rack	
		c) Spillway d) Turbine	
	4)	Running cost of which plant is least?	
	,	a) Hydroelectric plant b) Thermal power plant	
		c) Nuclear power plant d) Gas turbine plant	
	5)	Water is supplied to a boiler	
		 at atmospheric pressure b) at slightly more than atmospheric pressure 	
		c) at 100 cm/ kg ²	
		d) at more than the steam pressure on the boiler	
	6)	The function of reflector in a nuclear reactor is to	
		a) Bounce back most of the neutrons that escape from the fuel coreb) Reduce the speed of the neutrons	
		c) Stop the chain reaction	
		d) None of the above	
	7)	In a steam turbine cycle, the lowest pressure occurs in	
		a) turbine inlet b) condenser c) boiler d) super heater	
	0)		
	8)	A graphical representation of the discharge and time is known as: a) Load curve b) Load-duration curve	
		c) Monograph d) Hydrograph	
	9)	In a steam power plant water is used for cooling purposes in	
	-	a) boiler b) economizer	
		c) condenser d) super-heaters	

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Set R

Seat No.

- 10) Dam: Hydro plant:: _____.
 - a) Chimney : Gases
 - c) Gas turbine : Steam turbine
- b) Coal : Steam plant
- Reactor : Nuclear plant d)

Set R

- The equipment installed in power plants to reduce air pollution due to 11) smoke is ___ .
 - Induced draft fans a)
 - Electrostatic precipitators C)
- b) **De-super heaters**
- d) **Re-heaters**
- Which of the following enters the super heater of a boiler? 12) a) Cold water
 - b) Hot water
 - c) Wet steam d) Super-heated steam
- For high head and minimum discharge, the hydraulic turbine used is _____. 13)
 - a) Kaplan turbine
 - b) Francis turbine
 - c) Pelton wheel None of the above d)
- Which auxiliary of gas turbine consumes most of the power? 14)
 - Combustion chamber b)

c) Burner

a) Compressor

d) Fuel pump

Seat No.

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER PLANT ENGINEERING

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section 2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four

- a) Draw typical layout of thermal power plant.
- b) Explain radioactive decay and half-life of radioactive material.
- c) Explain hydrograph & flow duration curve.
- **d)** Discuss the harmful effect of emission and steps taken for their impact in thermal power plant.
- e) Write short note on current power generation scenario in India.
- f) State advantages and disadvantages of nuclear power plant.

Q.3 Solve any two

- a) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
- **b)** Write short note on
 - 1) Coal handling plant
 - 2) boiler
 - 3) turbine
- c) Draw and explain neat labeled diagram of BWR and PWR in nuclear power plant.

Section – II

Q.4 Solve any four

- a) Explain in brief any three types of tariff.
- b) What are the advantages and disadvantages of wind power plant?
- c) The thermal power plant of 210MW capacity has maximum demand of 160MW. Its annual load factor is 0.6. The coal consumption is 1kg/kWh of energy generated and cost of coal is Rs.450/tonne. Calculate annual Revenue earned if energy is sold at Rs. 1/kWh. Also find capacity factor.
- d) Write short note on Cost of electricity generation.
- e) Define the following.

Diversity factor, Demand factor, Average load, connected load.

f) With brief layout explain open loop gas power plant.

Max. Marks: 56

12

16

16

Set R

SLR-FM-404

Set R

12

Q.5 Solve any two

- a) With brief layout explain solar thermal power plant.
- A consumer takes steady load of 250K W at power factor of 0.8 lagging for 10 hours per day and 300 days per annum. Estimate the annual payment under each of the following tariffs
 - 1) Rs. 1.20/KWh + Rs. 1200/KVA/annum
 - 2) Rs. 1.20/KWh + Rs. 1200/KW/annum + Rs. 0.25/KVARh
- c) Draw typical layout of Diesel power plant & explain it briefly.

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER PLANT ENGINEERING

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Duration: 30 Minutes

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Assume suitable data if necessary.

MCQ/Objective Type Questions

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The function of reflector in a nuclear reactor is to _ 1)
 - a) Bounce back most of the neutrons that escape from the fuel core
 - b) Reduce the speed of the neutrons
 - Stop the chain reaction c)
 - d) None of the above
- 2) In a steam turbine cycle, the lowest pressure occurs in _____.
 - a) turbine inlet
 - c) boiler d) super heater
- 3) A graphical representation of the discharge and time is known as:
 - a) Load curve Load-duration curve b)
 - c) Monograph Hydrograph d)
- 4) In a steam power plant water is used for cooling purposes in _____.
 - a) boiler

economizer b)

c) condenser

d) super-heaters

Coal : Steam plant

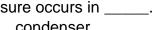
Reactor : Nuclear plant

- 5) Dam: Hydro plant:: _____.
 - a) Chimney : Gases
 - c) Gas turbine : Steam turbine
- The equipment installed in power plants to reduce air pollution due to 6) smoke is

b)

d)

- a) Induced draft fans b) **De-super heaters**
- Electrostatic precipitators d) **Re-heaters** c)
- 7) Which of the following enters the super heater of a boiler?
 - a) Cold water Hot water b)
 - c) Wet steam d) Super-heated steam
- For high head and minimum discharge, the hydraulic turbine used is . 8)
 - a) Kaplan turbine b) Francis turbine c) Pelton wheel
- Which auxiliary of gas turbine consumes most of the power? 9)
 - a) Compressor b)
 - c) Burner
- Combustion chamber
- Fuel pump d)
- d) None of the above



- b) condenser

Seat

No.

Max. Marks: 70

Set S

SLR-FM-404 Set S

- 10) A Thermalpower plant works on _____.
 - a) Carnot cycle b) Brayton cycle
 - c) Dual cycle d) Rankine cycle
- 11) Diesel engines for power plants are usually _
 - Supercharged a) Horizontal b)
 - c) Slow speed Air cooled d)
- A surge tank is provided near _____. 12)
 - b) a) Penstock Trash rack Turbine
 - c) Spillway d)
- 13) Running cost of which plant is least?
 - a) Hydroelectric plant
- Thermal power plant b) Gas turbine plant

.

- c) Nuclear power plant d)
- Water is supplied to a boiler _____. 14)
 - a) at atmospheric pressure
 - b) at slightly more than atmospheric pressure
 - c) at 100 cm/ kg^2
 - d) at more than the steam pressure on the boiler

Seat	
No.	

S.E. (Part – I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER PLANT ENGINEERING

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section 2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four

- a) Draw typical layout of thermal power plant.
- b) Explain radioactive decay and half-life of radioactive material.
- c) Explain hydrograph & flow duration curve.
- **d)** Discuss the harmful effect of emission and steps taken for their impact in thermal power plant.
- e) Write short note on current power generation scenario in India.
- f) State advantages and disadvantages of nuclear power plant.

Q.3 Solve any two

- a) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
- **b)** Write short note on
 - 1) Coal handling plant
 - 2) boiler
 - 3) turbine
- c) Draw and explain neat labeled diagram of BWR and PWR in nuclear power plant.

Section – II

Q.4 Solve any four

- a) Explain in brief any three types of tariff.
- b) What are the advantages and disadvantages of wind power plant?
- c) The thermal power plant of 210MW capacity has maximum demand of 160MW. Its annual load factor is 0.6. The coal consumption is 1kg/kWh of energy generated and cost of coal is Rs.450/tonne. Calculate annual Revenue earned if energy is sold at Rs. 1/kWh. Also find capacity factor.
- d) Write short note on Cost of electricity generation.
- **e)** Define the following.

Diversity factor, Demand factor, Average load, connected load.

f) With brief layout explain open loop gas power plant.



Max. Marks: 56



16

Set S

12

Q.5 Solve any two

- a) With brief layout explain solar thermal power plant.
- A consumer takes steady load of 250K W at power factor of 0.8 lagging for 10 hours per day and 300 days per annum. Estimate the annual payment under each of the following tariffs
 - 1) Rs. 1.20/KWh + Rs. 1200/KVA/annum
 - 2) Rs. 1.20/KWh + Rs. 1200/KW/annum + Rs. 0.25/KVARh
- c) Draw typical layout of Diesel power plant & explain it briefly.

Seat	
No.	

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book Page No.3

- 2) Assume suitable data if required.
- 3) Figures to the right indicate full mark.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- In a bipolar junction transistor the base region is made very thin so that 1)
 - a) electric field gradient in base is high
 - b) base can be easily fabricated
 - c) base can be easily biased
 - recombination in base region is minimum d)
- 2) The biasing circuit that gives best stability to Q point is _____.
 - voltage divider biasing a)
 - base resistance biasing b)
 - emitter resistor biasing C)
 - feedback resistor biasing d)
- 3) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
 - True False a) b)
- 4) The unit of h_{ie} parameter is _____.
 - b) Farad a) Mho
 - Ohm d) Unitless c)
- Which of the following statements is/are correct? 5) I- Enhancement type MOSFET is normally ON device II- Depeltion type MOSFET is normally OFF device III- JFET is normally OFF device.
 - a) Only II 11 & 11 b)
 - c) Only I d) None of these
- An FET is _____. 6) a) Bipolar transistor b) Unipolar transistor None of these
 - c) Tri-polar transistor d)
- The ideal value of input impedance of JFET is _ 7)
 - a) Zero

- Infinite b)
- c) Non zero d) None of these

Set

Max. Marks: 70

Marks: 14

SLR-FM-405 Set P

8 to 11: Match the correct pairs

Group A	Group B
8. Class AB Amplifier	a) Ri = 0 & Ro = 0
9. Class B Amplifier	b) Q at middle of DC loadline
10.Voltage Amplifier	c) $Ri = \infty \& Ro = \infty$
11.Transconductance Amplifier	d) Q at Cut off point
	e) Q in between middle of DC load line & cut
	off point
	f) Ri = ∞ & Ro = 0

- 12) In a full wave rectifier, the current in each diode flows for _____.
 - a) whole cycle of the input signal
 - b) half cycle of the input signal
 - c) more than half cycle of the input signal
 - d) none of these
- 13) The input impedance of voltage series feedback amplifier, with negative feedback _____.
 - a) Decreases

- b) Becomes zero
- c) Increases
- d) Is unchanged
- 14) An oscillator employs _____ feedback.
 - a) Positive
 - b) Negative
 - c) Neither positive nor negative
 - d) Data insufficient

Seat No.

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

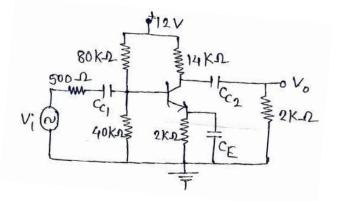
Q.2 Solve any four

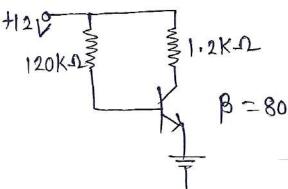
- a) Derive expression for current gain and input impedance for amplifier in terms of h-parameters.
- **b)** Calculate operating point voltage, current and stability factor for given fixed bias circuit.

- c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.
- d) Explain Darlington pair configuration with neat diagram.
- e) Define the following small signal parameters of JFET
 - 1) AC drain resistance
 - 2) Amplification factor
 - 3) DC drain resistance
 - 4) Transconductance

Q.3 Solve any Two

a) Determine the amplifier parameters current gain, voltage gain, input impedance and output impendence and output for the given CE amplifier, has h_{ie} =5 Kohm, h_{re} =3*10⁻⁴, h_{fe} =140 h_{oe} =8.8*10⁻⁵ A/V.





Max. Marks: 56

Set

16

- **b)** Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.
- c) Design a single stage RC coupled CE amplifier for a given requirement of Q(5V, 8mA), Voltage gain of 200, S=3, Rs= 50Ohm, h_{fe} =250, V_{BE} =0.6V, R_L=1Kohm, supply voltage V_{cc}=15V. Assume input signal frequency from 20Hz to 20KHz

Section - II

Q.4 Solve any four

- a) Explain the characteristics of UJT.
- **b)** Differentiate between positive & negative feedback amplifiers.
- c) Explain crossover distortion in power amplifier with suitable diagram.
- d) Derive the expression of ripple factor of L filter.
- e) In single stage voltage amplifier, voltage gain without feedback is 110, input resistance Ri=1.2 KΩ, output resistance Ro is 12 KΩ. Determine Voltage gain, input resistance & output resistance of the negative feedback amplifier if 25% output voltage is feedback in series with input?

Q.5 Solve any two.

- a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at $2K\Omega$ with ripple factor not exceeding 4%. Assume supply frequency of 50Hz & Use 2 diode FWR.
- **b)** Explain the effect of negative feedback on the gain, input resistance & output resistance of voltage series feedback amplifier.
- c) Define & determine overall efficiency and collector efficiency of RC coupled class A power amplifier with neat diagram.



16



	S.E. ((Part - I) (New/Old) (C Electric ELECTRONIC D	cal Engine	ering	c-2019
•		esday,17-12-2019 1 To 01:00 PM			Max. Marks: 70
Instructio	2) Q.No.1 is compulsory an Book Page No.3 2) Assume suitable data if 3) Figures to the right indic	required.		nutes in answer
		MCQ/Object	tive Type	Questions	
Duration:	30 Mi	nutes			Marks: 14
		he correct alternatives f	-	tions.	14
1)	ne a) c)	unit of <i>h_{ie}</i> parameter is _ Mho Ohm	 b) d)	Farad Unitless	
2)	I- El II- D III- 、 a)	ich of the following statem nhancement type MOSFE Depeltion type MOSFET is JFET is normally OFF dev Only II	T is normall normally O <i>v</i> ice. b)	y ON device FF device II & III	
	,	Only I	d)	None of these	
3)	An I a) c)	FET is Bipolar transistor Tri-polar transistor	b) d)	Unipolar transistor None of these	
4)	The a) c)	ideal value of input impe Zero Non zero	dance of JFl b) d)	ET is Infinite None of these	
5)	In a	bipolar junction transistor	r the base re	egion is made very thi	n so that
	a) b) c) d)	 electric field gradient in base can be easily fabri base can be easily biase recombination in base re	cated ed		
6)	The a) b) c) d)	biasing circuit that gives voltage divider biasing base resistance biasing emitter resistor biasing feedback resistor biasin		/ to Q point is	
7)		frequency response of B reases with decrease in fr True	•	in low frequency region False	on

Seat No.

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Set Q

8 to 11: Match the correct pairs

Group A	Group B
8. Class AB Amplifier	a) Ri = 0 & Ro = 0
9. Class B Amplifier	b) Q at middle of DC loadline
10.Voltage Amplifier	c) Ri = ∞ & Ro = ∞
11.Transconductance Amplifier	d) Q at Cut off point
	e) Q in between middle of DC load line & cut
	off point
	f) Ri = ∞ & Ro = 0

- 12) The input impedance of voltage series feedback amplifier, with negative feedback _____.
 - a) Decreases
- b) Becomes zerod) Is unchanged
- c) Increases d) Is
- 13) An oscillator employs _____ feedback.
 - a) Positive
 - b) Negative
 - c) Neither positive nor negative
 - d) Data insufficient
- 14) In a full wave rectifier, the current in each diode flows for _____.
 - a) whole cycle of the input signal
 - b) half cycle of the input signal
 - c) more than half cycle of the input signal
 - d) none of these

Seat No.

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

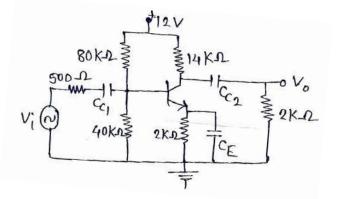
Q.2 Solve any four

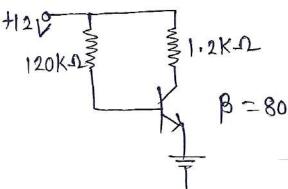
- a) Derive expression for current gain and input impedance for amplifier in terms of h-parameters.
- **b)** Calculate operating point voltage, current and stability factor for given fixed bias circuit.

- c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.
- d) Explain Darlington pair configuration with neat diagram.
- e) Define the following small signal parameters of JFET
 - 1) AC drain resistance
 - 2) Amplification factor
 - 3) DC drain resistance
 - 4) Transconductance

Q.3 Solve any Two

a) Determine the amplifier parameters current gain, voltage gain, input impedance and output impendence and output for the given CE amplifier, has h_{ie} =5 Kohm, h_{re} =3*10⁻⁴, h_{fe} =140 h_{oe} =8.8*10⁻⁵ A/V.





Max. Marks: 56

16

Set

- **SLR-FM-405**
 - Set
- b) Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.
- Design a single stage RC coupled CE amplifier for a given requirement of C) Q(5V, 8mA), Voltage gain of 200, S=3, Rs= 500hm, h_{fe} =250, V_{BE} =0.6V, R_1 =1Kohm, supply voltage V_{cc}=15V. Assume input signal frequency from 20Hz to 20KHz

Section - II

Q.4 Solve any four

- Explain the characteristics of UJT. a)
- Differentiate between positive & negative feedback amplifiers. b)
- Explain crossover distortion in power amplifier with suitable diagram. c)
- Derive the expression of ripple factor of L filter. d)
- In single stage voltage amplifier, voltage gain without feedback is 110, e) input resistance Ri=1.2 K Ω , output resistance Ro is 12 K Ω . Determine Voltage gain, input resistance & output resistance of the negative feedback amplifier if 25% output voltage is feedback in series with input?

Q.5 Solve any two.

- a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at 2K Ω with ripple factor not exceeding 4%. Assume supply frequency of 50Hz & Use 2 diode FWR.
- b) Explain the effect of negative feedback on the gain, input resistance & output resistance of voltage series feedback amplifier.
- Define & determine overall efficiency and collector efficiency of RC C) coupled class A power amplifier with neat diagram.



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Seat	
No.	

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minu	ites in answer
Book Page No.3	

- 2) Assume suitable data if required.
- Figures to the right indicate full mark.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- 1) An FET is
 - a) Bipolar transistor
 - b) Unipolar transistor c) Tri-polar transistor d) None of these
- The ideal value of input impedance of JFET is 2)
 - a) Zero b) Infinite
 - c) Non zero d) None of these
- In a bipolar junction transistor the base region is made very thin so that 3)
 - a) electric field gradient in base is high
 - base can be easily fabricated b)
 - base can be easily biased c)
 - recombination in base region is minimum d)
- The biasing circuit that gives best stability to Q point is _____. 4)
 - voltage divider biasing a)
 - base resistance biasing b)
 - emitter resistor biasing c)
 - feedback resistor biasing d)
- 5) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
 - True False a) b)
- 6) The unit of h_{ie} parameter is _____.
 - b) Farad Mho a)
 - Ohm d) Unitless c)
- 7) Which of the following statements is/are correct? I- Enhancement type MOSFET is normally ON device II- Depeltion type MOSFET is normally OFF device III- JFET is normally OFF device.
 - a) Only II
 - 11 & 11 b) c) Only I d) None of these



Max. Marks: 70

Marks: 14

Set R

8 to 11: Match the correct pairs

Group A	Group B
8. Class AB Amplifier	a) Ri = 0 & Ro = 0
9. Class B Amplifier	b) Q at middle of DC loadline
10.Voltage Amplifier	c) $Ri = \infty \& Ro = \infty$
11.Transconductance Amplifier	d) Q at Cut off point
	 e) Q in between middle of DC load line & cut off point
	f) $Ri = \infty \& Ro = 0$

- 12) An oscillator employs _____ feedback.
 - a) Positive
 - b) Negative
 - c) Neither positive nor negative
 - d) Data insufficient
- 13) In a full wave rectifier, the current in each diode flows for _____.
 - a) whole cycle of the input signal
 - b) half cycle of the input signal
 - c) more than half cycle of the input signal
 - d) none of these
- 14) The input impedance of voltage series feedback amplifier, with negative feedback _____.
 - a) Decreases

b) Becomes zero

c) Increases

d) Is unchanged

Seat No.

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

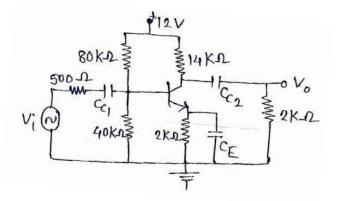
Q.2 Solve any four

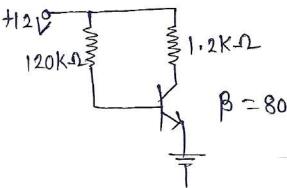
- a) Derive expression for current gain and input impedance for amplifier in terms of h-parameters.
- **b)** Calculate operating point voltage, current and stability factor for given fixed bias circuit.

- c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.
- d) Explain Darlington pair configuration with neat diagram.
- e) Define the following small signal parameters of JFET
 - 1) AC drain resistance
 - 2) Amplification factor
 - 3) DC drain resistance
 - 4) Transconductance

Q.3 Solve any Two

a) Determine the amplifier parameters current gain, voltage gain, input impedance and output impendence and output for the given CE amplifier, has h_{ie} =5 Kohm, h_{re} =3*10⁻⁴, h_{fe} =140 h_{oe} =8.8*10⁻⁵ A/V.





Max. Marks: 56

Set

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16

- **b)** Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.
- c) Design a single stage RC coupled CE amplifier for a given requirement of Q(5V, 8mA), Voltage gain of 200, S=3, Rs= 50Ohm, h_{fe} =250, V_{BE} =0.6V, R_L=1Kohm, supply voltage V_{cc}=15V. Assume input signal frequency from 20Hz to 20KHz

Section - II

Q.4 Solve any four

- a) Explain the characteristics of UJT.
- **b)** Differentiate between positive & negative feedback amplifiers.
- c) Explain crossover distortion in power amplifier with suitable diagram.
- d) Derive the expression of ripple factor of L filter.
- e) In single stage voltage amplifier, voltage gain without feedback is 110, input resistance Ri=1.2 KΩ, output resistance Ro is 12 KΩ. Determine Voltage gain, input resistance & output resistance of the negative feedback amplifier if 25% output voltage is feedback in series with input?

Q.5 Solve any two.

- a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at $2K\Omega$ with ripple factor not exceeding 4%. Assume supply frequency of 50Hz & Use 2 diode FWR.
- **b)** Explain the effect of negative feedback on the gain, input resistance & output resistance of voltage series feedback amplifier.
- c) Define & determine overall efficiency and collector efficiency of RC coupled class A power amplifier with neat diagram.



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None of these

3) Figures to the right indicate full mark. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 Q.1 Choose the correct alternatives from the options. 14 The biasing circuit that gives best stability to Q point is _____. 1) voltage divider biasing a) b) base resistance biasing C) emitter resistor biasing d) feedback resistor biasing The frequency response of BJT amplifier in low frequency region 2) decreases with decrease in frequency. a) True b) False 3) The unit of h_{ie} parameter is _____. a) Mho b) Farad c) Ohm d) Unitless Which of the following statements is/are correct? 4) I- Enhancement type MOSFET is normally ON device II- Depeltion type MOSFET is normally OFF device III- JFET is normally OFF device. a) Only II b) II & III c) Only I d) None of these An FET is 5) a) Bipolar transistor Unipolar transistor b) c) Tri-polar transistor d) None of these 6) The ideal value of input impedance of JFET is ____ a) Zero b) Infinite

d)

In a bipolar junction transistor the base region is made very thin so that

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book Page No.3

2) Assume suitable data if required.

Day & Date: Tuesday, 17-12-2019 Max. Marks: 70 Time: 10:00 AM To 01:00 PM

ELECTRONIC DEVICES AND CIRCUITS

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

c) Non zero

7)

a)

b)

c) d)

Seat

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Set S

8 to 11: Match the correct pairs

Group A	Group B
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- 12) In a full wave rectifier, the current in each diode flows for _____.
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- 13) The input impedance of voltage series feedback amplifier, with negative feedback _____.
 - a) Decreases

b) Becomes zero

c) Increases

- d) Is unchanged
- 14) An oscillator employs _____ feedback.
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 - b) Negative
 - c) Neither positive nor negative
 - d) Data insufficient

Seat No.

S.E. (Part - I) (New/Old) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

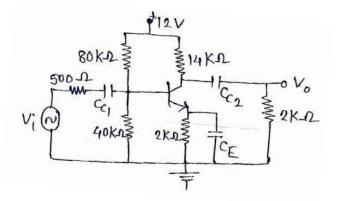
Q.2 Solve any four

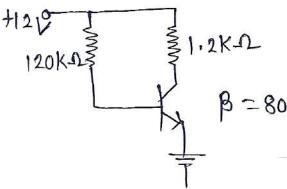
- a) Derive expression for current gain and input impedance for amplifier in terms of h-parameters.
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 - 4) Transconductance

Q.3 Solve any Two

a) Determine the amplifier parameters current gain, voltage gain, input impedance and output impendence and output for the given CE amplifier, has h_{ie} =5 Kohm, h_{re} =3*10⁻⁴, h_{fe} =140 h_{oe} =8.8*10⁻⁵ A/V.





Max. Marks: 56

Set

12

- **b)** Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.
- c) Design a single stage RC coupled CE amplifier for a given requirement of Q(5V, 8mA), Voltage gain of 200, S=3, Rs= 50Ohm, h_{fe} =250, V_{BE} =0.6V, R_L=1Kohm, supply voltage V_{cc}=15V. Assume input signal frequency from 20Hz to 20KHz

Section - II

Q.4 Solve any four

- a) Explain the characteristics of UJT.
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- c) Explain crossover distortion in power amplifier with suitable diagram.
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Q.5 Solve any two.

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- **b)** Explain the effect of negative feedback on the gain, input resistance & output resistance of voltage series feedback amplifier.
- c) Define & determine overall efficiency and collector efficiency of RC coupled class A power amplifier with neat diagram.



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Set

Max. Marks: 70

Marks: 14

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS AND LINEAR ALGEBRA

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The order of convergence of Newton-Raphson method is _____. 1)
 - a) 1 b) 3
 - 0 c) d) 2
- 2) For solving set of equation AX = B, in which the matrix A is transformed to diagonal matrix _____.
 - a) Gauss-Seidal method Gauss Jordan method
- d) Gauss Jacobi's method
- 3) As soon as a new value of a variable is found by iteration, it is used immediately in the next step, this method is called as
 - a) Gauss-Jacobi's method b) Gauss Seidal method
 - c) Gauss Jordan method d) Gauss Elimination method

Given initial value problem, $y' = \frac{dy}{dx} = f(x, y)$, where $y(x_0) = y_0$. Runge 4) kutta method of fourth order

a)
$$Y_{n+1} = Y_n + \frac{1}{6}[k_1 + k_2 + k_3 + k_4]$$

b)
$$Y_{n+1} = Y_n + \frac{1}{6}[k_1 + 2k_2 + 2k_3 + k_4]$$

C)
$$Y_{n+1} = Y_n + \frac{1}{6}[k_1 + 2k_2 + 3k_3 + 4k_4]$$

d) None of these

5) If
$$\frac{dy}{dx} = 1 + x$$
 and $y(0) = 1$ then Picard's first approximation y, is _____

a)
$$1 + x + \frac{x^2}{2}$$

c) $1 + x - \frac{x^2}{2}$
b) $-1 + x + \frac{x^2}{2}$
d) $1 - x + \frac{x^2}{2}$

- 6) In Newton's Cotes formula if f(x) is interpolated at equally spaced nodes by a polynomial of degree two then it represents _____
 - a) Trapezoidal rule c) Simpson three eight rule
- b) Simpson one third rule
- d) None of the above

7) The application of Romberg method is _

a) To solve partial D.E.

c)

- b) To solve ordinary D.E.
- To find the roots of the equation d) Evaluation of definite integral

b) Gauss elimination method

		Set	Ρ
8)	 Which of the following is true? a) Every AX = B system has at least one solution b) Every row echelon matrix is also row reduced echelon matrix c) Row reduced form of any matrix is unique d) Every AX = 0 system of linear equations is consistent 		
9)	 A set of vectors V₁ V₂ are linearly independent if and only if a) One Vector is multiple of the other b) zero vector c) One vector is not a multiple of other d) None of these 		
10)	The rank of a matrix A. denoted by rank A, is the dimension ofa) The matrixb) The null spacec) The row spaced) The column space	of A	
11)	The eigen values of the matrix $ \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 9 \end{bmatrix} area) 1,2,9b) 0,2,0c) 1,0,0d) 0,0,9$		
12)	If the inner product of two vectors u and v is unity then vectors are _a) Orthogonalb) Orthonormalc) Linearly dependentd) Linearly independent		_•
13)	Least square error in least square solution $AX = b$ isa) $\ b + A\hat{X}\ $ b) $\ bA\hat{X}\ $ c) $\ b - A\hat{X}\ $ d) $\ -b - A\hat{X}\ $		
14)	Let A be $n \times n$ symmetric, matrix then quadratic form $X'AX$ is positiv	е	

- definite _____.
 a) iff all eigenvalues are negative
 b) iff all eigenvalues are positive
 c) iff all eigenvalues are nonzero
 d) iff all eigenvalues are zero definite ___

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NUMERICAL METHODS AND LINEAR ALGEBRA

Day & Date: Friday,22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any three of the following questions.

a) Solve the following system of equation by Gauss Seidal method in three iteration

2x + y + 6z = 9 8x + 3y + 2z = 13x + 5y + z = 7

- **b)** Evaluate the integral $I = \int_0^2 \frac{dx}{x^2 + x + 1}$ by Simpsons one third rule by dividing interval in eight parts.
- c) Find the double root of $x^3 5.4x^2 + 9.24x 5.096 = 0$ given that it is nearer to 1.5.
- **d)** Using Picards method, solve $\frac{dy}{dx} = y^2 + x^2$ such that y = 1 when x = 0.
- e) Use Regula False Method to find positive root of $x \log_{10} x 1.2 = 0$

Q.3 Attempt any three of the following questions.

- a) Find the positive root of the following by using Newton Raphson method correct four decimal places $2x^3 3x 6$
- **b)** Using Runge Kutta method, solve $\frac{dy}{dx} = x + y$ such that y = 1 when x = 0 at h = 0.1 in one step.
- c) Solve the system of equation by Gauss-Jordan method. x + 2y + z = 3
 - 2x + 3y + 3z = 103x y + 2z = 13
- **d)** Find the value of \sqrt{N} the Newton Iterative formula. Hence find $\sqrt{3}$
- e) Evaluate $\int_{-1}^{1} (3x^2 + 5x^4) dx$ using Gaussian Quadrature method n = 3.

Q.4 Attempt any two of the following questions.

a) By the method of Factorization solve the following system.

x + 5y + z = 142x + y + 3z = 132x + y + 4z = 13

- 3x + y + 4z = 17
- **b)** Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Romberg's Method. Hence obtain an approximate value of π .
- **c)** Evaluate $\int_0^1 \int_0^1 e^{x+y} dx dy$ using h = k = 0.5 using Trapezoidal Rule. Also evaluate directly and compare the error.

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09

10

Set P

Max. Marks: 56

Section – II

Q.5 Attempt any three of the following questions.

a) Determine whether the vectors are linearly dependent or independent Г **5** 1 [-3]Γ21

$$V_1 \begin{bmatrix} -7\\9 \end{bmatrix} \cdot V_2 = \begin{bmatrix} 3\\-5 \end{bmatrix} \cdot V_3 = \begin{bmatrix} -7\\5 \end{bmatrix}$$

b) Describe the solution of $AX = b$
$$A = \begin{bmatrix} 3 & 5 & -4\\-3 & -2 & 4\\6 & 1 & -8 \end{bmatrix} \text{ and } b = \begin{bmatrix} 7\\-1\\-4 \end{bmatrix}$$

c) Find the rank of the matrix

$$\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$$

- d) Find the inverse of the matrix $\begin{bmatrix} 1 & 0 & -2 \\ -3 & 1 & 4 \\ 2 & -3 & 4 \end{bmatrix}$
- e) Determine whether the vector are orthogonal [1] [0] [-5]

$$V_1 = \begin{bmatrix} -2\\1 \end{bmatrix} \cdot V_2 = \begin{bmatrix} 1\\2 \end{bmatrix} \cdot V_3 = \begin{bmatrix} -2\\1 \end{bmatrix}$$

Q.6 Attempt any three of the following questions.

- **a)** Determine whether the following Matrix is Digonalizable $\begin{bmatrix} 5 & -8 & 1 \\ 0 & 0 & 7 \\ 0 & 0 & -2 \end{bmatrix}$
- b) Find the characteristic equation and eigen values of $A = \begin{bmatrix} 2 & 3 \\ 3 & -6 \end{bmatrix}$
- **c)** Let $V_1 = \begin{bmatrix} \check{1} \\ -1 \\ -2 \end{bmatrix}$. $V_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}$. $V_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}$ and $y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$ for what value of h is in y the plane generated by $\{V_1, V_2, V_3\}$

d) Write the following difference equation as a first order system
$$y_{k+3} - 2y_{k+2} - 5y_{k+1} + 6y_k = 0$$
 for all k

e) Check the quadratic form $3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2x_3$ is positive definite?

Q.7 Attempt any two of the following questions.

a) Find the largest eigen value of the matrix

$$A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix} \text{ and } x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \text{ upto five iterations.}$$

b) Let $A = \begin{bmatrix} 7 & 2 \\ -4 & 1 \end{bmatrix}$ find the formula for A^k given that $A = PDP^{-1}$

c) Orthogonally diagonalize the matrix
$$A = \begin{bmatrix} 3 & -2 & 4 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$$

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Page	Э	0I	Т	O

Seat No.

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS AND LINEAR ALGEBRA

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

- Which of the following is true? 1)
 - a) Every AX = B system has at least one solution
 - Every row echelon matrix is also row reduced echelon matrix b)
 - c) Row reduced form of any matrix is unique
 - d) Every AX = 0 system of linear equations is consistent
- 2) A set of vectors V_1 V_2 are linearly independent if and only if
 - a) One Vector is multiple of the other
 - b) zero vector
 - c) One vector is not a multiple of other
 - d) None of these

3) The rank of a matrix A. denoted by rank A, is the dimension of _____ of A.

- b) The null space a) The matrix
- The row space The column space c) d)
- 0 01 [1 The eigen values of the matrix 0 2 0 are 4) 0 0 9
 - 1,2,9 a)

6)

b) 0,2,0 d) 0,0,9 c) 1,0,0

5) If the inner product of two vectors u and v is unity then vectors are _____.

- a) Orthogonal b) Orthonormal c) Linearly dependent
- - Least square error in least square solution AX = b is _____. a) $\|b + A\hat{X}\|$ b) $\|bA\hat{X}\|$
 - d) $\|-b A\hat{X}\|$ C) $\|b - A\hat{X}\|$
- 7) Let A be $n \times n$ symmetric, matrix then quadratic form X'AX is positive definite
 - a) iff all eigenvalues are negative
 - b) iff all eigenvalues are positive
 - c) iff all eigenvalues are nonzero
 - d) iff all eigenvalues are zero
- The order of convergence of Newton-Raphson method is _____. 8) a)
 - 1 b) 3
 - c) 0 d) 2

Max. Marks: 70

Marks: 14

d) Linearly independent

- 9) For solving set of equation AX = B, in which the matrix A is transformed to diagonal matrix _____.
 - a) Gauss-Seidal method
- b) Gauss elimination methodd) Gauss Jacobi's method
- c) Gauss Jordan method
- As soon as a new value of a variable is found by iteration, it is used immediately in the next step, this method is called as _____.
 - a) Gauss-Jacobi's method b) Gauss Seidal method
 - c) Gauss Jordan method d) Gauss Elimination method

11) Given initial value problem, $y' = \frac{dy}{dx} = f(x, y)$, where $y(x_0) = y_0$. Runge kutta method of fourth order

- kutta method of fourth order _____ a) $Y_{n+1} = Y_n + \frac{1}{6}[k_1 + k_2 + k_3 + k_4]$
- b) $Y_{n+1} = Y_n + \frac{4}{6}[k_1 + 2k_2 + 2k_3 + k_4]$
- c) $Y_{n+1} = Y_n + \frac{1}{6}[k_1 + 2k_2 + 3k_3 + 4k_4]$
- d) None of these

12) If $\frac{dy}{dx} = 1 + x$ and y(0) = 1 then Picard's first approximation y, is _____.

- a) $1 + x + \frac{x^2}{2}$ c) $1 + x - \frac{x^2}{2}$ b) $-1 + x + \frac{x^2}{2}$ d) $1 - x + \frac{x^2}{2}$
- 13) In Newton's Cotes formula if f(x) is interpolated at equally spaced nodes by a polynomial of degree two then it represents _____.
 - a) Trapezoidal rule b) Simpson one third rule
 - c) Simpson three eight rule d) None of the above
- 14) The application of Romberg method is _
 - a) To solve partial D.E.
- b) To solve ordinary D.E.
- c) To find the roots of the equation d) Evaluation of definite integral

SLR-FM-411

Set Q

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NUMERICAL METHODS AND LINEAR ALGEBRA

Day & Date: Friday,22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any three of the following questions.

a) Solve the following system of equation by Gauss Seidal method in three iteration

2x + y + 6z = 9 8x + 3y + 2z = 13x + 5y + z = 7

- **b)** Evaluate the integral $I = \int_0^2 \frac{dx}{x^2 + x + 1}$ by Simpsons one third rule by dividing interval in eight parts.
- c) Find the double root of $x^3 5.4x^2 + 9.24x 5.096 = 0$ given that it is nearer to 1.5.
- **d)** Using Picards method, solve $\frac{dy}{dx} = y^2 + x^2$ such that y = 1 when x = 0.
- e) Use Regula False Method to find positive root of $x \log_{10} x 1.2 = 0$

Q.3 Attempt any three of the following questions.

- a) Find the positive root of the following by using Newton Raphson method correct four decimal places $2x^3 3x 6$
- **b)** Using Runge Kutta method, solve $\frac{dy}{dx} = x + y$ such that y = 1 when x = 0 at h = 0.1 in one step.
- c) Solve the system of equation by Gauss-Jordan method. x + 2y + z = 3
 - 2x + 3y + 3z = 103x y + 2z = 13
- **d)** Find the value of \sqrt{N} the Newton Iterative formula. Hence find $\sqrt{3}$
- e) Evaluate $\int_{-1}^{1} (3x^2 + 5x^4) dx$ using Gaussian Quadrature method n = 3.

Q.4 Attempt any two of the following questions.

a) By the method of Factorization solve the following system.

x + 5y + z = 142x + y + 3z = 132x + y + 4z = 17

- 3x + y + 4z = 17
- **b)** Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Romberg's Method. Hence obtain an approximate value of π .
- **c)** Evaluate $\int_0^1 \int_0^1 e^{x+y} dx dy$ using h = k = 0.5 using Trapezoidal Rule. Also evaluate directly and compare the error.

09

Max. Marks: 56

09

Section – II

Q.5 Attempt any three of the following questions.

- a) Determine whether the vectors are linearly dependent or independent
- $V_{1} \begin{bmatrix} 5\\ -7\\ 9 \end{bmatrix}, V_{2} = \begin{bmatrix} -3\\ 3\\ -5 \end{bmatrix}, V_{3} = \begin{bmatrix} 2\\ -7\\ 5 \end{bmatrix}$ **b)** Describe the solution of AX = b $A = \begin{bmatrix} 3 & 5 & -4\\ -3 & -2 & 4\\ 6 & 1 & -8 \end{bmatrix} \text{ and } b = \begin{bmatrix} 7\\ -1\\ -4 \end{bmatrix}$ **c)** Find the rank of the matrix $\begin{bmatrix} 2 & 3 & -1 & -1 \end{bmatrix}$
 - $\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 3 & 0 & -7 \end{bmatrix}$
- d) Find the inverse of the matrix $\begin{bmatrix} 1 & 0 & -2 \\ -3 & 1 & 4 \\ 2 & -3 & 4 \end{bmatrix}$
- e) Determine whether the vector are orthogonal $V_1 = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix}$. $V_2 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$. $V_3 = \begin{bmatrix} -5 \\ -2 \\ 1 \end{bmatrix}$

- a) Determine whether the following Matrix is Digonalizable $\begin{bmatrix} 5 & -8 & 1 \\ 0 & 0 & 7 \\ 0 & 0 & 2 \end{bmatrix}$
- **b)** Find the characteristic equation and eigen values of $A = \begin{bmatrix} 2 & 3 \\ 3 & -6 \end{bmatrix}$
- **c)** Let $V_1 = \begin{bmatrix} \tilde{1} \\ -1 \\ -2 \end{bmatrix}$. $V_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}$. $V_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}$ and $y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$ for what value of h is in y the plane generated by $\{V_1, V_2, V_3\}$
- d) Write the following difference equation as a first order system $y_{k+3} 2y_{k+2} 5y_{k+1} + 6y_k = 0$ for all k
- e) Check the quadratic form $3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2x_3$ is positive definite?

Q.7 Attempt any two of the following questions.

a) Find the largest eigen value of the matrix

$$A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix} \text{ and } x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \text{ upto five iterations.}$$

b) Let $A = \begin{bmatrix} 7 & 2 \\ -4 & 1 \end{bmatrix}$ find the formula for A^k given that $A = PDP^{-1}$
 $\begin{bmatrix} 3 & -2 & 4 \end{bmatrix}$

c) Orthogonally diagonalize the matrix
$$A = \begin{bmatrix} 0 & 2 & 1 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$$

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Seat No.

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS AND LINEAR ALGEBRA

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

3)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- If $\frac{dy}{dx} = 1 + x$ and y(0) = 1 then Picard's first approximation y, is _____. 1)
 - b) $-1 + x + \frac{x^2}{2}$ d) $1 x + \frac{x^2}{2}$ a) $1 + x + \frac{x^2}{2}$ c) $1 + x - \frac{x^2}{2}$
- 2) In Newton's Cotes formula if f(x) is interpolated at equally spaced nodes by a polynomial of degree two then it represents _____.
 - a) Trapezoidal rule
- b) Simpson one third rule d) None of the above
- c) Simpson three eight rule
- The application of Romberg method is _
- a) To solve partial D.E.
- b) To solve ordinary D.E. c) To find the roots of the equation Evaluation of definite integral d)
- 4) Which of the following is true?
 - a) Every AX = B system has at least one solution
 - Every row echelon matrix is also row reduced echelon matrix b)
 - C) Row reduced form of any matrix is unique
 - d) Every AX = 0 system of linear equations is consistent
- 5) A set of vectors $V_1 V_2$ are linearly independent if and only if
 - a) One Vector is multiple of the other
 - b) zero vector
 - c) One vector is not a multiple of other
 - d) None of these

c) Linearly dependent

6) The rank of a matrix A. denoted by rank A, is the dimension of of A. a)

- b) The null space The matrix d) The column space c)
 - The row space
- The eigen values of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \end{bmatrix}$ 2 0 are ____ 7) 0 9
 - 1,2,9 b) 0,2,0 a)
 - d) 0,0.9 c) 1,0,0
- If the inner product of two vectors u and v is unity then vectors are 8) a) Orthogonal
 - b) Orthonormal
 - d) Linearly independent

Marks: 14

Max. Marks: 70



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9)	Least square error in least square solution $AX = b$ isa) $\ b + A\hat{X}\ $ b) $\ bA\hat{X}\ $ c) $\ b - A\hat{X}\ $ d) $\ -b - A\hat{X}\ $	
10)	 Let A be n × n symmetric, matrix then quadratic form X'AX is positive definite a) iff all eigenvalues are negative b) iff all eigenvalues are positive c) iff all eigenvalues are nonzero d) iff all eigenvalues are zero 	
11)	The order of convergence of Newton-Raphson method is a) 1	
12)	For solving set of equation $AX = B$, in which the matrix A is transformed to diagonal matrixa) Gauss-Seidal methodb) Gauss elimination methodc) Gauss Jordan methodd) Gauss Jacobi's method	
13)	As soon as a new value of a variable is found by iteration, it is used immediately in the next step, this method is called as a) Gauss-Jacobi's method b) Gauss Seidal method c) Gauss Jordan method d) Gauss Elimination method	
14)	Given initial value problem, $y' = \frac{dy}{dx} = f(x, y)$, where $y(x_0) = y_0$. Runge kutta method of fourth order	

- a) $Y_{n+1} = Y_n + \frac{1}{6}[k_1 + k_2 + k_3 + k_4]$ b) $Y_{n+1} = Y_n + \frac{1}{6}[k_1 + 2k_2 + 2k_3 + k_4]$ c) $Y_{n+1} = Y_n + \frac{1}{6}[k_1 + 2k_2 + 3k_3 + 4k_4]$ d) None of these

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NUMERICAL METHODS AND LINEAR ALGEBRA

Day & Date: Friday,22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any three of the following questions.

a) Solve the following system of equation by Gauss Seidal method in three iteration

2x + y + 6z = 9 8x + 3y + 2z = 13x + 5y + z = 7

- **b)** Evaluate the integral $I = \int_0^2 \frac{dx}{x^2 + x + 1}$ by Simpsons one third rule by dividing interval in eight parts.
- c) Find the double root of $x^3 5.4x^2 + 9.24x 5.096 = 0$ given that it is nearer to 1.5.
- **d)** Using Picards method, solve $\frac{dy}{dx} = y^2 + x^2$ such that y = 1 when x = 0.
- e) Use Regula False Method to find positive root of $x \log_{10} x 1.2 = 0$

Q.3 Attempt any three of the following questions.

- a) Find the positive root of the following by using Newton Raphson method correct four decimal places $2x^3 3x 6$
- **b)** Using Runge Kutta method, solve $\frac{dy}{dx} = x + y$ such that y = 1 when x = 0 at h = 0.1 in one step.
- c) Solve the system of equation by Gauss-Jordan method. x + 2y + z = 3
 - 2x + 3y + 3z = 103x y + 2z = 13
- **d)** Find the value of \sqrt{N} the Newton Iterative formula. Hence find $\sqrt{3}$
- e) Evaluate $\int_{-1}^{1} (3x^2 + 5x^4) dx$ using Gaussian Quadrature method n = 3.

Q.4 Attempt any two of the following questions.

a) By the method of Factorization solve the following system.

x + 5y + z = 142x + y + 3z = 132x + y + 4z = 17

- 3x + y + 4z = 17
- **b)** Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Romberg's Method. Hence obtain an approximate value of π .
- **c)** Evaluate $\int_0^1 \int_0^1 e^{x+y} dx dy$ using h = k = 0.5 using Trapezoidal Rule. Also evaluate directly and compare the error.

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Max. Marks: 56

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Section – II

Q.5 Attempt any three of the following questions.

a) Determine whether the vectors are linearly dependent or independent

$V_1 \begin{bmatrix} 5\\-7\\9 \end{bmatrix} \cdot V_2 = \begin{bmatrix} -3\\3\\-5 \end{bmatrix} \cdot V_3 = \begin{bmatrix} 2\\-7\\5 \end{bmatrix}$ **b)** Describe the solution of AX = b

- $A = \begin{bmatrix} 3 & 5 & -4 \\ -3 & -2 & 4 \\ 6 & 1 & -8 \end{bmatrix} \text{ and } b = \begin{bmatrix} 7 \\ -1 \\ -4 \end{bmatrix}$ c) Find the rank of the matrix
 - $\begin{bmatrix} 2 & 3 & -1 & -1 \\ 1 & -1 & -2 & -4 \\ 3 & 1 & 3 & -2 \\ 6 & 2 & 0 & 7 \end{bmatrix}$
- d) Find the inverse of the matrix $\begin{bmatrix} 1 & 0 & -2 \\ -3 & 1 & 4 \\ 2 & -3 & 4 \end{bmatrix}$
- e) Determine whether the vector are orthogonal $V_1 = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix}$. $V_2 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$. $V_3 = \begin{bmatrix} -5 \\ -2 \\ 1 \end{bmatrix}$

Q.6 Attempt any three of the following questions.

- a) Determine whether the following Matrix is Digonalizable $\begin{bmatrix} 5 & -8 & 1 \\ 0 & 0 & 7 \\ 0 & 0 & -2 \end{bmatrix}$
- **b)** Find the characteristic equation and eigen values of $A = \begin{bmatrix} 2 & 3 \\ 3 & -6 \end{bmatrix}$
- **c)** Let $V_1 = \begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}$. $V_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}$. $V_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}$ and $y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$ for what value of h is in y the plane generated by $\{V_1, V_2, V_3\}$

d) Write the following difference equation as a first order system $y_{k+3} - 2y_{k+2} - 5y_{k+1} + 6y_k = 0$ for all k

e) Check the quadratic form $3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2x_3$ is positive definite?

Q.7 Attempt any two of the following questions.

a) Find the largest eigen value of the matrix

$$A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix} \text{ and } x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \text{ upto five iterations.}$$

b) Let $A = \begin{bmatrix} 7 & 2 \\ -4 & 1 \end{bmatrix}$ find the formula for A^k given that $A = B$

c) Orthogonally diagonalize the matrix $A = \begin{bmatrix} 3 & -2 & 4 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$

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S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS AND LINEAR ALGEBRA Max. Marks: 70 **Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. 2) Figures to the right indicate full marks. 3) Use of non programmable calculator is allowed. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 Choose the correct alternatives from the options and rewrite the sentence. The rank of a matrix A. denoted by rank A, is the dimension of _____ of A. 1) b) The null space a) The matrix The row space The column space c) d) 0 01 The eigen values of the matrix $\begin{vmatrix} 0 & 2 & 0 \end{vmatrix}$ are _ 2) 0 0 9 a) 1,2,9 b) 0,2,0 c) 1.0.0 d) 0.0.9 a) Orthogonal b) Orthonormal c) Linearly dependent d) Linearly independent 4) Least square error in least square solution AX = b is . a) $\|b + A\hat{X}\|$ b) $\|bA\hat{X}\|$ c) $\|b - A\hat{X}\|$ d) $\|-b - A\hat{X}\|$ Let A be $n \times n$ symmetric, matrix then guadratic form X'AX is positive definite a) iff all eigenvalues are negative b) iff all eigenvalues are positive c) iff all eigenvalues are nonzero d) iff all eigenvalues are zero The order of convergence of Newton-Raphson method is . a) 1 b) 3 c) 0 d) 2 For solving set of equation AX = B, in which the matrix A is transformed to 7) diagonal matrix ____ a) Gauss-Seidal method b) Gauss elimination method c) Gauss Jordan method d) Gauss Jacobi's method

As soon as a new value of a variable is found by iteration, it is used 8) immediately in the next step, this method is called as ____

a) Gauss-Jacobi's method c) Gauss Jordan method

- b) Gauss Seidal method
- d) Gauss Elimination method

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Seat No.

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Q.1

14

If the inner product of two vectors u and v is unity then vectors are _____. 3)

5)

6)

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9) Given initial value problem, $y' = \frac{dy}{dx} = f(x, y)$, where $y(x_0) = y_0$. Runge kutta method of fourth order _____.

a)
$$Y_{n+1} = Y_n + \frac{1}{6}[k_1 + k_2 + k_3 + k_4]$$

b)
$$Y_{n+1} = Y_n + \frac{1}{6} [k_1 + 2k_2 + 2k_3 + k_4]$$

c)
$$Y_{n+1} = Y_n + \frac{1}{\epsilon} [k_1 + 2k_2 + 3k_3 + 4k_4]$$

d) None of these

10) If
$$\frac{dy}{dx} = 1 + x$$
 and $y(0) = 1$ then Picard's first approximation y, is _____.

a)
$$1 + x + \frac{x^2}{2}$$

c) $1 + x - \frac{x^2}{2}$
b) $-1 + x + \frac{x^2}{2}$
d) $1 - x + \frac{x^2}{2}$

11) In Newton's Cotes formula if
$$f(x)$$
 is interpolated at equally spaced nodes by a polynomial of degree two then it represents _____.

- a) Trapezoidal rule b) Simpson one third rule
- c) Simpson three eight rule d) None of the above
- 12) The application of Romberg method is _____
 - a) To solve partial D.E.
- b) To solve ordinary D.E.
- c) To find the roots of the equation d) Evaluation of definite integral
- 13) Which of the following is true?
 - a) Every AX = B system has at least one solution
 - b) Every row echelon matrix is also row reduced echelon matrix
 - c) Row reduced form of any matrix is unique
 - d) Every AX = 0 system of linear equations is consistent
- 14) A set of vectors $V_1 V_2$ are linearly independent if and only if
 - a) One Vector is multiple of the other
 - b) zero vector
 - c) One vector is not a multiple of other
 - d) None of these

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S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NUMERICAL METHODS AND LINEAR ALGEBRA

Day & Date: Friday,22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any three of the following questions.

a) Solve the following system of equation by Gauss Seidal method in three iteration

2x + y + 6z = 9 8x + 3y + 2z = 13x + 5y + z = 7

- **b)** Evaluate the integral $I = \int_0^2 \frac{dx}{x^2 + x + 1}$ by Simpsons one third rule by dividing interval in eight parts.
- c) Find the double root of $x^3 5.4x^2 + 9.24x 5.096 = 0$ given that it is nearer to 1.5.
- **d)** Using Picards method, solve $\frac{dy}{dx} = y^2 + x^2$ such that y = 1 when x = 0.
- e) Use Regula False Method to find positive root of $x \log_{10} x 1.2 = 0$

Q.3 Attempt any three of the following questions.

- a) Find the positive root of the following by using Newton Raphson method correct four decimal places $2x^3 3x 6$
- **b)** Using Runge Kutta method, solve $\frac{dy}{dx} = x + y$ such that y = 1 when x = 0 at h = 0.1 in one step.
- c) Solve the system of equation by Gauss-Jordan method. x + 2y + z = 3
 - 2x + 3y + 3z = 103x - y + 2z = 13
- **d)** Find the value of \sqrt{N} the Newton Iterative formula. Hence find $\sqrt{3}$
- e) Evaluate $\int_{-1}^{1} (3x^2 + 5x^4) dx$ using Gaussian Quadrature method n = 3.

Q.4 Attempt any two of the following questions.

a) By the method of Factorization solve the following system.

x + 5y + z = 142x + y + 3z = 13

- 3x + y + 4z = 17
- **b)** Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Romberg's Method. Hence obtain an approximate value of π .
- **c)** Evaluate $\int_0^1 \int_0^1 e^{x+y} dx dy$ using h = k = 0.5 using Trapezoidal Rule. Also evaluate directly and compare the error.

09

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Max. Marks: 56

Section – II

Q.5 Attempt any three of the following questions.

a) Determine whether the vectors are linearly dependent or independent

$$V_1 \begin{bmatrix} 5\\-7\\9 \end{bmatrix} \cdot V_2 = \begin{bmatrix} -3\\3\\-5 \end{bmatrix} \cdot V_3 = \begin{bmatrix} 2\\-7\\5 \end{bmatrix}$$

Describe the solution of $AX = b$

- $A = \begin{bmatrix} 3 & 5 & -4 \\ -3 & -2 & 4 \\ 6 & 1 & -8 \end{bmatrix} \text{ and } b = \begin{bmatrix} 7 \\ -1 \\ -4 \end{bmatrix}$
- c) Find the rank of the matrix $\begin{bmatrix}
 2 & 3 & -1 & -1 \\
 1 & -1 & -2 & -4 \\
 3 & 1 & 3 & -2 \\
 . & . & . & . & . & . & . \\
 \end{bmatrix}$

b)

- d) Find the inverse of the matrix $\begin{bmatrix} 1 & 0 & -2 \\ -3 & 1 & 4 \\ 2 & -3 & 4 \end{bmatrix}$
- e) Determine whether the vector are orthogonal $V_1 = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix}$. $V_2 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix}$. $V_3 = \begin{bmatrix} -5 \\ -2 \\ 1 \end{bmatrix}$

- a) Determine whether the following Matrix is Digonalizable $\begin{bmatrix} 5 & -8 & 1 \\ 0 & 0 & 7 \\ 0 & 0 & -2 \end{bmatrix}$ b) Find the characteristic equation and set
- **b)** Find the characteristic equation and eigen values of $A = \begin{bmatrix} 2 & 3 \\ 3 & -6 \end{bmatrix}$
- **c)** Let $V_1 = \begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}$. $V_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}$. $V_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}$ and $y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$ for what value of h is in y the plane generated by $\{V_1, V_2, V_3\}$

d) Write the following difference equation as a first order system
$$y_{k+3} - 2y_{k+2} - 5y_{k+1} + 6y_k = 0$$
 for all k

e) Check the quadratic form $3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2x_3$ is positive definite?

Q.7 Attempt any two of the following questions.

a) Find the largest eigen value of the matrix

$$A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix} \text{ and } x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix} \text{ upto five iterations.}$$

b) Let $A = \begin{bmatrix} 7 & 2 \\ -4 & 1 \end{bmatrix}$ find the formula for A^k given that $A = PDP^{-1}$

c) Orthogonally diagonalize the matrix
$$A = \begin{bmatrix} 3 & -2 & 4 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$$

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S.E (Part - II) (New) (CBSC) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES - II									
		e: Saturday, 23-11-2019 0 PM To 05:30 PM		Max. Marks: 70					
Instr	uctio	ns: 1) Q. No. 1 is compulsory and it sh	ould l	be solved in first 30 minutes in					
		answer book. 2) Figures to the right indicate full	marke	、 、					
		, 6							
Dura	tion: 3	MCQ/Objective Ty 30 Minutes		Marks: 14					
Q.1	Choo 1)	An eight-pole wound rotor induction r driven at 1800 r.p.m. by a prime mov revolving magnetic filed. The frequen a) 60 Hz c) 180 Hz	notor er in t	operating on 60 Hz supply is he opposite direction of					
	2)	The circle diagram for an induction m a) efficiency c) frequency	otor d b) d)	annot be used to determine <u>.</u> power factor Output					
	3)	If the number of rotor slots is equal to refuses to start. Hence it is known as a) cogging c) air gap		ber of stator slots, then motor Crawling relative speed					
	4)	 An induction motor can run at Synchr a) it is run on load b) it is run in reverse direction c) it is run on voltage higher than t d) e.m.f. is injected in the rotor circ 	he rat						
	5)	 A Double cage induction motor has _ a) two series conductors in stator b) two series conductors in rotor c) none of these d) two parallel conductors in rotor 							
	6)	 Under which of the following starting high starting currents a) Star-delta starter c) Direct on line starter 	metho b) d)	ods an induction motor draws Auto transformer starter Reduced voltage starter					
	7)	Star-delta starting is equivalent to autapping.a) 33.3%c) 57.7%	to trar b) d)	50% 83%					
	8)	 If any two phases for an induction more a) the motor will run in reverse dire b) the motor will run at reduced sp c) the motor will pat run 	ection	e interchanged					

Page **1** of **16**

c) the motor will not run d) the motor will burn

Set P

SLR-FM-412

Seat

No.

Set | P 9) Full-load copper losses in a 3-phase 50 Hz 4-pole induction motor running at 1455 rpm are 300 W. The rotor input is _ 10 kW a) 5 kW b) C) 20 kW d) 50 kW 10) Which torque is greater _____. Break down b) Full load a) c) No load Running d) 11) If stator voltage of a SCIM is reduced to 50 per cent of its rated value, torque developed is reduced by _____ per cent of its full-load value. 50 b) 25 a) C) 75 d) 57.7 In no load test of IM input is measured with two watt meters and shows 12) 5000w and -3200 watt reading, the no load input power is _____. 8200 w 5000w a) b) 4100w d) 1800w C) As load power factor on an alternator becomes more leading the value of 13) generated voltage required to give rated voltage is_ . increases b) remain unchanged a) d) changes with speed c) decreases 14) The winding of 4 pole alternator having 36 slots and a coil span 1 to 8 short pitched by _____ degrees.

a) 140 b) 80 c) 20 d) 40 **SLR-FM-412**

S.E (Part - II) (New) (CBSC) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL MACHINES - II

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Seat

No.

Instructions: 1) All question are compulsory.

2) Figures to the right indicate full marks.

Section I

Q.2 Attempt any four of the following questions.

- a) Find the ratio of maximum torque to full load torque in terms of full load slip, use torque equation of IM.
- **b)** Give the constructional details of three phase IM with suitable sketches.
- c) In a double cage induction motor if the outer cage has an impedance at standstill of (0.3+j0.4) ohm, compare the relative currents and torques of two cages at standstill if the inner cage has an impedance of (0.1+j1.5) ohm at standstill.
- d) Explain slip power recovery scheme for speed control of three phase IM.
- e) Explain DOL starter with neat circuit diagram.
- f) Determine the suitable tapping on an autotransformer for an IM required to start the motor 40% of full load torque. The short circuit Current of the motor is five times full load current at a full load slip of 0.035.

Q.3 Attempt the following questions.

 a) Draw circle diagram for a 5 h.p., 200 V, 50 Hz, 4-pole, 3-phase, starconnected induction motor from following test data: No load: 200 V, 5 A, 350 W
 Chart circuit: 100V/20A 4700W

Short circuit: 100V,26A,1700W

From the circle diagram, find:

- 1) line current and power factor at full-load.
- 2) Maximum torque and starting torque in terms of full-load torque.

The rotor Cu loss at standstill is half the total Cu loss.

- **b)** A three phase delta connected cage type induction motor when connected directly to 400 V 50 Hz supply takes a starting current of 100 amp. In each phase calculate.
 - i) Line current for DOL starter
 - ii) line and phase current for star delta starter
 - iii) line and phase current for 70% tapping on autotransformer starter.

OR

- **b)** Describe with circuit diagram the working of
 - i) autotransformer starter
 - ii) star delta starter

Max. Marks: 56

SLR-FM-412



12

16

Set

Section –II

Q.4 Attempt any four of the following questions.

- a) Explain why single phase induction motor is not self-starting.
- **b)** A three phase star connected alternator rated at 1600 KVA, 13500 v. the armature resistance and synchronous reactance are 1.5 ohm and 30 ohm respectively per phase. Calculate the percentage voltage regulation for a load of 1280 kw at 0.8 leading power factor.
- c) Explain why is a rotating field system used in preference to a stationary field in alternators?
- **d)** Why is synchronous motor not self-starting? What methods are generally used to start the synchronous motors?
- e) Show that backward slip S_b = (2-S) where S is forward slip. Draw equivalent ckt of single phase induction motor on double revolving field theory basis.
- f) Explain no load and blocked rotor test of single phase IM.

Q. 5 Attempt any two of the following questions.

a) A 3.5 MVA star connected alternator rated at 4160 v at 50 Hz has the open circuit characteristic given by the following data.

Field Current	50	100	150	200	250	300	350	400	450
EMF	1620	3150	4160	4750	5130	5370	5550	5650	5750

A Field current of 200 A is found necessary to circulate full load current on short circuit of the alternator. Calculate by MMF method the voltage regulation of alternator at 0.8 pf lagging. Neglect resistance.

- b) Explain with neat sketch parallel operation of an alternator.
- c) A 240 v, 50 Hz, 2 pole 1 ph capacitor start ac motor has following constants referred to the stator: stator resistance=2.2 ohm; rotor resistance = 3.8 ohm; stator reactance = 3 ohm; rotor reactance = 2.1 ohm; magnetizing reactance = 86 ohm; iron and friction loss = 50 W find output power and efficiency at the given loading. Given s = 6%

16

SLR-FM-412

Set

S.E (Part - II) (New) (CBSC) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES - II

Day & Date: Saturday, 23-11-2019

Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

3)

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 1) If any two phases for an induction motor are interchanged _____.

- a) the motor will run in reverse direction
- b) the motor will run at reduced speed
- c) the motor will not run
- d) the motor will burn
- 2) Full-load copper losses in a 3-phase 50 Hz 4-pole induction motor running at 1455 rpm are 300 W. The rotor input is _____.

a) 5 kŴ	b)	10 kW
c) 20 kW	d)	50 kW
Which torque is greater		
a) Break down	b)	Full load

c) No load d) Running

- 4) If stator voltage of a SCIM is reduced to 50 per cent of its rated value, torque developed is reduced by _____ per cent of its full-load value.
 - a) 50 b) 25 c) 75 d) 57.7
- 5) In no load test of IM input is measured with two watt meters and shows 5000w and -3200 watt reading, the no load input power is _____.
 - a) 8200 w b) 5000w
 - c) 4100w d) 1800w
- 6) As load power factor on an alternator becomes more leading the value of generated voltage required to give rated voltage is_____.
 - a) increases b) remain unchanged
 - c) decreases d) changes with speed
- 7) The winding of 4 pole alternator having 36 slots and a coil span 1 to 8 short pitched by _____ degrees.
 - a) 140 b) 80 c) 20 d) 40
- 8) An eight-pole wound rotor induction motor operating on 60 Hz supply is driven at 1800 r.p.m. by a prime mover in the opposite direction of revolving magnetic filed. The frequency of rotor current is _____.
 - a) 60 Hz b) 120 Hz
 - c) 180 Hz d) none of the above

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Set Q

Max. Marks: 70

Marks: 14

			Set Q
9)	The circle diagram for an induction r a) efficiency c) frequency		cannot be used to determine <u>.</u> power factor Output
10)	If the number of rotor slots is equal to refuses to start. Hence it is known a a) cogging c) air gap		ber of stator slots, then motor Crawling relative speed
11)	 An induction motor can run at Synch a) it is run on load b) it is run in reverse direction c) it is run on voltage higher than d) e.m.f. is injected in the rotor cir 	the ra	
12)	 A Double cage induction motor has a) two series conductors in stator b) two series conductors in rotor c) none of these d) two parallel conductors in rotor 		<u>.</u>
13)	Under which of the following starting high starting currents a) Star-delta starter c) Direct on line starter	b)	ods an induction motor draws Auto transformer starter Reduced voltage starter
14)	Star-delta starting is equivalent to a tapping. a) 33.3%	uto tra b)	nsformer starting with

c) 57.7% d) 83%

SLR-FM-412

S.E (Part - II) (New) (CBSC) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL MACHINES – II

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Seat

No.

Instructions: 1) All question are compulsory.

2) Figures to the right indicate full marks.

Section I

Q.2 Attempt any four of the following questions.

- a) Find the ratio of maximum torque to full load torque in terms of full load slip, use torque equation of IM.
- b) Give the constructional details of three phase IM with suitable sketches.
- c) In a double cage induction motor if the outer cage has an impedance at standstill of (0.3+j0.4) ohm, compare the relative currents and torques of two cages at standstill if the inner cage has an impedance of (0.1+j1.5) ohm at standstill.
- d) Explain slip power recovery scheme for speed control of three phase IM.
- e) Explain DOL starter with neat circuit diagram.
- f) Determine the suitable tapping on an autotransformer for an IM required to start the motor 40% of full load torque. The short circuit Current of the motor is five times full load current at a full load slip of 0.035.

Q.3 Attempt the following questions.

 a) Draw circle diagram for a 5 h.p., 200 V, 50 Hz, 4-pole, 3-phase, starconnected induction motor from following test data: No load: 200 V, 5 A, 350 W
 Chart size vite 400 V (20 A 4700 W)

Short circuit: 100V,26A,1700W

From the circle diagram, find:

- 1) line current and power factor at full-load.
- 2) Maximum torque and starting torque in terms of full-load torque.

The rotor Cu loss at standstill is half the total Cu loss.

- b) A three phase delta connected cage type induction motor when connected directly to 400 V 50 Hz supply takes a starting current of 100 amp. In each phase calculate.
 - i) Line current for DOL starter
 - ii) line and phase current for star delta starter
 - iii) line and phase current for 70% tapping on autotransformer starter.

OR

- **b)** Describe with circuit diagram the working of
 - i) autotransformer starter
 - ii) star delta starter

Max. Marks: 56

Set

SLR-FM-412



12

Section –II

Q.4 Attempt any four of the following questions.

- a) Explain why single phase induction motor is not self-starting.
- **b)** A three phase star connected alternator rated at 1600 KVA, 13500 v. the armature resistance and synchronous reactance are 1.5 ohm and 30 ohm respectively per phase. Calculate the percentage voltage regulation for a load of 1280 kw at 0.8 leading power factor.
- c) Explain why is a rotating field system used in preference to a stationary field in alternators?
- **d)** Why is synchronous motor not self-starting? What methods are generally used to start the synchronous motors?
- e) Show that backward slip S_b = (2-S) where S is forward slip. Draw equivalent ckt of single phase induction motor on double revolving field theory basis.
- f) Explain no load and blocked rotor test of single phase IM.

Q. 5 Attempt any two of the following questions.

a) A 3.5 MVA star connected alternator rated at 4160 v at 50 Hz has the open circuit characteristic given by the following data.

Field Curren	nt 50	100	150	200	250	300	350	400	450
EMF	1620	3150	4160	4750	5130	5370	5550	5650	5750

A Field current of 200 A is found necessary to circulate full load current on short circuit of the alternator. Calculate by MMF method the voltage regulation of alternator at 0.8 pf lagging. Neglect resistance.

- b) Explain with neat sketch parallel operation of an alternator.
- c) A 240 v, 50 Hz, 2 pole 1 ph capacitor start ac motor has following constants referred to the stator: stator resistance=2.2 ohm; rotor resistance = 3.8 ohm; stator reactance = 3 ohm; rotor reactance = 2.1 ohm; magnetizing reactance = 86 ohm; iron and friction loss = 50 W find output power and efficiency at the given loading. Given s = 6%

16

SLR-FM-412 Set Q

S.E (Part - II) (New) (CBSC) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINES - II** Day & Date: Saturday, 23-11-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book. 2) Figures to the right indicate full marks. **MCQ/Objective Type Questions** Marks: 14

Duration: 30 Minutes

Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 1)
 - A Double cage induction motor has _ two series conductors in stator a)

 - two series conductors in rotor b)
 - c) none of these
 - two parallel conductors in rotor d)
 - 2) Under which of the following starting methods an induction motor draws high starting currents _____.
 - Star-delta starter b) a) Auto transformer starter
 - c) Direct on line starter d) Reduced voltage starter
 - 3) Star-delta starting is equivalent to auto transformer starting with _____ tapping.
 - a) 33.3% b) 57.7% d) c)
 - 4) If any two phases for an induction motor are interchanged .
 - the motor will run in reverse direction a)
 - the motor will run at reduced speed b)
 - the motor will not run c)
 - d) the motor will burn

Full-load copper losses in a 3-phase 50 Hz 4-pole induction motor running 5) at 1455 rpm are 300 W. The rotor input is _

- 5 kW 10 kW a) b) 20 kW d) 50 kW c)
- 6) Which torque is greater _____. Break down Full load a) b)
 - c) No load d) Running
- If stator voltage of a SCIM is reduced to 50 per cent of its rated value, 7) torque developed is reduced by _____ per cent of its full-load value.
 - 50 b) 25 a)
 - c) 75 d) 57.7

In no load test of IM input is measured with two watt meters and shows 8) 5000w and -3200 watt reading, the no load input power is _____.

- 5000w a) 8200 w b)
- 4100w d) 1800w c)

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Set R

- 50%
- 83%

			SLR-FM-412
			Set R
9)	As load power factor on an alternator b generated voltage required to give rate a) increases c) decreases		-
10)	The winding of 4 pole alternator having short pitched by degrees. a) 140 c) 20	g 36 b) d)	slots and a coil span 1 to 8 80 40
11)	An eight-pole wound rotor induction m driven at 1800 r.p.m. by a prime move revolving magnetic filed. The frequenc a) 60 Hz c) 180 Hz	r in t	he opposite direction of
12)	The circle diagram for an induction mo a) efficiency c) frequency		annot be used to determine <u>.</u> power factor Output
13)	If the number of rotor slots is equal to refuses to start. Hence it is known as _ a) cogging c) air gap	numl b) d)	ber of stator slots, then motor Crawling relative speed
14)	An induction motor can run at Synchro a) it is run on load b) it is run in reverse direction	onou	speed when

- it is run in reverse direction b)
- it is run on voltage higher than the rated voltage e.m.f. is injected in the rotor circuit. C)
- d)

Seat No.

S.E (Part - II) (New) (CBSC) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINES – II

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All question are compulsory.

2) Figures to the right indicate full marks.

Section I

Q.2 Attempt any four of the following questions.

- a) Find the ratio of maximum torque to full load torque in terms of full load slip, use torque equation of IM.
- **b)** Give the constructional details of three phase IM with suitable sketches.
- c) In a double cage induction motor if the outer cage has an impedance at standstill of (0.3+j0.4) ohm, compare the relative currents and torques of two cages at standstill if the inner cage has an impedance of (0.1+j1.5) ohm at standstill.
- d) Explain slip power recovery scheme for speed control of three phase IM.
- e) Explain DOL starter with neat circuit diagram.
- f) Determine the suitable tapping on an autotransformer for an IM required to start the motor 40% of full load torque. The short circuit Current of the motor is five times full load current at a full load slip of 0.035.

Q.3 Attempt the following questions.

 a) Draw circle diagram for a 5 h.p., 200 V, 50 Hz, 4-pole, 3-phase, starconnected induction motor from following test data: No load: 200 V, 5 A, 350 W
 Chart sizewith 400V/200A 4700W

Short circuit: 100V,26A,1700W

From the circle diagram, find:

- 1) line current and power factor at full-load.
- 2) Maximum torque and starting torque in terms of full-load torque.

The rotor Cu loss at standstill is half the total Cu loss.

- b) A three phase delta connected cage type induction motor when connected directly to 400 V 50 Hz supply takes a starting current of 100 amp. In each phase calculate.
 - i) Line current for DOL starter
 - ii) line and phase current for star delta starter
 - iii) line and phase current for 70% tapping on autotransformer starter.

OR

- **b)** Describe with circuit diagram the working of
 - i) autotransformer starter
 - ii) star delta starter

Max. Marks: 56

Set

R

16

SLR-FM-412 Set R

Section –II

Q.4 Attempt any four of the following questions.

- a) Explain why single phase induction motor is not self-starting.
- **b)** A three phase star connected alternator rated at 1600 KVA, 13500 v. the armature resistance and synchronous reactance are 1.5 ohm and 30 ohm respectively per phase. Calculate the percentage voltage regulation for a load of 1280 kw at 0.8 leading power factor.
- c) Explain why is a rotating field system used in preference to a stationary field in alternators?
- **d)** Why is synchronous motor not self-starting? What methods are generally used to start the synchronous motors?
- e) Show that backward slip S_b = (2-S) where S is forward slip. Draw equivalent ckt of single phase induction motor on double revolving field theory basis.
- f) Explain no load and blocked rotor test of single phase IM.

Q. 5 Attempt any two of the following questions.

a) A 3.5 MVA star connected alternator rated at 4160 v at 50 Hz has the open circuit characteristic given by the following data.

Field Current	50	100	150	200	250	300	350	400	450
EMF	1620	3150	4160	4750	5130	5370	5550	5650	5750

A Field current of 200 A is found necessary to circulate full load current on short circuit of the alternator. Calculate by MMF method the voltage regulation of alternator at 0.8 pf lagging. Neglect resistance.

- **b)** Explain with neat sketch parallel operation of an alternator.
- A 240 v, 50 Hz, 2 pole 1 ph capacitor start ac motor has following constants referred to the stator: stator resistance=2.2 ohm; rotor resistance = 3.8 ohm; stator reactance = 3 ohm; rotor reactance = 2.1 ohm; magnetizing reactance = 86 ohm; iron and friction loss = 50 W find output power and efficiency at the given loading. Given s = 6%

16

		ELECTRICAL M		NES – II				
		e: Saturday, 23-11-2019 30 PM To 05:30 PM		Max. Marks	: 7			
Inst	ructio	ns: 1) Q. No. 1 is compulsory and it s answer book.	hould	be solved in first 30 minutes in				
		Figures to the right indicate ful	Imarks	3.				
-		MCQ/Objective Ty	/pe Qı	Jestions Marks				
	Duration: 30 Minutes							
Q.1	Cho 1)	ose the correct alternatives from th Which torque is greater a) Break down	b)	Full load	14			
		c) No load	d)	Running				
	2)	If stator voltage of a SCIM is reduce torque developed is reduced by a) 50 c) 75						
	3)	In no load test of IM input is measur 5000w and -3200 watt reading, the a) 8200 w c) 4100w						
	4)	As load power factor on an alternate generated voltage required to give r a) increases c) decreases						
	5)	The winding of 4 pole alternator hav short pitched by degrees. a) 140 c) 20	ing 36 b) d)	slots and a coil span 1 to 8 80 40				
	6)	An eight-pole wound rotor induction driven at 1800 r.p.m. by a prime mo revolving magnetic filed. The freque a) 60 Hz c) 180 Hz	ver in t	he opposite direction of				
	7)	The circle diagram for an induction r a) efficiency c) frequency	motor c b) d)	cannot be used to determine power factor Output	<u></u> .			
	8)	If the number of rotor slots is equal to refuses to start. Hence it is known a a) cogging c) air gap		ber of stator slots, then motor Crawling relative speed				

S.E (Part - II) (New) (CBSC) Examination Nov/Dec-2019 Electrical Engineering ...

Seat No.

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70

- 14 14

relative speed C) air gap d)

Set S

9) An induction motor can run at Synchronous speed when _____.

- a) it is run on load
- b) it is run in reverse direction
- c) it is run on voltage higher than the rated voltage
- d) e.m.f. is injected in the rotor circuit.
- 10) A Double cage induction motor has _____.
 - a) two series conductors in stator
 - b) two series conductors in rotor
 - c) none of these
 - d) two parallel conductors in rotor
- 11) Under which of the following starting methods an induction motor draws high starting currents _____.
 - a) Star-delta starter
- b) Auto transformer starter

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Set S

- c) Direct on line starter d) Reduced voltage starter
- Star-delta starting is equivalent to auto transformer starting with ______ tapping.
 - a) 33.3% b) 50%
 - c) 57.7% d) 83%
- 13) If any two phases for an induction motor are interchanged _____.
 - a) the motor will run in reverse direction
 - b) the motor will run at reduced speed
 - c) the motor will not run
 - d) the motor will burn
- 14) Full-load copper losses in a 3-phase 50 Hz 4-pole induction motor running at 1455 rpm are 300 W. The rotor input is _____.

a)	5 kŴ	b)	10 kW
c)	20 kW	d)	50 kW

Seat No.

S.E (Part - II) (New) (CBSC) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINES – II**

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All question are compulsory.

2) Figures to the right indicate full marks.

Section I

Q.2 Attempt any four of the following questions.

- Find the ratio of maximum torque to full load torque in terms of full load a) slip, use torgue equation of IM.
- Give the constructional details of three phase IM with suitable sketches. b)
- In a double cage induction motor if the outer cage has an impedance at c) standstill of (0.3+j0.4) ohm, compare the relative currents and torgues of two cages at standstill if the inner cage has an impedance of (0.1+j1.5) ohm at standstill.
- d) Explain slip power recovery scheme for speed control of three phase IM.
- Explain DOL starter with neat circuit diagram. e)
- Determine the suitable tapping on an autotransformer for an IM required to **f**) start the motor 40% of full load torque. The short circuit Current of the motor is five times full load current at a full load slip of 0.035.

Q.3 Attempt the following questions.

Draw circle diagram for a 5 h.p., 200 V, 50 Hz, 4-pole, 3-phase, stara) connected induction motor from following test data: No load: 200 V, 5 A, 350 W

Short circuit: 100V,26A,1700W

From the circle diagram, find:

- line current and power factor at full-load. 1)
- 2) Maximum torque and starting torque in terms of full-load torque.

The rotor Cu loss at standstill is half the total Cu loss.

- A three phase delta connected cage type induction motor when b) connected directly to 400 V 50 Hz supply takes a starting current of 100 amp. In each phase calculate.
 - Line current for DOL starter i)
 - line and phase current for star delta starter ii)
 - line and phase current for 70% tapping on autotransformer starter. iii)

OR

- Describe with circuit diagram the working of b)
 - autotransformer starter i)
 - star delta starter ii)

Max. Marks: 56

12

16

Set

Section –II

Q.4 Attempt any four of the following questions.

- a) Explain why single phase induction motor is not self-starting.
- **b)** A three phase star connected alternator rated at 1600 KVA, 13500 v. the armature resistance and synchronous reactance are 1.5 ohm and 30 ohm respectively per phase. Calculate the percentage voltage regulation for a load of 1280 kw at 0.8 leading power factor.
- c) Explain why is a rotating field system used in preference to a stationary field in alternators?
- **d)** Why is synchronous motor not self-starting? What methods are generally used to start the synchronous motors?
- e) Show that backward slip S_b = (2-S) where S is forward slip. Draw equivalent ckt of single phase induction motor on double revolving field theory basis.
- f) Explain no load and blocked rotor test of single phase IM.

Q. 5 Attempt any two of the following questions.

a) A 3.5 MVA star connected alternator rated at 4160 v at 50 Hz has the open circuit characteristic given by the following data.

Field Current	50	100	150	200	250	300	350	400	450
EMF	1620	3150	4160	4750	5130	5370	5550	5650	5750

A Field current of 200 A is found necessary to circulate full load current on short circuit of the alternator. Calculate by MMF method the voltage regulation of alternator at 0.8 pf lagging. Neglect resistance.

- b) Explain with neat sketch parallel operation of an alternator.
- c) A 240 v, 50 Hz, 2 pole 1 ph capacitor start ac motor has following constants referred to the stator: stator resistance=2.2 ohm; rotor resistance = 3.8 ohm; stator reactance = 3 ohm; rotor reactance = 2.1 ohm; magnetizing reactance = 86 ohm; iron and friction loss = 50 W find output power and efficiency at the given loading. Given s = 6%

16

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELEMENTS OF POWER SYSTEM**

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

C)

a) Exciters

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Transmission and distribution of electric power by underground system is 1) superior to overhead system in respect of _____.
 - Appearance and public safety a)
 - Maintenance cost b)
 - c) Frequency of faults, power failure and accidents
 - d) All of the above
- 2) Maximum permissible span for wooden poles is b) 10 to 15 years
 - a) from 2 to 5 years
 - 25 to 30 years d) 60 to 70 years

3) The rated voltage of a 3 phase power system is given as

- rms phase voltage b) peak phase voltage a)
- peak line to line voltage d) rms line to line voltage C)
- 4) The underground system cannot be operated above _____.
 - 440 V b) 11 Kv a)
 - 33 kV d) 66 kV C)
- 5) Transmission line connects .
 - Generating station to a switching station a)
 - Stepdown transformer station to service transformer banks b)
 - Distribution transformer to consumer premises c)
 - Service points to consumer premises d)

The voltage of the single phase supply to residential consumers is _____. 6)

- 110 V b) 210 V a)
- d) 400 V c) 230 V
- 7) Feeder is designed mainly from the point of view of
 - a) Its current carrying capacity b) Voltage drop in it Operating voltage d) Operating Frequency
- 8) In a substation the following equipment is not installed _____
 - b) series capacitors
 - shunt reactors d) voltatre transformers c)

Set

Max. Marks: 70

Marks: 14

- For the same conductor length, same amount of power, same Insse sand same maximum voltage to earth, which system requires minimum conductor area _____.
 - a) Single phase ac
- b) 3 phase ac

c) 2 wire ac

- d) 3 wire ac
- 10) ACSR conductors are used in transmission line in place of copper because _____.
 - a) economy factor
- b) they are light weight

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- c) high tensile strength d) all of the above
- 11) String efficiency of a string insulator is dependent on _____.
 - a) size of the insulators
 - b) number of insulator discs in the string
 - c) Size of the tower
 - d) none of the above
- 12) The effect of wind pressure is more predominant on _____.
 - a) transmission lines
- b) neutral wires
- c) insulator d) Supporting tower
- 13) Which of the following is the source of heat generation in the cables?
 - a) Dielectric losses in cable insulation
 - b) losses in the conductor
 - c) Losses in the metallic sheathings and armourings
 - d) All of the above
- 14) Due to which of the following reasons the cables should not operated too hot?
 - a) The oil may lose its viscosity and it may start drawing off from higher levels
 - b) Expansion of the oil may cause the sheath to burst
 - c) Unequal expansion may create voids in the insulation which will lead to ionization
 - d) The thermal instability may rise due to the rapid increase of dielectric losses with temperature
 - e) All of the above

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELEMENTS OF POWER SYSTEM**

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve Any Four

- Derive equation for conductor material required in 2-wire DC system with a) one conductor earthed.
- b) The self-capacitance of each unit in a string of three suspension insulators is C. The shunting capacitance of the connecting metal work of each insulator to earth is 0.15 C while for line it is 0.1 C. Calculated.
 - 1) The voltage across each insulator as a percentage of the line voltage to earth
 - String efficiency 2)
- What is meant by sag? Derive an expression for sag in a transmission line c) having equal level of supports and unequal level of supports?
- Derive expression of capacitance grading. d)
- An overhead transmission line at a river crossing is supported from two e) towers at heights of 40m and 90m above water level, the horizontal distance between the towers being 400m. If the maximum allowable tension is 2000kg. Find the clearance between the conductor and water at a point mid-way between the towers. Weight of conductor is 1kg/m.

Q.3 Solve Any Two

Determine the most economical cross section for 3 phase transmission a) line 1Km long to supply at a constant voltage of 110Kv for the following daily load cycle:

6 hours	20MW	at 0.8 pf lagg
12 hours	5MW	at 0.8 pf lagg
6 hours	6MW	at 0.8 pf lagg
The Dise is		

The line is used for 365 days yearly. The cost per km of line including erection is Rs (9000+6000a) where a is the area of X-section of conductor in cm^2 . The annual rate of interest and depreciation is 10% and the energy cost 6P per Kwh. The resistance per km of each conductor is 0.176/a.

- A string of 4 insulator has a self-capacitance equal to 10 times the pin to b) earth capacitance. Find.
 - 1) The voltage across various units expressed as a percentage of total voltage across the string
 - String efficiency 2)
- A single core 66kv cable working on 3 phase system has a conductor C) diameter of 2 cm and a sheath of inside diameter 5.3 cm. If two intersheaths are introduce in such a way that the stress varies between the same maximum and minimum in the three layers find
 - 1) Position of intersheaths
 - 2) Voltage on the intersheaths
 - Maximum and minimum stress.



12

16

Set

Section – II

Q.4 Solve Any Four

- a) Derive the expression for capacitance of 3-ph Symmetrical overhead line.
- **b)** Derive an expression for voltage regulation and efficiency of short transmission line along with the equivalent circuit and phasor diagram.
- c) Draw and explain concentrated loaded DC distributor fed at one end.
- d) Explain different equipment used in substation.
- e) A 3-phase, 50Hz, 150 km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1Ω , 0.5Ω and 3×10^{-6} S per km per phase. If the line delivers 50 MW at 110 kV and 0.8 p.f. lagging, determine the sending end voltage and current. Assume a nominal π circuit for the line.

Q.5 Solve Any Two

- 12
- a) A balanced 3-phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is (20 + j52) ohms and the total phase-neutral admittance is 315×10^{-6} Siemen. Using nominal T method, determine:
 - 1) the A, B, C and D constants of the line
 - 2) sending end voltage
 - 3) regulation of the line
- **b)** Derive the expression for inductance of 3-ph single circuit overhead triangular configuration of transmission line for symmetrical spacing.
- c) A single phase overhead transmission line delivers 1100kw at 33Kv at 0.8p.f lagg. The total resistance and inductive reactance of the line are 10Ω and 15Ω respectively. Determine:
 - 1) Sending end voltage
 - 2) Sending end power factor
 - 3) Transmission Efficiency



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S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELEMENTS OF POWER SYSTEM**

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

1)

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In a substation the following equipment is not installed
- a) Exciters b) series capacitors
 - d) voltatre transformers c) shunt reactors
- For the same conductor length, same amount of power, same Insse sand 2) same maximum voltage to earth, which system requires minimum conductor area
 - a) Single phase ac 2 wire ac
- b) 3 phase ac d) 3 wire ac
- ACSR conductors are used in transmission line in place of copper 3) because .
 - economy factor a)
- b) they are light weight d) all of the above
- high tensile strength C)
- 4) String efficiency of a string insulator is dependent on _____.
 - size of the insulators a)
 - number of insulator discs in the string b)
 - Size of the tower c)
 - d) none of the above
- 5) The effect of wind pressure is more predominant on _____. a)
 - transmission lines b) neutral wires
 - insulator d) Supporting tower c)
- Which of the following is the source of heat generation in the cables? 6)
 - Dielectric losses in cable insulation a)
 - b) losses in the conductor
 - Losses in the metallic sheathings and armourings C)
 - d) All of the above

Set

Marks: 14

Max. Marks: 70

- 7) Due to which of the following reasons the cables should not operated too hot?
 - a) The oil may lose its viscosity and it may start drawing off from higher levels
 - Expansion of the oil may cause the sheath to burst b)
 - Unequal expansion may create voids in the insulation which will lead C) to ionization
 - The thermal instability may rise due to the rapid increase of dielectric d) losses with temperature
 - All of the above e)
- 8) Transmission and distribution of electric power by underground system is superior to overhead system in respect of _____.
 - a) Appearance and public safety
 - Maintenance cost b)
 - C) Frequency of faults, power failure and accidents
 - d) All of the above

9) Maximum permissible span for wooden poles is _____

from 2 to 5 years a) 25 to 30 years

c)

- b) 10 to 15 years d) 60 to 70 years
- 10) The rated voltage of a 3 phase power system is given as _____.
 - rms phase voltage a)
- b) peak phase voltage d) rms line to line voltage
- C) peak line to line voltage
- 11) The underground system cannot be operated above .
 - 440 V a) b) 11 Kv
 - 33 kV d) 66 kV C)
- 12) Transmission line connects
 - Generating station to a switching station a)
 - Stepdown transformer station to service transformer banks b)
 - Distribution transformer to consumer premises c)
 - Service points to consumer premises d)
- 13) The voltage of the single phase supply to residential consumers is _____.
 - 110 V b) 210 V a) C)
 - d) 400 V 230 V
- Feeder is designed mainly from the point of view of _____ 14)
 - a) Its current carrying capacity b) Voltage drop in it
 - d) Operating Frequency C) Operating voltage



Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELEMENTS OF POWER SYSTEM**

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve Any Four

- Derive equation for conductor material required in 2-wire DC system with a) one conductor earthed.
- b) The self-capacitance of each unit in a string of three suspension insulators is C. The shunting capacitance of the connecting metal work of each insulator to earth is 0.15 C while for line it is 0.1 C. Calculated.
 - 1) The voltage across each insulator as a percentage of the line voltage to earth
 - 2) String efficiency
- What is meant by sag? Derive an expression for sag in a transmission line c) having equal level of supports and unequal level of supports?
- Derive expression of capacitance grading. d)
- An overhead transmission line at a river crossing is supported from two e) towers at heights of 40m and 90m above water level, the horizontal distance between the towers being 400m. If the maximum allowable tension is 2000kg. Find the clearance between the conductor and water at a point mid-way between the towers. Weight of conductor is 1kg/m.

Q.3 Solve Any Two

Determine the most economical cross section for 3 phase transmission a) line 1Km long to supply at a constant voltage of 110Kv for the following daily load cycle:

6 hours	20MW	at 0.8 pf lagg
12 hours	5MW	at 0.8 pf lagg
6 hours	6MW	at 0.8 pf lagg
The Dise is		

The line is used for 365 days yearly. The cost per km of line including erection is Rs (9000+6000a) where a is the area of X-section of conductor in cm^2 . The annual rate of interest and depreciation is 10% and the energy cost 6P per Kwh. The resistance per km of each conductor is 0.176/a.

- A string of 4 insulator has a self-capacitance equal to 10 times the pin to b) earth capacitance. Find.
 - 1) The voltage across various units expressed as a percentage of total voltage across the string
 - String efficiency 2)
- A single core 66kv cable working on 3 phase system has a conductor C) diameter of 2 cm and a sheath of inside diameter 5.3 cm. If two intersheaths are introduce in such a way that the stress varies between the same maximum and minimum in the three layers find
 - 1) Position of intersheaths
 - 2) Voltage on the intersheaths
 - 3) Maximum and minimum stress.



12

16

Set

Section – II

Q.4 Solve Any Four

- a) Derive the expression for capacitance of 3-ph Symmetrical overhead line.
- **b)** Derive an expression for voltage regulation and efficiency of short transmission line along with the equivalent circuit and phasor diagram.
- c) Draw and explain concentrated loaded DC distributor fed at one end.
- d) Explain different equipment used in substation.
- e) A 3-phase, 50Hz, 150 km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1Ω , 0.5Ω and 3×10^{-6} S per km per phase. If the line delivers 50 MW at 110 kV and 0.8 p.f. lagging, determine the sending end voltage and current. Assume a nominal π circuit for the line.

Q.5 Solve Any Two

- 12
- a) A balanced 3-phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is (20 + j52) ohms and the total phase-neutral admittance is 315×10^{-6} Siemen. Using nominal T method, determine:
 - 1) the A, B, C and D constants of the line
 - 2) sending end voltage
 - 3) regulation of the line
- **b)** Derive the expression for inductance of 3-ph single circuit overhead triangular configuration of transmission line for symmetrical spacing.
- c) A single phase overhead transmission line delivers 1100kw at 33Kv at 0.8p.f lagg. The total resistance and inductive reactance of the line are 10Ω and 15Ω respectively. Determine:
 - 1) Sending end voltage
 - 2) Sending end power factor
 - 3) Transmission Efficiency

SLR-FM-413 Set Q

Set

Max. Marks: 70

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELEMENTS OF POWER SYSTEM

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

a)

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Transmission line connects _____
 - a) Generating station to a switching station
 - b) Stepdown transformer station to service transformer banks
 - c) Distribution transformer to consumer premises
 - d) Service points to consumer premises
- 2) The voltage of the single phase supply to residential consumers is _____.
 - 110 V b) 210 V
 - c) 230 V d) 400 V
- 3) Feeder is designed mainly from the point of view of _____
 - a) Its current carrying capacity b) Voltage drop in it
 - c) Operating voltage d) Operating Frequency
- 4) In a substation the following equipment is not installed _____
 - a) Exciters

- b) series capacitors
- c) shunt reactors d) voltatre transformers
- 5) For the same conductor length, same amount of power, same Insse sand same maximum voltage to earth, which system requires minimum conductor area _____.
 - a) Single phase ac b) 3 phase ac
 - c) 2 wire ac d) 3 wire ac
- ACSR conductors are used in transmission line in place of copper because _____.
 - a) economy factor b) they are light weight
 - c) high tensile strength d) all of the above
- 7) String efficiency of a string insulator is dependent on _____.
 - a) size of the insulators
 - b) number of insulator discs in the string
 - c) Size of the tower
 - d) none of the above
- 8) The effect of wind pressure is more predominant on _____
 - a) transmission lines
 - c) insulator

- b) neutral wires
- d) Supporting tower



R

Marks: 14

- 9) Which of the following is the source of heat generation in the cables?
 - a) Dielectric losses in cable insulation
 - b) losses in the conductor
 - Losses in the metallic sheathings and armourings c)
 - d) All of the above
- 10) Due to which of the following reasons the cables should not operated too hot?
 - The oil may lose its viscosity and it may start drawing off from higher a) levels
 - Expansion of the oil may cause the sheath to burst b)
 - Unequal expansion may create voids in the insulation which will lead c) to ionization
 - The thermal instability may rise due to the rapid increase of dielectric d) losses with temperature
 - All of the above e)
- 11) Transmission and distribution of electric power by underground system is superior to overhead system in respect of _____.
 - a) Appearance and public safety
 - b) Maintenance cost
 - Frequency of faults, power failure and accidents C)
 - d) All of the above
- Maximum permissible span for wooden poles is ____ 12)
 - from 2 to 5 years b) 10 to 15 years a)
 - 25 to 30 years C)
- d) 60 to 70 years
- The rated voltage of a 3 phase power system is given as _____. 13)
 - rms phase voltage a)
- b) peak phase voltage

Set R

- peak line to line voltage c)
 - d) rms line to line voltage
- The underground system cannot be operated above _____. 14)
 - 440 V a)

b) 11 Kv

33 kV C)

d) 66 kV

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELEMENTS OF POWER SYSTEM

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve Any Four

- a) Derive equation for conductor material required in 2-wire DC system with one conductor earthed.
- **b)** The self-capacitance of each unit in a string of three suspension insulators is C. The shunting capacitance of the connecting metal work of each insulator to earth is 0.15 C while for line it is 0.1 C. Calculated.
 - 1) The voltage across each insulator as a percentage of the line voltage to earth
 - 2) String efficiency
- c) What is meant by sag? Derive an expression for sag in a transmission line having equal level of supports and unequal level of supports?
- **d)** Derive expression of capacitance grading.
- e) An overhead transmission line at a river crossing is supported from two towers at heights of 40m and 90m above water level, the horizontal distance between the towers being 400m. If the maximum allowable tension is 2000kg. Find the clearance between the conductor and water at a point mid-way between the towers. Weight of conductor is 1kg/m.

Q.3 Solve Any Two

a) Determine the most economical cross section for 3 phase transmission line 1Km long to supply at a constant voltage of 110Kv for the following daily load cycle:

6 hours	20MW	at 0.8 pf lagg
12 hours	5MW	at 0.8 pf lagg
6 hours	6MW	at 0.8 pf lagg
The Dise is		

The line is used for 365 days yearly. The cost per km of line including erection is Rs (9000+6000a) where a is the area of X-section of conductor in cm^2 . The annual rate of interest and depreciation is 10% and the energy cost 6P per Kwh. The resistance per km of each conductor is 0.176/a.

- **b)** A string of 4 insulator has a self-capacitance equal to 10 times the pin to earth capacitance. Find.
 - 1) The voltage across various units expressed as a percentage of total voltage across the string
 - 2) String efficiency
- c) A single core 66kv cable working on 3 phase system has a conductor diameter of 2 cm and a sheath of inside diameter 5.3 cm. If two intersheaths are introduce in such a way that the stress varies between the same maximum and minimum in the three layers find
 - 1) Position of intersheaths
 - 2) Voltage on the intersheaths
 - 3) Maximum and minimum stress.



Set

16

Section – II

Q.4 Solve Any Four

- a) Derive the expression for capacitance of 3-ph Symmetrical overhead line.
- **b)** Derive an expression for voltage regulation and efficiency of short transmission line along with the equivalent circuit and phasor diagram.
- c) Draw and explain concentrated loaded DC distributor fed at one end.
- d) Explain different equipment used in substation.
- e) A 3-phase, 50Hz, 150 km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1Ω , 0.5Ω and 3×10^{-6} S per km per phase. If the line delivers 50 MW at 110 kV and 0.8 p.f. lagging, determine the sending end voltage and current. Assume a nominal π circuit for the line.

Q.5 Solve Any Two

- 12
- a) A balanced 3-phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is (20 + j52) ohms and the total phase-neutral admittance is 315×10^{-6} Siemen. Using nominal T method, determine:
 - 1) the A, B, C and D constants of the line
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- **b)** Derive the expression for inductance of 3-ph single circuit overhead triangular configuration of transmission line for symmetrical spacing.
- c) A single phase overhead transmission line delivers 1100kw at 33Kv at 0.8p.f lagg. The total resistance and inductive reactance of the line are 10Ω and 15Ω respectively. Determine:
 - 1) Sending end voltage
 - 2) Sending end power factor
 - 3) Transmission Efficiency

SLR-FM-413 Set R

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELEMENTS OF POWER SYSTEM

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

Marks: 14

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - ACSR conductors are used in transmission line in place of copper because _____.
 - a) economy factor
- b) they are light weight
- d) all of the above
- 2) String efficiency of a string insulator is dependent on _____.
 - a) size of the insulators

high tensile strength

- b) number of insulator discs in the string
- c) Size of the tower
- d) none of the above
- 3) The effect of wind pressure is more predominant on _____.
 - a) transmission lines b) neutral wires
 - c) insulator d) Supporting tower
- 4) Which of the following is the source of heat generation in the cables?
 - a) Dielectric losses in cable insulation
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 - c) Losses in the metallic sheathings and armourings
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- 5) Due to which of the following reasons the cables should not operated too hot?
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 - d) The thermal instability may rise due to the rapid increase of dielectric losses with temperature
 - e) All of the above
- 6) Transmission and distribution of electric power by underground system is superior to overhead system in respect of _____.
 - a) Appearance and public safety
 - b) Maintenance cost
 - c) Frequency of faults, power failure and accidents
 - d) All of the above

Set S

Max. Marks: 70

	SLR-FM-413
	Set S
7)	Maximum permissible span for wooden poles isa) from 2 to 5 yearsb) 10 to 15 yearsc) 25 to 30 yearsd) 60 to 70 years
8)	The rated voltage of a 3 phase power system is given asa) rms phase voltageb) peak phase voltagec) peak line to line voltaged) rms line to line voltage
9)	The underground system cannot be operated abovea) 440 Vb) 11 Kvc) 33 kVd) 66 kV
10)	 Transmission line connects a) Generating station to a switching station b) Stepdown transformer station to service transformer banks c) Distribution transformer to consumer premises d) Service points to consumer premises
11)	The voltage of the single phase supply to residential consumers isa) 110 Vb) 210 Vc) 230 Vd) 400 V
12)	 Feeder is designed mainly from the point of view of a) Its current carrying capacity b) Voltage drop in it c) Operating voltage d) Operating Frequency
13)	In a substation the following equipment is not installeda) Excitersb) series capacitorsc) shunt reactorsd) voltatre transformers
14)	For the same conductor length, same amount of power, same Insse sand

- 14) same maximum voltage to earth, which system requires minimum conductor area ____ _.
 - a) Single phase acc) 2 wire ac
- b) 3 phase acd) 3 wire ac

Seat	
No	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELEMENTS OF POWER SYSTEM**

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve Any Four

- Derive equation for conductor material required in 2-wire DC system with a) one conductor earthed.
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 - 1) The voltage across each insulator as a percentage of the line voltage to earth
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- What is meant by sag? Derive an expression for sag in a transmission line c) having equal level of supports and unequal level of supports?
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- An overhead transmission line at a river crossing is supported from two e) towers at heights of 40m and 90m above water level, the horizontal distance between the towers being 400m. If the maximum allowable tension is 2000kg. Find the clearance between the conductor and water at a point mid-way between the towers. Weight of conductor is 1kg/m.

Q.3 Solve Any Two

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6 hours	20MW	at 0.8 pf lagg
12 hours	5MW	at 0.8 pf lagg
6 hours	6MW	at 0.8 pf lagg
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The line is used for 365 days yearly. The cost per km of line including erection is Rs (9000+6000a) where a is the area of X-section of conductor in cm^2 . The annual rate of interest and depreciation is 10% and the energy cost 6P per Kwh. The resistance per km of each conductor is 0.176/a.

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 - 2) Voltage on the intersheaths
 - 3) Maximum and minimum stress.



Set

12

Section – II

Q.4 Solve Any Four

- a) Derive the expression for capacitance of 3-ph Symmetrical overhead line.
- **b)** Derive an expression for voltage regulation and efficiency of short transmission line along with the equivalent circuit and phasor diagram.
- c) Draw and explain concentrated loaded DC distributor fed at one end.
- d) Explain different equipment used in substation.
- e) A 3-phase, 50Hz, 150 km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1Ω , 0.5Ω and 3×10^{-6} S per km per phase. If the line delivers 50 MW at 110 kV and 0.8 p.f. lagging, determine the sending end voltage and current. Assume a nominal π circuit for the line.

Q.5 Solve Any Two

12

16

SLR-FM-413

Set

- a) A balanced 3-phase load of 30 MW is supplied at 132 kV, 50 Hz and 0.85 p.f. lagging by means of a transmission line. The series impedance of a single conductor is (20 + j52) ohms and the total phase-neutral admittance is 315×10^{-6} Siemen. Using nominal T method, determine:
 - 1) the A, B, C and D constants of the line
 - 2) sending end voltage
 - 3) regulation of the line
- **b)** Derive the expression for inductance of 3-ph single circuit overhead triangular configuration of transmission line for symmetrical spacing.
- c) A single phase overhead transmission line delivers 1100kw at 33Kv at 0.8p.f lagg. The total resistance and inductive reactance of the line are 10Ω and 15Ω respectively. Determine:
 - 1) Sending end voltage
 - 2) Sending end power factor
 - 3) Transmission Efficiency

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **ELECTRICAL ENGINEERING** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In a typical op-amp, which stage is supposed to be a dual-input unbalanced output or single-ended output differential amplifier?
 - Intermediate stage Input stage b) a)
 - c) Output stage d) Level shifting stage
- 2) The large signal bandwidth of an op-amp is limited by its _____.
 - a) loop gain b) slew rate
 - c) output impedance d) input frequency
- CMRR of a differential amplifier can be improved by decreasing _____. 3)
 - a) Differential voltage gain b) Common mode voltage gain
 - c) Both a and b None of the above. d)
- For an inverting amplifier, if $R_f = 100k\Omega$ and $R_i = 1k\Omega$ then closed loop gain 4) is
 - 1,00,000 b) 1,000 a)
 - 101 d) 100 c)
- Which of the following is a combination of inverting and non-inverting 5) amplifier?
 - a) Differential amplifier with one op-amp
 - b) Differential amplifier with two op-amps
 - c) Differential amplifier with three op-amps
 - d) Differential amplifier with four op-amps
- The gain of differential amplifier with one op-amp is same as that of _____. 6)
 - a) The inverting amplifier
 - The non-inverting amplifier b)
 - c) Both inverting and non-inverting amplifier
 - d) None of the mentioned
- 7) Unity gain amplifier is also known as
 - a) difference amplifier
 - c) single ended

- comparator b)
- d) voltage follower

Set

Marks: 14

Max. Marks: 70

8) A multiplexer is a combinational logic circuit used to perform the operation AND-OR

- a) AND-AND b)
- c) NOR-OR d) **XOR-NAND**
- 9) The minterm designation for AB'C'D is
 - a) m_0 b) mg
 - d) c) m₇ m_{10}
- 10) Shifting a register content to right by one bit position is equivalent to
 - a) Division by two b) Multiplication by two
 - c) Addition by two d) Subtraction by two
- 11) In _____ type of counter, the complementary output of the last stage is connected to the D input of first stage.
 - a) Ring Counter Twisted ring counter b)
 - c) Straight counter d) None of these
- The main difference between JK and RS flip-flop is that _____ 12)
 - a) JK flip-flop does not need a clock pulse
 - b) here is feedback in JK flip-flop
 - JK flip-flop accepts both inputs as 1 c)
 - d) JK flip-flop is acronym of junction cathode multivibrator
- A digital circuit that can store on bit is a _____ 13)
 - a) XOR Gate b) Register c)
 - None of these Flipflop d)
- Twenty TTL loads per TTL driver is known as _____ 14)
 - a) noise immunity

- fan-out b)
- c) propagation delay d) power dissipation



Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 ELECTRICAL ENGINEERING ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section - I

Q.2 Attempt any four of the following questions.

- a) Explain DC Analysis of differential amplifier (SIBO)
- **b)** Explain the ideal characteristics of op-amp.
- c) Explain the concept of virtual ground condition.
- d) Explain current to voltage converter.
- e) Draw and explain equivalent circuit and ideal voltage transfer curve of op-amp.

Q.3 Attempt any two of the following questions.

- a) Draw and explain the block diagram of operational amplifier.
- **b)** Explain instrumentation amplifier.
- c) Derive an expression for input resistance and output resistance for voltage shunt feedback amplifier.

Section - II

Q.4 Attempt any four of the following questions.

- a) Simplify the following logical functions using k-map $F(A,B,C)=\Sigma m(1,2,5,6,7)$
- **b)** Explain S-Rflipflop with logical diagram and truthtable. Also obtain its characteristic equation.
- c) Explain full adder in detail & realize it using basic logic gates.
- d) Draw & Explain 3 bit ring counter with the help of timing diagram.
- e) Define the following terms related to logic families
 - 1) Propagation delay
 - 2) Fanin
 - 3) Fanout
 - 4) Figure of merit

Q.5 Attempt any two of the following questions.

- a) Design MOD-10 asynchronous DOWN counter using J-Kflipflop
- **b)** Design and explain 3 bit UP synchronous counter using Dflipflop.
- c) Convert the following Boolean expression from product of sum form to a simplified/minimized sum of product form& realize minimized logical expression using NAND gates only. $F(A,B,C,D) = \pi M(1,3,6,7,9,12)$

Max. Marks: 56

Set

12

16

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Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **ELECTRICAL ENGINEERING** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- Figures to the right indicate full marks.
- Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

4)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- A multiplexer is a combinational logic circuit used to perform the 1) operation
 - AND-AND a) b) AND-OR NOR-OR d) **XOR-NAND**
 - C)
- 2) The minterm designation for AB'C'D is_ a) m_0 b) m₉
 - d) c) m₇ m_{10}
- 3) Shifting a register content to right by one bit position is equivalent to
 - Division by two a)
 - Addition by two d) c)
 - In _____ type of counter, the complementary output of the last stage is

b)

- connected to the D input of first stage. a) Ring Counter Twisted ring counter b)
- c) Straight counter
 - None of these d)

Multiplication by two

Subtraction by two

- The main difference between JK and RS flip-flop is that 5)
 - JK flip-flop does not need a clock pulse a)
 - b) here is feedback in JK flip-flop
 - JK flip-flop accepts both inputs as 1 C)
 - JK flip-flop is acronym of junction cathode multivibrator d)
- A digital circuit that can store on bit is a 6)
 - XOR Gate Register a) b) Flipflop None of these C) d)
- 7) Twenty TTL loads per TTL driver is known as _____ a)
 - noise immunity b) fan-out propagation delay d) power dissipation C)
- In a typical op-amp, which stage is supposed to be a dual-input 8) unbalanced output or single-ended output differential amplifier?
 - Intermediate stage a) Input stage b)
 - Output stage Level shifting stage d) c)

Q

Set

Max. Marks: 70

Marks: 14

an inverting amplifier, if $R_f = 1$	$00k\Omega$ ar	nd $R_i = 1 k\Omega$ then clos	sec
·			
1,00,000	b)	1,000	
101	d)	100	
ch of the following is a combir	nation of	f inverting and non-ir	۱Ve
olifier?			
Differential amplifier with one	op-amp	D	
Differential amplifier with two	op-amp)S	
Differential amplifier with thre	e op-an	nps	
Differential amplifier with four	op-amp	DS	

- The gain of differential amplifier with one op-amp is same as that of _____. 13)
 - a) The inverting amplifier
 - b) The non-inverting amplifier
 - c) Both inverting and non-inverting amplifier
 - d) None of the mentioned
- Unity gain amplifier is also known as ____ 14)
 - a) difference amplifier
- b) comparator
- d) c) single ended voltage follower

Set Q

SLR-FM-414

- 9) The large signal bandwidth of an op-amp is limited by its _____.
 - a) loop gain

- b) slew rate
- c) output impedance d)
- CMRR of a differential amplifier can be improved by decreasing _____. 10)
 - a) Differential voltage gain b) Common mode voltage gain
 - d) None of the above.

input frequency

- c) Both a and b For an inverting amplifier, if $R_f = 100k\Omega$ and $R_i = 1k\Omega$ then closed loop gain
- is ___ a) 1

11)

- **c)** 1
- 12) Whic erting ampl
 - a) D
 - b) D
 - c) [
 - d) [

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 ELECTRICAL ENGINEERING ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section - I

Q.2 Attempt any four of the following questions.

- a) Explain DC Analysis of differential amplifier (SIBO)
- **b)** Explain the ideal characteristics of op-amp.
- c) Explain the concept of virtual ground condition.
- d) Explain current to voltage converter.
- e) Draw and explain equivalent circuit and ideal voltage transfer curve of op-amp.

Q.3 Attempt any two of the following questions.

- a) Draw and explain the block diagram of operational amplifier.
- **b)** Explain instrumentation amplifier.
- c) Derive an expression for input resistance and output resistance for voltage shunt feedback amplifier.

Section - II

Q.4 Attempt any four of the following questions.

- a) Simplify the following logical functions using k-map $F(A,B,C)=\Sigma m(1,2,5,6,7)$
- **b)** Explain S-Rflipflop with logical diagram and truthtable. Also obtain its characteristic equation.
- c) Explain full adder in detail & realize it using basic logic gates.
- d) Draw & Explain 3 bit ring counter with the help of timing diagram.
- e) Define the following terms related to logic families
 - 1) Propagation delay
 - 2) Fanin
 - 3) Fanout
 - 4) Figure of merit

Q.5 Attempt any two of the following questions.

- a) Design MOD-10 asynchronous DOWN counter using J-Kflipflop
- **b)** Design and explain 3 bit UP synchronous counter using Dflipflop.
- c) Convert the following Boolean expression from product of sum form to a simplified/minimized sum of product form& realize minimized logical expression using NAND gates only. $F(A,B,C,D) = \pi M(1,3,6,7,9,12)$

Max. Marks: 56

12

16

16

Seat No.

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **ELECTRICAL ENGINEERING** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Which of the following is a combination of inverting and non-inverting amplifier?
 - a) Differential amplifier with one op-amp
 - b) Differential amplifier with two op-amps
 - Differential amplifier with three op-amps C)
 - d) Differential amplifier with four op-amps

The gain of differential amplifier with one op-amp is same as that of . 2)

- a) The inverting amplifier
- b) The non-inverting amplifier
- c) Both inverting and non-inverting amplifier
- d) None of the mentioned

Unity gain amplifier is also known as 3)

- a) difference amplifier b) single ended d) c)
- 4) A multiplexer is a combinational logic circuit used to perform the operation
 - a) AND-AND b) AND-OR
 - c) NOR-OR d) **XOR-NAND**

The minterm designation for AB'C'D is 5)

- a) m_0 b) mg
- c) m₇ d) m_{10}
- 6) Shifting a register content to right by one bit position is equivalent to
 - Division by two Multiplication by two a) b)
 - c) Addition by two d) Subtraction by two
- _ type of counter, the complementary output of the last stage is 7) In ____ connected to the D input of first stage.
 - a) Ring Counter Twisted ring counter b)
 - c) Straight counter None of these d)



Max. Marks: 70

Marks: 14

- comparator
- voltage follower

			SLR-FM-414
			Set R
8)	 The main difference between JK and a) JK flip-flop does not need a clock b) here is feedback in JK flip-flop c) JK flip-flop accepts both inputs as d) JK flip-flop is acronym of junction 	c puls s 1	Se .
9)		a b) d)	
10)	, .	nowr b) d)	n as fan-out power dissipation
11)	, , , ,		differential amplifier?
12)	, 10	amp b) d)	is limited by its slew rate input frequency
13)	,	be im b) d)	Common mode voltage gain
14)	For an inverting amplifier, if R _f = 100k is a) 1.00.000	Ωar b)	nd $R_i = 1k\Omega$ then closed loop gain 1.000

a) 1,00,000 b) 1,000 c) 101 d) 100

Seat	
No.	

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 ELECTRICAL ENGINEERING ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section - I

Q.2 Attempt any four of the following questions.

- a) Explain DC Analysis of differential amplifier (SIBO)
- **b)** Explain the ideal characteristics of op-amp.
- c) Explain the concept of virtual ground condition.
- d) Explain current to voltage converter.
- e) Draw and explain equivalent circuit and ideal voltage transfer curve of op-amp.

Q.3 Attempt any two of the following questions.

- a) Draw and explain the block diagram of operational amplifier.
- **b)** Explain instrumentation amplifier.
- c) Derive an expression for input resistance and output resistance for voltage shunt feedback amplifier.

Section - II

Q.4 Attempt any four of the following questions.

- a) Simplify the following logical functions using k-map $F(A,B,C)=\Sigma m(1,2,5,6,7)$
- **b)** Explain S-Rflipflop with logical diagram and truthtable. Also obtain its characteristic equation.
- c) Explain full adder in detail & realize it using basic logic gates.
- d) Draw & Explain 3 bit ring counter with the help of timing diagram.
- e) Define the following terms related to logic families
 - 1) Propagation delay
 - 2) Fanin
 - 3) Fanout
 - 4) Figure of merit

Q.5 Attempt any two of the following questions.

- a) Design MOD-10 asynchronous DOWN counter using J-Kflipflop
- **b)** Design and explain 3 bit UP synchronous counter using Dflipflop.
- c) Convert the following Boolean expression from product of sum form to a simplified/minimized sum of product form& realize minimized logical expression using NAND gates only. $F(A,B,C,D) = \pi M(1,3,6,7,9,12)$

Max. Marks: 56

R

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S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **ELECTRICAL ENGINEERING** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Shifting a register content to right by one bit position is equivalent 1) to
 - Division by two a)

- b) Multiplication by two
- d) Subtraction by two
- 2) In _____ type of counter, the complementary output of the last stage is connected to the D input of first stage.
 - a) Ring Counter

Addition by two

Twisted ring counter b) d) None of these c) Straight counter

The main difference between JK and RS flip-flop is that 3)

- JK flip-flop does not need a clock pulse a)
- here is feedback in JK flip-flop b)
- JK flip-flop accepts both inputs as 1 c)
- d) JK flip-flop is acronym of junction cathode multivibrator
- A digital circuit that can store on bit is a 4)
 - a) XOR Gate Register b)
 - c) Flipflop d) None of these

Twenty TTL loads per TTL driver is known as _____ 5) a) noise immunity

- fan-out b)
- c) propagation delay d) power dissipation

In a typical op-amp, which stage is supposed to be a dual-input 6) unbalanced output or single-ended output differential amplifier?

- Input stage b) Intermediate stage a) c)
 - Output stage d) Level shifting stage
- 7) The large signal bandwidth of an op-amp is limited by its _____.
 - a) loop gain b) slew rate
 - c) output impedance d) input frequency
- CMRR of a differential amplifier can be improved by decreasing _____ 8)
 - a) Differential voltage gain b)
 - c) Both a and b
- Common mode voltage gain
- d) None of the above.

Max. Marks: 70

Marks: 14

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Set

Seat

No.

Set

- 9) For an inverting amplifier, if $R_f = 100k\Omega$ and $R_i = 1k\Omega$ then closed loop gain is
 - a) 1,00,000 1.000 b)
 - 101 d) 100 C)
- Which of the following is a combination of inverting and non-inverting 10) amplifier?
 - a) Differential amplifier with one op-amp
 - b) Differential amplifier with two op-amps
 - c) Differential amplifier with three op-amps
 - d) Differential amplifier with four op-amps
- 11) The gain of differential amplifier with one op-amp is same as that of _____.
 - a) The inverting amplifier
 - b) The non-inverting amplifier
 - c) Both inverting and non-inverting amplifier
 - d) None of the mentioned
- 12) Unity gain amplifier is also known as
 - a) difference amplifier b) comparator
 - single ended d) voltage follower C)
- 13) A multiplexer is a combinational logic circuit used to perform the operation
 - a) AND-AND b) AND-OR
 - d) c) NOR-OR **XOR-NAND**
- 14) The minterm designation for AB'C'D is_
 - a) m_0 b) m₉ d)
 - c) m₇

 m_{10}

Page **12** of **12**

SLR-FM-414

b) Design and explain 3 bit UP synchronous counter using Dflipflop. c) Convert the following Boolean expression from product of sum form to a simplified/minimized sum of product form& realize minimized logical expression using NAND gates only. $F(A,B,C,D) = \pi M(1,3,6,7,9,12)$

- c) Derive an expression for input resistance and output resistance for voltage shunt feedback amplifier.

Section - II

Q.4 Attempt any four of the following questions.

- a) Simplify the following logical functions using k-map $F(A,B,C)=\Sigma m(1,2,5,6,7)$
- b) Explain S-Rflipflop with logical diagram and truthtable. Also obtain its
- c) Explain full adder in detail & realize it using basic logic gates.
- d) Draw & Explain 3 bit ring counter with the help of timing diagram.

a) Design MOD-10 asynchronous DOWN counter using J-Kflipflop

- e) Define the following terms related to logic families

 - 1) Propagation delay
 - 2) Fanin

op-amp.

- 4) Figure of merit

3) Fanout

Attempt any two of the following questions.

- characteristic equation.

a) Draw and explain the block diagram of operational amplifier. **b)** Explain instrumentation amplifier.

Attempt any four of the following questions.

b) Explain the ideal characteristics of op-amp. c) Explain the concept of virtual ground condition.

Attempt any two of the following questions.

d) Explain current to voltage converter.

a) Explain DC Analysis of differential amplifier (SIBO)

2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. Section - I

e) Draw and explain equivalent circuit and ideal voltage transfer curve of

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **ELECTRICAL ENGINEERING** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

Seat No.

Q.2

Q.3

Q.5

Max. Marks: 56

16

12



12

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019

Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence.

3v

Calculate current I of the circuit shown below.

10v

1) For the circuit shown in fig. Determine the current supplied by 3V source.

 4Ω

b)

d)

b)

d)

0.25A

Ι

5Ω

0.75 A

1.0 A

2A

2 A

-4 A



a)

c)

2)

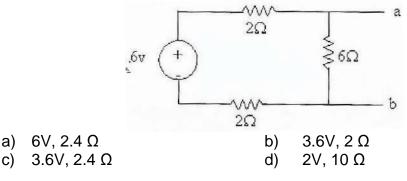
0.25 A

0.5 A



c) -2 A

The Thevenin's equivalent of the circuit shown in given fig. is _____.

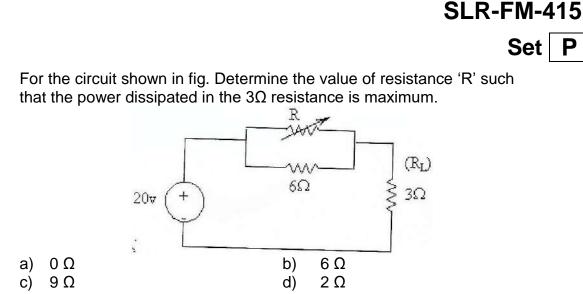


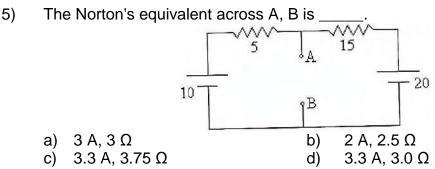
SLR-FM-415

Max. Marks: 70

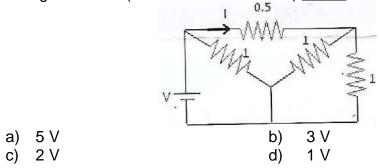
Marks: 14







In the circuit shown in the fig. if I = 2 A, then the value of the battery 6) voltage V will be (all resistors are in ohm)



- 7) The superposition theorem is valid for _
 - All linear networks a)

4)

- b) Linear and Symmetrical networks only
- c) Only linear networks having no dependent sources
- d) Linear as well as non linear networks
- 8) A capacitor does not allow sudden changes in ____ .
 - a) currents b) Voltages
 - d) both a and b none of Above c)
- 9) Which notation of instant implies that the unchanged condition of network is about to change?
 - a) $t(0)^+$ t(0) b)
 - c) t* d) t(0*)
- 10) The time constant of a series RC circuit is
 - 1/RC R/C a) b) e^{-RC}
 - RC d) c)

Ρ

SLR-FM-415 Set P

11)	The Laplace transform of $t^{3}\delta(t-4)$ is
-----	--

a) $4^3 e^{-4s}$ c) $e^{4s}3^2$

b) 3⁴e^{3s}

None of these d)

- 12) L[e^t] is: _____. a) 1/s-log2 b) 1/s+log2 none of these c) 1/s+2 d)
- A 2-port network using z-parameter representation is said to be reciprocal 13) if _____.
 - a) $Z_{11} = Z_{22}$ $\begin{array}{l} Z_{12} = Z_{21} \\ Z_{11} \ Z_{22} \text{-} \ Z_{12} \ Z_{21} = 1 \end{array}$ b) c) $Z_{12} = - Z_{21}$ d)
- The number of possible combination generated by four variables taken to 14) at a time in a two port network is: _ 2
 - a) 4 b) c) 6
 - d) none of these

Seat	
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S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2V

.

4V

8V

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

a) Obtain potential of node B with respect to node G in the network shown in the fig.

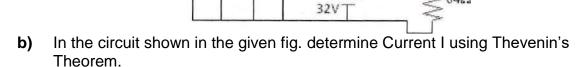
 $4 \, \mathrm{C}$

60

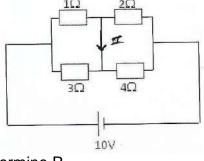
32 Q

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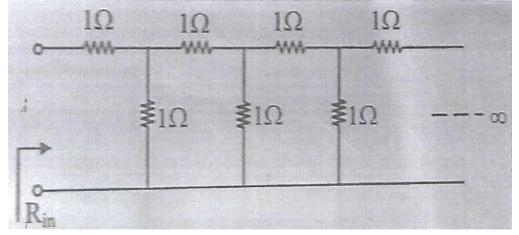
~64Ω



16V



c) In the circuit shown determine R_{in}

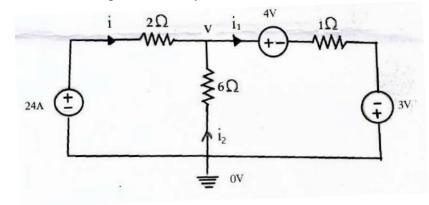


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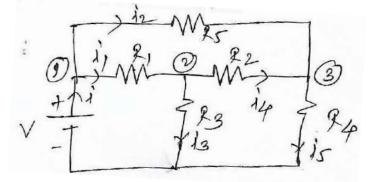
Max. Marks: 56

Set P

d) Determine i, i₁, i₂ using nodal analysis.

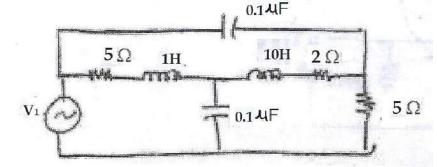


e) Draw graph of a network and Write incident matrix.

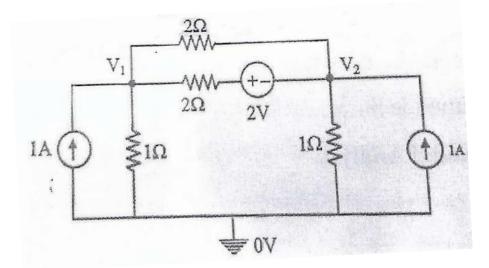


Q.3 Solve any two.

a) Find the duel network of the network shown.



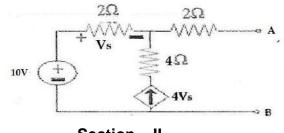
b) Consider the following circuit, determine node voltages V_1 and V_2



SLR-FM-415

Set P

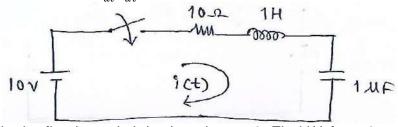
c) Find Norton's equivalent of the circuit shown in the given fig.





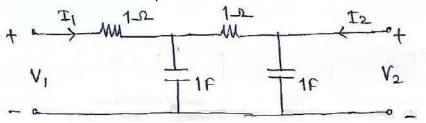
Q.4 Solve any four.

a) In the network shown, the switch is closed. Assuming all initial conditions as zero, find $i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ at $t = 0^+$

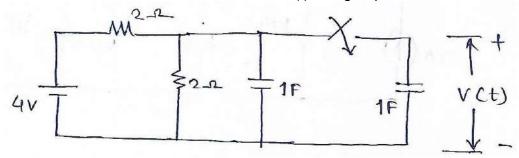


b) In the fig. the switch is closed at t = 0. Find i(t) for t>0. $10 A \stackrel{(1)}{\longrightarrow} \stackrel{(2)}{\longrightarrow} 1 \mathcal{L} \stackrel{(2)}{\longrightarrow} 2 \mathcal{L} \stackrel{(1)}{\longrightarrow} 31H$

- c) Derive ABCD parameter in terms of Y-parameter.
- d) Determine admittance parameters of the network.



e) The network shown has acquired steady state at t < 0 with switch open. The switch is closed at t = 0. Determine v(t) using Laplace transform.



16

SLR-FM-415

Set P

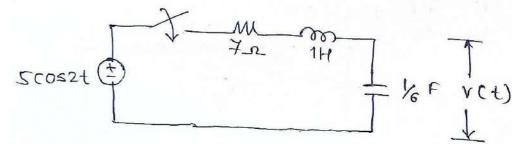
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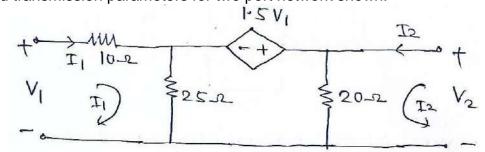
12

Q.5 Solve any two.

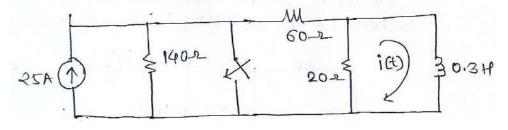
a) In the network shown, find voltage v(t) for t > 0 using Laplace transform.



b) Find transmission parameters for two port network shown.



c) In fig., switch is closed at t = 0. Find i(t) for t > 0.



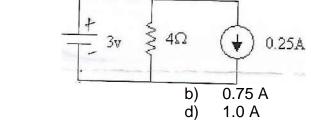
Seat No.		Set Q	
S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS			
	Day & Date: Wednesday, 27-11-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM Max. Marks: 70		
Instru	uctior	s: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.	
		2) Figures to the right indicates full marks.	
Durati	ion: 3	MCQ/Objective Type Questions) Minutes Marks: 14	
	sente		
	1)	A capacitor does not allow sudden changes in a) currents b) Voltages c) both a and b d) none of Above	
	2)	Which notation of instant implies that the unchanged condition of network is about to change? a) $t(0)^+$ b) $t(0)^-$ c) t^* d) $t(0^*)$	
	3)	The time constant of a series RC circuit is	
	0)	a) $1/RC$ b) R/C c) RC d) e^{-RC}	
	4)	The Laplace transform of $t^{3}\delta(t-4)$ is	
		a) $4^3 e^{-4s}$ c) $e^{4s}3^2$ b) $3^4 e^{3s}$ d) None of these	
	5)	L[e ^t] is: a) 1/s-log2 b) 1/s+log2 c) 1/s+2 d) none of these	
	6)	A 2-port network using z-parameter representation is said to be reciprocal if	
		a) $Z_{11} = Z_{22}$ b) $Z_{12} = Z_{21}$ c) $Z_{12} = -Z_{21}$ d) $Z_{11} Z_{22} - Z_{12} Z_{21} = 1$	
	7)	The number of possible combination generated by four variables taken to at a time in a two port network is:	
		a) 4 b) 2	

c) 6 d) none of these

SLR-FM-415



8) For the circuit shown in fig. Determine the current supplied by 3V source.



a) 0.25 A c) 0.5 A

4 A

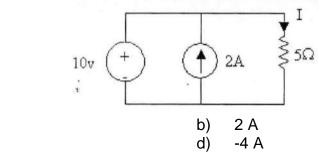
-2 A

a)

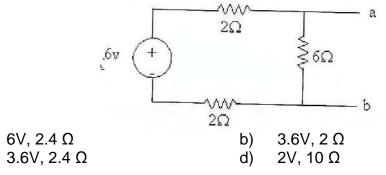
c)

a) c)

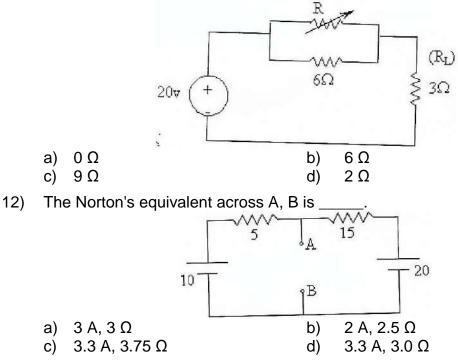
9) Calculate current I of the circuit shown below.



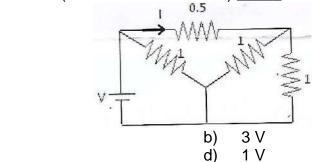
10) The Thevenin's equivalent of the circuit shown in given fig. is _____



11) For the circuit shown in fig. Determine the value of resistance 'R' such that the power dissipated in the 3Ω resistance is maximum.



13) In the circuit shown in the fig. if I = 2 A, then the value of the battery voltage V will be (all resistors are in ohm) _____.



- 14) The superposition theorem is valid for _____.
 - a) All linear networks

5 V

2 V

a)

c)

- b) Linear and Symmetrical networks only
- c) Only linear networks having no dependent sources
- d) Linear as well as non linear networks

SLR-FM-415

Set Q

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2V

.

4V

8V

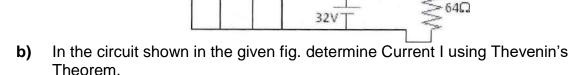
2) Figures to the right indicate full marks.

Section – I

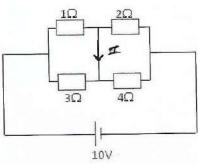
Q.2 Solve any four.

a) Obtain potential of node B with respect to node G in the network shown in the fig.

 $4 \, \mathrm{C}$



16V

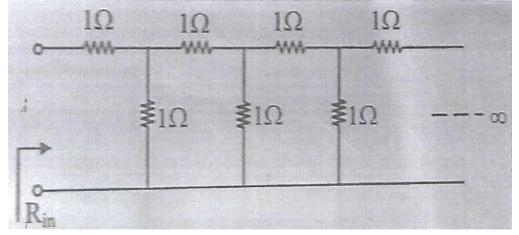


6

32 Q

R

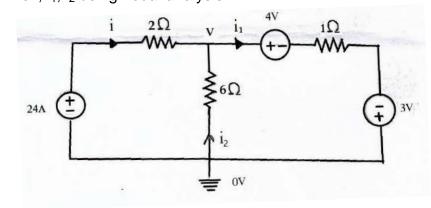
c) In the circuit shown determine R_{in}



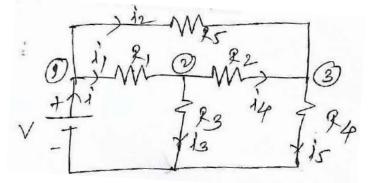
Max. Marks: 56



d) Determine i, i_1 , i_2 using nodal analysis.

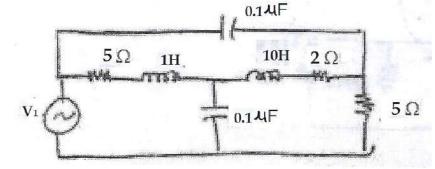


e) Draw graph of a network and Write incident matrix.

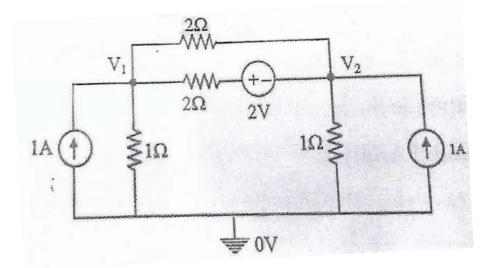


Q.3 Solve any two.

a) Find the duel network of the network shown.



b) Consider the following circuit, determine node voltages V_1 and V_2

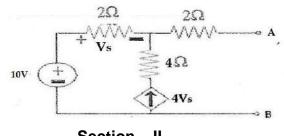


12

SLR-FM-415

Set Q

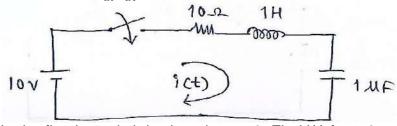
Find Norton's equivalent of the circuit shown in the given fig. c)



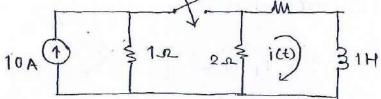


Q.4 Solve any four.

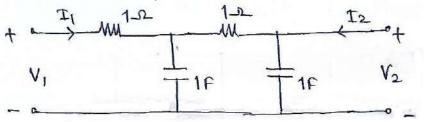
In the network shown, the switch is closed. Assuming all initial conditions a) as zero, find $i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ at $t = 0^+$



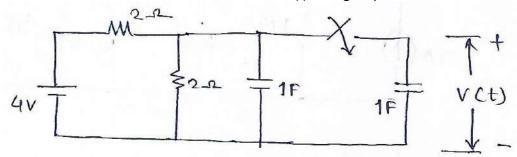
In the fig. the switch is closed at t = 0. Find i(t) for t>0. b) 22



- c) Derive ABCD parameter in terms of Y-parameter.
- Determine admittance parameters of the network. d)



The network shown has acquired steady state at t < 0 with switch open. e) The switch is closed at t = 0. Determine v(t) using Laplace transform.



16

SLR-FM-415

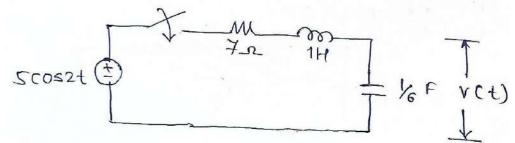
Set | Q

Set Q

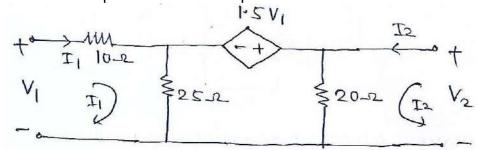
12

Q.5 Solve any two.

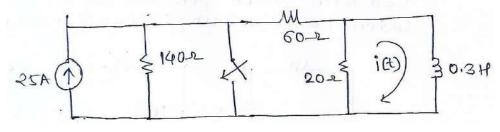
a) In the network shown, find voltage v(t) for t > 0 using Laplace transform.



b) Find transmission parameters for two port network shown.



c) In fig., switch is closed at t = 0. Find i(t) for t > 0.



Set R

Max. Marks: 70

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicates full marks.

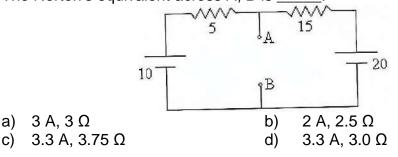
MCQ/Objective Type Questions

Duration: 30 Minutes

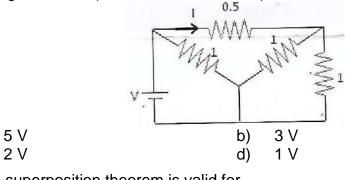
Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - 1) The Norton's equivalent across A, B is ____



In the circuit shown in the fig. if I = 2 A, then the value of the battery voltage V will be (all resistors are in ohm) _____.



- 3) The superposition theorem is valid for _____.
 - a) All linear networks
 - b) Linear and Symmetrical networks only
 - c) Only linear networks having no dependent sources
 - d) Linear as well as non linear networks

A capacitor does not allow sudden changes in _____.

- a) currents b) Voltages
- c) both a and b d) none of Above
- 5) Which notation of instant implies that the unchanged condition of network is about to change?

b)

d)

t(0)

t(0*)

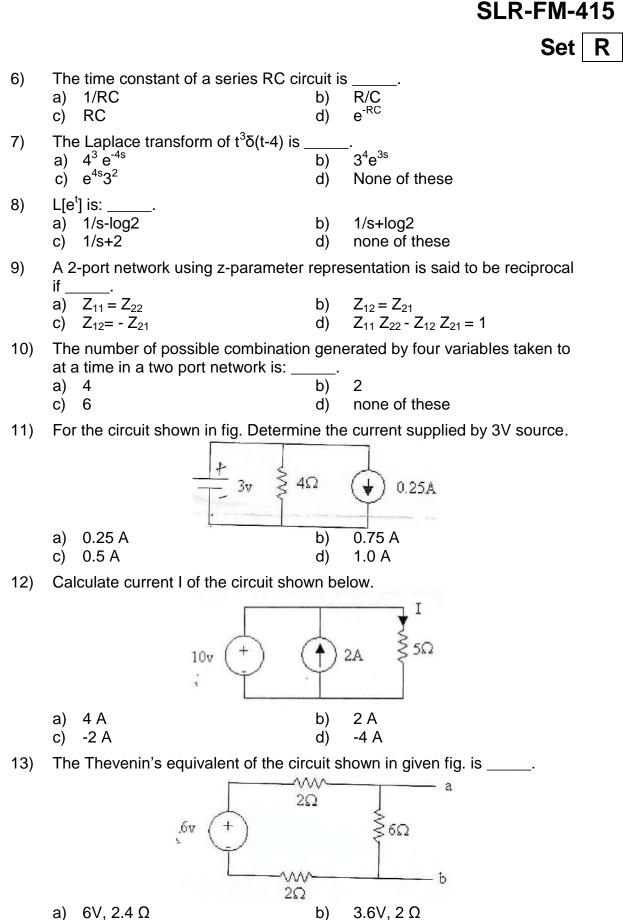
a) t(0)⁺

a)

c)

c) t*

Marks: 14



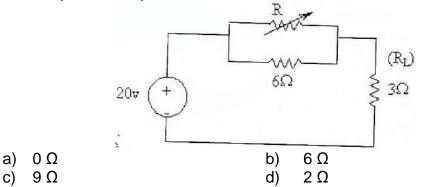
2V, 10 Ω

a) $6V, 2.4 \Omega$ b) c) $3.6V, 2.4 \Omega$ d)

Set R For the circuit shown in fig. Determine the value of resistance 'R' such that the power dissipated in the 3Ω resistance is maximum.

SLR-FM-415

14)





Set

R

Seat No.

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

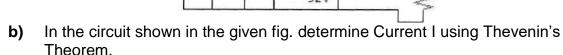
Instructions: 1) All questions are compulsory.

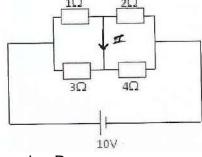
2) Figures to the right indicate full marks.

Section – I

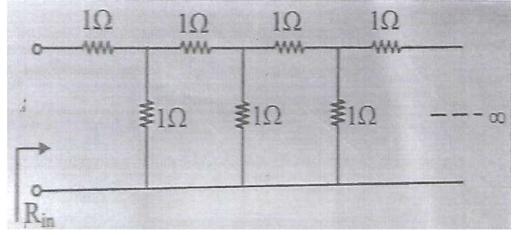
Q.2 Solve any four.

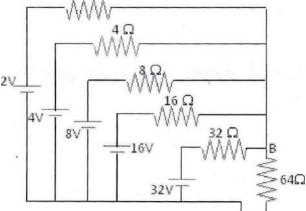
a) Obtain potential of node B with respect to node G in the network shown in the fig.





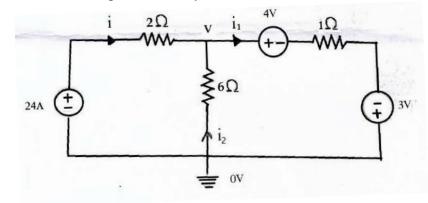
c) In the circuit shown determine R_{in}



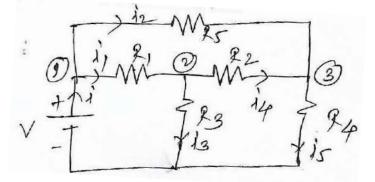


Max. Marks: 56

d) Determine i, i₁, i₂ using nodal analysis.

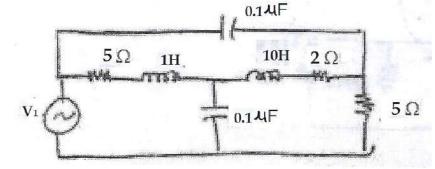


e) Draw graph of a network and Write incident matrix.

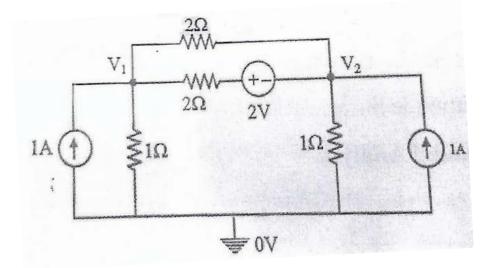


Q.3 Solve any two.

a) Find the duel network of the network shown.

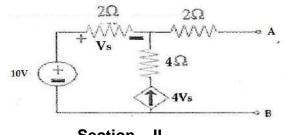


b) Consider the following circuit, determine node voltages V_1 and V_2



SLR-FM-415 Set R

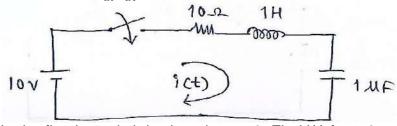
Find Norton's equivalent of the circuit shown in the given fig. c)



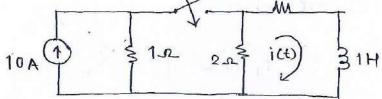


Q.4 Solve any four.

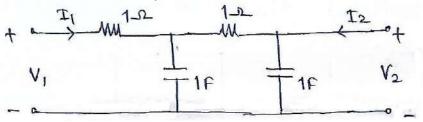
In the network shown, the switch is closed. Assuming all initial conditions a) as zero, find $i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ at $t = 0^+$



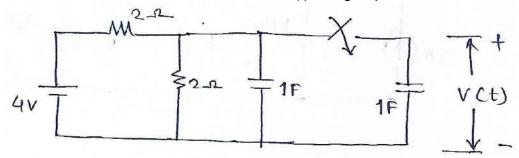
In the fig. the switch is closed at t = 0. Find i(t) for t>0. b) 22



- c) Derive ABCD parameter in terms of Y-parameter.
- Determine admittance parameters of the network. d)



The network shown has acquired steady state at t < 0 with switch open. e) The switch is closed at t = 0. Determine v(t) using Laplace transform.



16

SLR-FM-415

Set | R

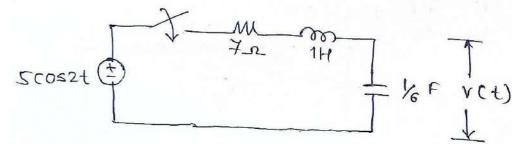
Set

R

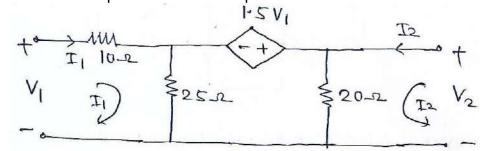
12

Q.5 Solve any two.

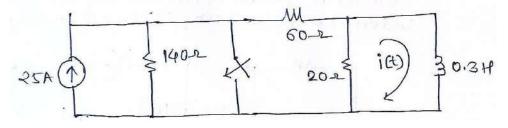
a) In the network shown, find voltage v(t) for t > 0 using Laplace transform.



b) Find transmission parameters for two port network shown.

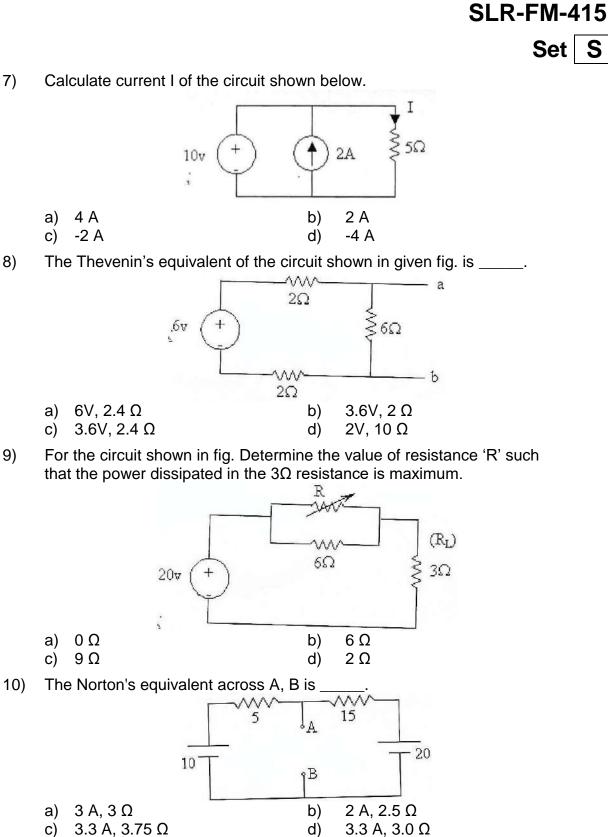


c) In fig., switch is closed at t = 0. Find i(t) for t > 0.



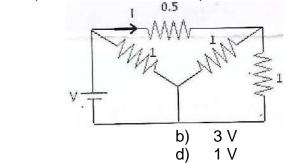
Seat No.	t		Set	S
		S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-201 Electrical Engineering NETWORK ANALYSIS	9	
		e: Wednesday, 27-11-2019 Ma 30 PM To 05:30 PM	ax. Marks	s: 70
Instr	uctio	 ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minute Book. 2) Figures to the right indicates full marks 	es in ans	wer
		2) Figures to the right indicates full marks.		
D	tions	MCQ/Objective Type Questions		
		30 Minutes	Mark	
Q.1		ose the correct alternatives from the options and rewrite the tence.		14
	1)	The time constant of a series RC circuit is a) 1/RC b) R/C c) RC d) e ^{-RC}		
	2)	The Laplace transform of $t^{3}\delta(t-4)$ is a) $4^{3} e^{-4s}$ b) $3^{4}e^{3s}$ c) $e^{4s}3^{2}$ d) None of these		
	3)	L[e ^t] is: a) 1/s-log2 b) 1/s+log2 c) 1/s+2 d) none of these		
	4)	A 2-port network using z-parameter representation is said to be rec	iprocal	
		if a) $Z_{11} = Z_{22}$ b) $Z_{12} = Z_{21}$ c) $Z_{12} = -Z_{21}$ d) $Z_{11} Z_{22} - Z_{12} Z_{21} = 1$		
	5)	The number of possible combination generated by four variables taat a time in a two port network is:a) 4b) 2c) 6d) none of these	iken to	
	6)	For the circuit shown in fig. Determine the current supplied by 3V s $ \begin{array}{c c} + & & & \\ \hline \end{array} \\ \hline \hline & & & \\ \hline & & & \\ \hline \hline \\ \hline $	ource.	

SLR-FM-415



3.3 A, 3.75 Ω C)

11) In the circuit shown in the fig. if I = 2 A, then the value of the battery voltage V will be (all resistors are in ohm) _____.



- 12) The superposition theorem is valid for _____.
 - a) All linear networks

5 V

2 V

a)

c)

- b) Linear and Symmetrical networks only
- c) Only linear networks having no dependent sources
- d) Linear as well as non linear networks
- 13) A capacitor does not allow sudden changes in _____
 - a) currents b) Voltages
 - c) both a and b d) none of Above
- 14) Which notation of instant implies that the unchanged condition of network is about to change?
 - a) $t(0)^+$ b) $t(0)^$ c) t^* d) $t(0^*)$

SLR-FM-415

Set S

Set

S

S.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2V

.

4V

8V

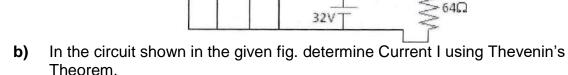
2) Figures to the right indicate full marks.

Section – I

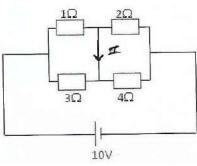
Q.2 Solve any four.

a) Obtain potential of node B with respect to node G in the network shown in the fig.

 $4 \, \mathrm{C}$



16V

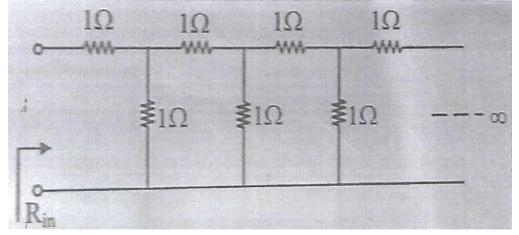


60

32 Q

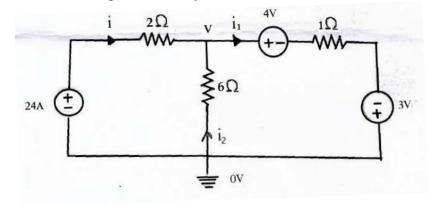
R

c) In the circuit shown determine R_{in}

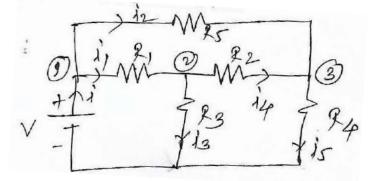


Max. Marks: 56

d) Determine i, i₁, i₂ using nodal analysis.

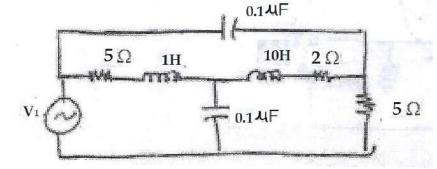


e) Draw graph of a network and Write incident matrix.

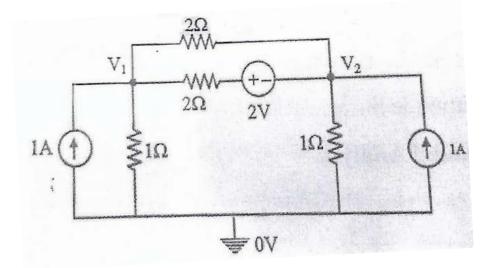


Q.3 Solve any two.

a) Find the duel network of the network shown.

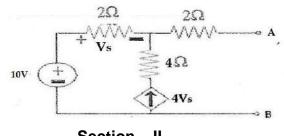


b) Consider the following circuit, determine node voltages V_1 and V_2



SLR-FM-415 Set S

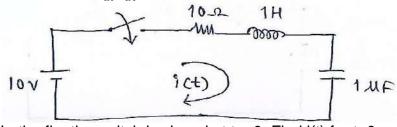
Find Norton's equivalent of the circuit shown in the given fig. c)





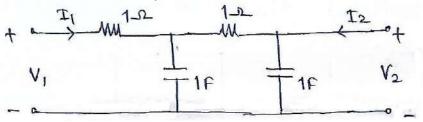
Q.4 Solve any four.

In the network shown, the switch is closed. Assuming all initial conditions a) as zero, find $i, \frac{di}{dt}, \frac{d^2i}{dt^2}$ at $t = 0^+$

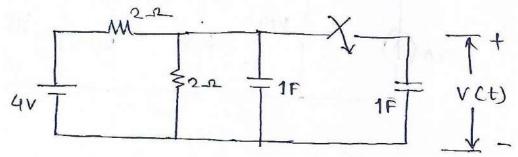


In the fig. the switch is closed at t = 0. Find i(t) for t>0. b) 22 AA i(t) 102 20 1H 10A

- c) Derive ABCD parameter in terms of Y-parameter.
- Determine admittance parameters of the network. d)



The network shown has acquired steady state at t < 0 with switch open. e) The switch is closed at t = 0. Determine v(t) using Laplace transform.



16

SLR-FM-415

Set S

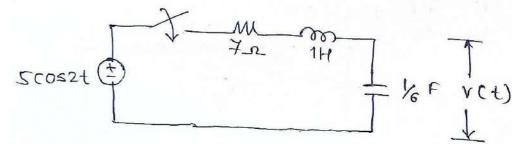
Set

S

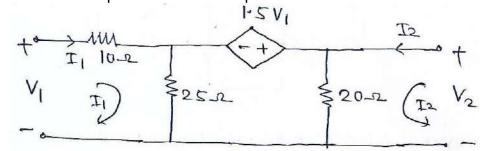
12

Q.5 Solve any two.

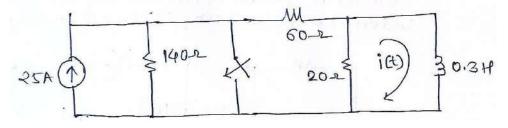
a) In the network shown, find voltage v(t) for t > 0 using Laplace transform.



b) Find transmission parameters for two port network shown.



c) In fig., switch is closed at t = 0. Find i(t) for t > 0.



Page 1 of 16

T.E. (Part-I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

Seat

No.

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Range of accelerating factor is _ 1)
 - 50 to 100 b) 1 to 10 a) 1.6 to 1.8 10.8 to 11.2 C) d)

2) For n bus power system size of Y bus matrix is

- (n-2)×(n-2) $(n-1) \times (n-1)$ a) b)
- (n-1)x(n-2)C) n×n d)
- 3) Which among the following methods are generally used for the calculation of symmetrical faults?
 - Norton theorem a)
- b) Thevenin's theorem Only (b) and (c)
- Kirchhoff's laws d) C)
- 4) Which of the following fault results into a three phase faults?
 - Single line to ground fault. a)
 - Double line to ground fault b)
 - c) Line to line fault
 - Fault due to all the three phases to earth. d)
- 5) In what direction does the phasor get rotated if it is multiplied by the operator 'a'?
 - Anti-clockwise a)
 - b) Clockwise
 - gets rotated by 90° in the clockwise direction c)
 - gets rotated by 90° in the anticlockwise direction d)
- 6) The Critical Clearance time of a fault in the power system is related to
 - Reactive power limit a) c)
- Short Circuit limit b) Transient stability limit
- Steady state stability limit d)
- Fault level means ____ 7)
 - Fault Current a) C) Fault MVA
- Voltage at the point of fault b)
- d) Fault power factor
- 8) The impedance per phase of 3-phase transmission line on a base of 100 MV A,100 kV is 2 PV, the value of this impedance on a base of 400 MVA and 400 kV would be _____.
 - 1.5 pu b) 1.0 pu a)
 - 0.5 pu d) 0.25 pu c)

Max. Marks: 70

Set

Set

- In a circuit the voltage and current are given by v = (10 + i5) and
- i = (6 + j4). The circuit is _____.

inductive

9)

a)

c)

- b) Capacitive
- c) resistive d) it could be any of the above.
- 10) If a new line is added between the buses 2 and 3 in a system, the elements of YBus affected by addition of this line are _____.
 - a) Y22,Y33
- b) Y22, Y23, Y32, Y33
- Y23,Y32 d) None of the above
- 11) At a particular unbalanced node, the real powers specified are: Leaving the node 20 MW, 25 MW Entering the node 60 MW, 30 MW The balancing power will be:
 - a) 30 MW leaving the node
 - b) 45 MW leaving the node
 - c) 45 MW entering the node
 - d) 22.5 MW entering the node and 22.5 MW leaving the node
- 12) For a 15-bus power system with 3 voltage controlled bus, the size of Jacobian matrix is _____.
 - a) 11 × 11 b) 12×12
 - c) 24×24 d) 28×28
- 13) A three-phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3 s. The symmetrical breaking current is _____.
 - a) 1200 A b) 3600 A
 - c) 35 KA d) 104.8 KA
- 14) The bus-bars of each of the two alternators of 15% reactance each, are interconnected through tie-bar reactors of 15% each. The equivalent impedance to fault current for a 3-phase fault in any alternator bus-bar will be _____.
 - a) 75% b) 10% c) 11.25% d) 15%

Seat	
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T.E. (Part-I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Answer any four from following question.

- a) A generating station has five section bus-bar connected with a tie-bar through 7-5% reactors rated at 3000 kVA. Each generator is of 3000 kVA with 10% reactance and is connected to one section of the bus-bar. Find the total steady input to a dead short-circuit between the lines on one of the sections of the bus-bars with reactors.
- **b)** Explain clearly the computational procedure for load flow solution using Decoupled method..
- c) With the help of sample power system explain step by step method for formation of Y bus using singular Transformation.
- d) Derive and explain static load flow equation.
- e) Three generators are rated as follows: Generator 1-100 MVA, 35 kV, reactance 10%; Generator 2- 200 MVA, 32 kV, reactance 8%; Generator 3-200 MVA, 35 kV, and reactance 12%. Determine the reactance of the generator corresponding to base Values of 200 MVA, 35 kV.
- f) A 3-phase, 20 MVA, 11 kV alternator has internal reactance of 5% and negligible resistance. Find the external reactance per phase to be connected in series with the alternator so that steady current on short circuit does not exceed six times the full load current.

Q.3 Attempt any two of the following questions.

- a) Explain clearly the computational procedure for load flow solution using NR method when the system contains all type of buses.
- **b)** The following is the system data for a load flow solution: The line admittances:

Bus code	Admittance
1-2	2-j8.0
1-3	1-j4.0
2-3	0.666-j2.664
2-4	1-j4.0
3-4	2-j8.0

The schedule of active and reactive powers:

Bus code	Р	Q	V	Remarks
1	-	-	1.06	Slack
2	0.5	0.2	1+j0.0	PQ
3	0.4	0.3	1+j0.0	PQ
4	0.3	0.1	1+j0.0	PQ

Determine the voltages at the end of first iteration using Gauss-Seidel method. Take α = 1.6.

Max. Marks: 56

16

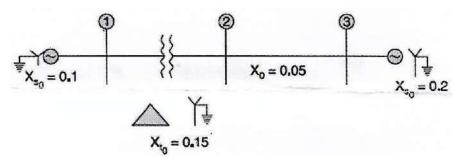
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- Set P
- c) Obtain a step by step programmable technique for building a complete Z bus of the given system.

Section – II

Q.4 Answer any four of the following question.

- a) The current from neutral to ground connection is 12 A. Calculate the zero phase sequence components in phases.
- **b)** The zero sequence reactances (in p.u.) are indicated in the network shown in the figure. Determine the value of zero sequence driving-point reactance at node 3 shown in fig.



- c) Determine the fault currents in each phase following a double line-to ground short circuit at the terminals of a star-connected synchronous generator operating initially on an open circuit voltage of 1 pu. The positive, negative and zero sequence reactance of the generator are, respectively, j0.35, j0.25 and j0.20, and its star point is isolated from ground.
- d) Explain with sequence network various open conductor faults on the power system.
- e) Prove That

i)
$$\frac{1-a^2}{a-a^2} = -a$$

ii) $1-a$

 $\frac{1}{a+a^2} = 1-a^2$

Where a and a^2 are vector operators.

f) Derive swing equation and discuss its importance in power system stability.

Q.5 Answer any two of the following question.

- a) Three 6.6 kV, 12 MVA, 3-phase alternators are connected to a common set of busbars. The positive, negative and zero sequence impedances of each alternator are 15%, 12% and 4.5% respectively. If an earth fault occurs on one busbar, determine the fault current:
 - i) If all the alternator neutrals are solidly grounded
 - ii) If only one of the alternator neutrals is solidly earthed and the others are isolated
 - iii) If one of the alternator neutrals is earthed through a reactance of 0.5 ohm and the others are isolated.
- b) Derive an expression with sequence network of the system when
 - i) line to line (LL) fault on generator
 - ii) LLG fault on generator
- c) Three resistors of 5Ω , 10Ω and 20Ω are connected in delta across the three phases of a balanced 100 volts supply. What are the sequence components in the resistors and in supply lines?

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T.E. (Part-I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

c)

C)

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 - 2) Figures to the right indicate full marks.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The impedance per phase of 3-phase transmission line on a base of 100 MV A,100 kV is 2 PV, the value of this impedance on a base of 400 MVA and 400 kV would be _____.
 - a) 1.5 pu b) 1.0 pu
 - c) 0.5 pu d) 0.25 pu
- 2) In a circuit the voltage and current are given by v = (10 + j5) and
 - i = (6 + j4). The circuit is _____. a) inductive
 - b) Capacitive
 - resistive d) it could be any of the above.
- 3) If a new line is added between the buses 2 and 3 in a system, the elements of YBus affected by addition of this line are _____.
 - a) Y22,Y33 b)
 - b) Y22, Y23, Y32, Y33d) None of the above
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Y23,Y32

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a)	75%	b)	10%
c)	11.25%	d)	15%



Max. Marks: 70

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- 8) Range of accelerating factor is ____
 - a) 50 to 100 b) 1 to 10 c) 1.6 to 1.8 d) 10.8 to 11.2
- 9) For n bus power system size of Y bus matrix is _
 - a) (n-1)×(n-1) b) (n-2)×(n-2)
 - c) n×n d) (n-1)×(n-2)
- 10) Which among the following methods are generally used for the calculation of symmetrical faults?
 - a) Norton theorem b) Thevenin's theorem
 - Kirchhoff's laws d) Only (b) and (c)
- 11) Which of the following fault results into a three phase faults?
 - a) Single line to ground fault.
 - b) Double line to ground fault
 - c) Line to line fault
 - d) Fault due to all the three phases to earth.
- 12) In what direction does the phasor get rotated if it is multiplied by the operator 'a'?
 - a) Anti-clockwise
 - b) Clockwise

C)

- c) gets rotated by 90° in the clockwise direction
- d) gets rotated by 90° in the anticlockwise direction
- 13) The Critical Clearance time of a fault in the power system is related to
 - a) Reactive power limit
 - c) Steady state stability limit
- 14) Fault level means _____
 - a) Fault Current
 - c) Fault MVA

- b) Short Circuit limit
- d) Transient stability limit
- b) Voltage at the point of fault
- d) Fault power factor

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T.E. (Part-I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

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Section – I

Q.2 Answer any four from following question.

- a) A generating station has five section bus-bar connected with a tie-bar through 7-5% reactors rated at 3000 kVA. Each generator is of 3000 kVA with 10% reactance and is connected to one section of the bus-bar. Find the total steady input to a dead short-circuit between the lines on one of the sections of the bus-bars with reactors.
- **b)** Explain clearly the computational procedure for load flow solution using Decoupled method..
- c) With the help of sample power system explain step by step method for formation of Y bus using singular Transformation.
- d) Derive and explain static load flow equation.
- e) Three generators are rated as follows: Generator 1-100 MVA, 35 kV, reactance 10%; Generator 2- 200 MVA, 32 kV, reactance 8%; Generator 3-200 MVA, 35 kV, and reactance 12%. Determine the reactance of the generator corresponding to base Values of 200 MVA, 35 kV.
- f) A 3-phase, 20 MVA, 11 kV alternator has internal reactance of 5% and negligible resistance. Find the external reactance per phase to be connected in series with the alternator so that steady current on short circuit does not exceed six times the full load current.

Q.3 Attempt any two of the following questions.

- a) Explain clearly the computational procedure for load flow solution using NR method when the system contains all type of buses.
- **b)** The following is the system data for a load flow solution: The line admittances:

Bus code	Admittance
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The schedule of active and reactive powers:

Bus code	Р	Q	V	Remarks
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3	0.4	0.3	1+j0.0	PQ
4	0.3	0.1	1+j0.0	PQ

Determine the voltages at the end of first iteration using Gauss-Seidel method. Take α = 1.6.

Max. Marks: 56

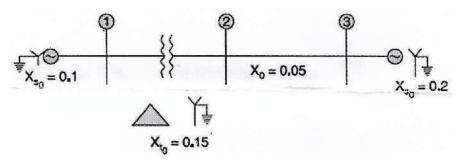
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- Set Q
- c) Obtain a step by step programmable technique for building a complete Z bus of the given system.

Section – II

Q.4 Answer any four of the following question.

- a) The current from neutral to ground connection is 12 A. Calculate the zero phase sequence components in phases.
- **b)** The zero sequence reactances (in p.u.) are indicated in the network shown in the figure. Determine the value of zero sequence driving-point reactance at node 3 shown in fig.



- c) Determine the fault currents in each phase following a double line-to ground short circuit at the terminals of a star-connected synchronous generator operating initially on an open circuit voltage of 1 pu. The positive, negative and zero sequence reactance of the generator are, respectively, j0.35, j0.25 and j0.20, and its star point is isolated from ground.
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$$\frac{1-a^2}{a-a^2} = -a$$

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 $\frac{1}{a+a^2} = 1-a^2$

Where a and a^2 are vector operators.

f) Derive swing equation and discuss its importance in power system stability.

Q.5 Answer any two of the following question.

- a) Three 6.6 kV, 12 MVA, 3-phase alternators are connected to a common set of busbars. The positive, negative and zero sequence impedances of each alternator are 15%, 12% and 4.5% respectively. If an earth fault occurs on one busbar, determine the fault current:
 - i) If all the alternator neutrals are solidly grounded
 - ii) If only one of the alternator neutrals is solidly earthed and the others are isolated
 - iii) If one of the alternator neutrals is earthed through a reactance of 0.5 ohm and the others are isolated.
- b) Derive an expression with sequence network of the system when
 - i) line to line (LL) fault on generator
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- c) Three resistors of 5Ω , 10Ω and 20Ω are connected in delta across the three phases of a balanced 100 volts supply. What are the sequence components in the resistors and in supply lines?

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T.E. (Part-I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

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No.

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 - 2) Figures to the right indicate full marks.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In what direction does the phasor get rotated if it is multiplied by the 1) operator 'a'?
 - Anti-clockwise a)
 - Clockwise b)
 - gets rotated by 90° in the clockwise direction c)
 - gets rotated by 90° in the anticlockwise direction d)
- 2) The Critical Clearance time of a fault in the power system is related to
 - Reactive power limit a)
 - Steady state stability limit C)
- 3) Fault level means
- b) Voltage at the point of fault
- Fault Current a) C) Fault MVA d) Fault power factor
- 4) The impedance per phase of 3-phase transmission line on a base of 100 MV A,100 kV is 2 PV, the value of this impedance on a base of 400 MVA and 400 kV would be _____.
 - a) 1.5 pu b) 1.0 pu
 - d) 0.25 pu c) 0.5 pu
- 5) In a circuit the voltage and current are given by v = (10 + i5) and
 - i = (6 + j4). The circuit is _____. inductive b) Capacitive a)
 - c) resistive d) it could be any of the above.
- If a new line is added between the buses 2 and 3 in a system, the 6) elements of YBus affected by addition of this line are
 - Y22,Y33 b) Y22, Y23, Y32, Y33 a)
 - d) None of the above Y23,Y32 C)
- At a particular unbalanced node, the real powers specified are: Leaving 7) the node 20 MW, 25 MW Entering the node 60 MW, 30 MW The balancing power will be:
 - a) 30 MW leaving the node
 - 45 MW leaving the node b)
 - c) 45 MW entering the node
 - 22.5 MW entering the node and 22.5 MW leaving the node d)

Short Circuit limit b)

- Transient stability limit d)

- Max. Marks: 70
- Set

For a 15-bus power system with 3 voltage controlled bus, the size of Jacobian matrix is _____. 11 × 11 b) 12×12 24×24 d) 28 × 28 A three-phase, 33 kV oil circuit breaker is rated 1200 A, 2000 MVA, 3 s. The symmetrical breaking current is 3600 A 1200 A b) 35 KA d) 104.8 KA The bus-bars of each of the two alternators of 15% reactance each, are interconnected through tie-bar reactors of 15% each. The equivalent impedance to fault current for a 3-phase fault in any alternator bus-bar will

- 75% b) 10% a)
- d) 15% c) 11.25%
- 11) Range of accelerating factor is ____ a) 50 to 100 b) 1 to 10 1.6 to 1.8 d) 10.8 to 11.2 c)
- 12) For n bus power system size of Y bus matrix is _____.

a)	(n-1)×(n-1)	b)	(n-2)×(n-2)
``		1)	()) ()

- C) nxn d) (n-1)x(n-2)
- 13) Which among the following methods are generally used for the calculation of symmetrical faults?
 - Norton theorem a)

8)

9)

10)

a)

C)

a)

C)

be

- Thevenin's theorem b)
- Kirchhoff's laws C) d) Only (b) and (c)
- Which of the following fault results into a three phase faults? 14)
 - Single line to ground fault. a)
 - Double line to ground fault b)
 - Line to line fault C)
 - Fault due to all the three phases to earth. d)

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T.E. (Part-I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

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Section – I

Q.2 Answer any four from following question.

- a) A generating station has five section bus-bar connected with a tie-bar through 7-5% reactors rated at 3000 kVA. Each generator is of 3000 kVA with 10% reactance and is connected to one section of the bus-bar. Find the total steady input to a dead short-circuit between the lines on one of the sections of the bus-bars with reactors.
- **b)** Explain clearly the computational procedure for load flow solution using Decoupled method..
- c) With the help of sample power system explain step by step method for formation of Y bus using singular Transformation.
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- e) Three generators are rated as follows: Generator 1-100 MVA, 35 kV, reactance 10%; Generator 2- 200 MVA, 32 kV, reactance 8%; Generator 3-200 MVA, 35 kV, and reactance 12%. Determine the reactance of the generator corresponding to base Values of 200 MVA, 35 kV.
- f) A 3-phase, 20 MVA, 11 kV alternator has internal reactance of 5% and negligible resistance. Find the external reactance per phase to be connected in series with the alternator so that steady current on short circuit does not exceed six times the full load current.

Q.3 Attempt any two of the following questions.

- a) Explain clearly the computational procedure for load flow solution using NR method when the system contains all type of buses.
- **b)** The following is the system data for a load flow solution: The line admittances:

Bus code	Admittance
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The schedule of active and reactive powers:

Bus code	Р	Q	V	Remarks
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Determine the voltages at the end of first iteration using Gauss-Seidel method. Take α = 1.6.

Max. Marks: 56

Set

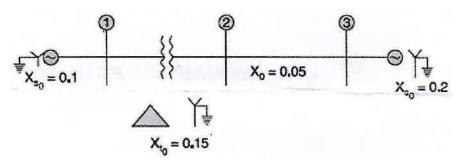
12

- Set R
- c) Obtain a step by step programmable technique for building a complete Z bus of the given system.

Section – II

Q.4 Answer any four of the following question.

- a) The current from neutral to ground connection is 12 A. Calculate the zero phase sequence components in phases.
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- b) Derive an expression with sequence network of the system when
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- c) Three resistors of 5Ω , 10Ω and 20Ω are connected in delta across the three phases of a balanced 100 volts supply. What are the sequence components in the resistors and in supply lines?

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Seat	
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T.E. (Part-I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

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 - (n-1)×(n-1) (n-2)x(n-2)a) b)
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- Which among the following methods are generally used for the calculation 8) of symmetrical faults?
 - a) Norton theorem Thevenin's theorem b) Kirchhoff's laws c)
 - Only (b) and (c) d)



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- 9) Which of the following fault results into a three phase faults?
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- b) Capacitive
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- Short Circuit limit

- b)
- Transient stability limit d)

Set

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T.E. (Part-I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

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Section – I

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Max. Marks: 56

Set

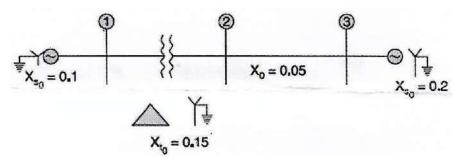
12

- Set S
- c) Obtain a step by step programmable technique for building a complete Z bus of the given system.

Section – II

Q.4 Answer any four of the following question.

- a) The current from neutral to ground connection is 12 A. Calculate the zero phase sequence components in phases.
- **b)** The zero sequence reactances (in p.u.) are indicated in the network shown in the figure. Determine the value of zero sequence driving-point reactance at node 3 shown in fig.



- c) Determine the fault currents in each phase following a double line-to ground short circuit at the terminals of a star-connected synchronous generator operating initially on an open circuit voltage of 1 pu. The positive, negative and zero sequence reactance of the generator are, respectively, j0.35, j0.25 and j0.20, and its star point is isolated from ground.
- d) Explain with sequence network various open conductor faults on the power system.
- e) Prove That

i)
$$\frac{1-a^2}{a-a^2} = -a$$

ii) $1-a$

 $\frac{1}{a+a^2} = 1-a^2$

Where a and a^2 are vector operators.

f) Derive swing equation and discuss its importance in power system stability.

Q.5 Answer any two of the following question.

- a) Three 6.6 kV, 12 MVA, 3-phase alternators are connected to a common set of busbars. The positive, negative and zero sequence impedances of each alternator are 15%, 12% and 4.5% respectively. If an earth fault occurs on one busbar, determine the fault current:
 - i) If all the alternator neutrals are solidly grounded
 - ii) If only one of the alternator neutrals is solidly earthed and the others are isolated
 - iii) If one of the alternator neutrals is earthed through a reactance of 0.5 ohm and the others are isolated.
- b) Derive an expression with sequence network of the system when
 - i) line to line (LL) fault on generator
 - ii) LLG fault on generator
- c) Three resistors of 5Ω , 10Ω and 20Ω are connected in delta across the three phases of a balanced 100 volts supply. What are the sequence components in the resistors and in supply lines?

16

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence.

 In closed loop control system, with positive value of feedback gain the overall gain of the system will _____.

d)

- a) decrease
- c) be unaffected
- 2) A system is stable for _____
 - a) GM and PM both +vec) GM -ve PM + ve
 - GM -ve PM + ve
- 3) Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero?
 - a) The system is relatively stable
 - b) The system is highly stable
 - c) The system is highly oscillatory
 - d) None of the above
- 4) In control system integrator is represented by _____.
 - a) S b) S^2 c) $1/S^2$ d) 1/S
 - c) $1/S^2$ d) 1/S
- 5) The type 2 system has _____ at the origin.
 - a) no net pole b) net pole
 - c) simple pole d) two poles
- 6) If the gain of the critical damped system is increased it will behave as
 - a) oscillatory b) critically damped
 - c) overdamped d) underdamped
- 7) Which of the following is the electrical analogous element for displacement in force-voltage analogy?
 - a) Flux b) Voltage
 - c) Charge d) Current
- 8) The step response of the system described by the differential equation. dy
 - $\begin{array}{l} \frac{dy}{dx} + 6y = x(t) \text{ will be } ____.\\ a) & (1/6)^*(1 e^{-6t}) \\ c) & e^{6t} \end{array} \qquad \qquad b) \quad e^{-3t} u(t) \\ d) \quad none \text{ of above} \end{array}$

- b) GM and PM both -ve

any of the above

b) increase

d) GM +ve and PM -ve





Max. Marks: 70

Set P

- 9) Which of the following transfer functions represent under damped second order systems?
 - a) $1/(s^2 + s + 1)$ c) $2/(s^2 + 2s + 2)$
- b) $4/(s^2 + 2s + 4)$ d) all of the above
- 10) Type and order of transfer function G (s) = $K/\{s(s + 2)\}$ _____.
 - a) 1,2 c) 0,2 b) 2,1 d) 1,1
- 11) The characteristic equation of a feedback control is $2s^4 + s^3 + 3s^2 + 5s + 10 = 0$. The number of roots in the right half of the s-plane is _____.
 - a) 2 b) 3
 - c) 0 d) 4
- 12) If the phase angle at gain crossover frequency is estimated to be -105°, what will be the value of phase margin of the system?
 - a) 23° b) 45°
 - c) 60° d) 75°
- Asymptotic stability is concerned with _____.
 - a) A system under influence of input
 - b) A system not under influence of input
 - c) A system under influence of output
 - d) A system not under influence of output
- 14) The addition of open loop poles pulls the root locus towards _____.
 - a) The right and system becomes stable
 - b) Imaginary axis and system becomes marginally stable
 - c) The left and system becomes unstable
 - d) The right and system becomes unstable

12

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

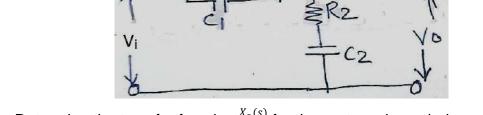
2) Figure to the right indicates full marks.

Section – I

CONTROL SYSTEMS – I

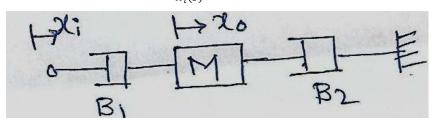
Q.2 Solve any four.

- a) Explain the classification of control system.
- b) Explain force to voltage and force to current analogy.
- **c)** Determine the transfer function $\frac{V_0(s)}{V_1(s)}$ of the network shown below.



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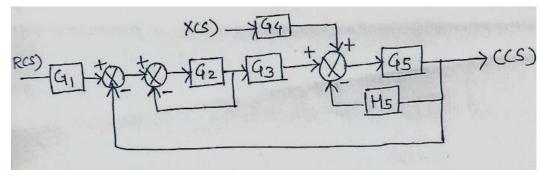
d) Determine the transfer function $\frac{X_o(s)}{X_i(s)}$ for the system shown below.



- e) With the help of neat sketch explain closed loop control system.
- f) Explain the terminology of signal flow graph.

Q.3 Solve any two.

a) Determine the total output of following system using block diagram reduction technique.



Max. Marks: 56

16

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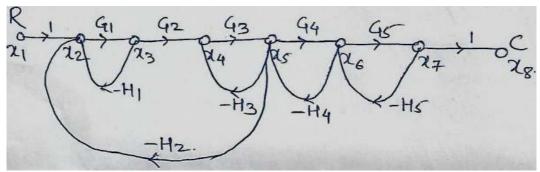
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b) Determine the transfer function of a system shown below.



c) Derive on expression for transfer function of a field controlled dc servomotor.

Section – II

Q.4 Solve any four.

- a) For a unity feedback system with closed loop transfer function $\frac{c(s)}{R(s)} = \frac{K_s + b}{S^2 + as + b}$, show that the steady state error with unit ramp input is given by $\frac{a-k}{b}$.
- b) With the help of Routh's array method determine the stability of a system given by $s^8 + 5s^6 + 2s^4 + 3s^2 + 1 = 0$.
- c) Explain different rules for the construction of root locus.
- d) The response of a control system after applying unit step input is $c(t)=1 + e^{-40t} 2e^{-20t}$. Determine.
 - 1) w_n
 - ξ
 - 3) closed loop transfer function
- e) With the help of neat sketch explain transient response specification.
- f) A unity feedback system has G(s) = 100(s+12)/s(s+4)(s+5). Determine.
 - 1) Type of system
 - 2) All error coefficients
 - 3) steady state error when input is 4t

Q.5 Solve any two.

12

16

a) A unity feedback control system has $G(s) \frac{80}{s(s+2)(s+20)}$. Draw the Bode plot. Determine gain margin, phase margin, gain crossover frequency, phase

crossover frequency. Comment on stability.

b) The open loop transfer function of a system is $G(s) \cdot H(s) = \frac{K}{s(s+2+2j)(S+2-2j)}$

Draw a root locus and comment on the stability of the closed loop system.

- c) With the help of neat sketch and mathematical expressions explain:
 - 1) PI controller
 - 2) PD controller
 - 3) PID controller

CONTROL SYSTEMS – I Max. Marks: 70 Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. 2) Figure to the right indicates full marks. **MCQ/Objective Type Questions Duration: 30 Minutes** Marks: 14 Choose the correct alternatives from the options and rewrite the sentence. The step response of the system described by the differential equation. 1) $\frac{dy}{dx} + 6y = x(t) \text{ will be } ____.$ dx $(1/6)^{*}(1-e^{-6t})$ b) $e^{-3t}u(t)$ a)

c) d) none of above 2) Which of the following transfer functions represent under damped second order systems?

a)	$1/(s^2 + s + 1)$	b) $4/(s^2 + 2s + 4)$
c)	$2/(s^2 + 2s + 2)$	d) all of the above

3) Type and order of transfer function G (s) = $K/\{s(s + 2)\}$ _____.

0, 2 d) 1.1 c) The characteristic equation of a feedback control is $2s^4 + s^3 + 3s^2 + 5s + 10 = 0$. 4)

b) 2, 1

- The number of roots in the right half of the s-plane is _____.
 - a) 2 b) 3 d) 4 C) 0
- 5) If the phase angle at gain crossover frequency is estimated to be -105°, what will be the value of phase margin of the system?
 - a) 23° b) 45° c) 60° d) 75°
- Asymptotic stability is concerned with 6)
 - a) A system under influence of input
 - b) A system not under influence of input
 - c) A system under influence of output
 - d) A system not under influence of output
- The addition of open loop poles pulls the root locus towards _____. 7)
 - The right and system becomes stable a)
 - Imaginary axis and system becomes marginally stable b)
 - The left and system becomes unstable c)
 - d) The right and system becomes unstable
- In closed loop control system, with positive value of feedback gain the 8) overall gain of the system will _____
 - decrease a) b) increase
 - be unaffected d) any of the above C)

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

a)

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No.

Q.1

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9) A system is stable for _____

- a) GM and PM both +ve
- c) GM -ve PM + ve
- b) GM and PM both -ve
- d) GM +ve and PM -ve
- 10) Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero?
 - a) The system is relatively stable
 - b) The system is highly stable
 - c) The system is highly oscillatory
 - d) None of the above
- 11) In control system integrator is represented by _____
 - a) S b) S^2 c) $1/S^2$ d) 1/S
- 12) The type 2 system has _____ at the origin.
 - a) no net pole b) net pole
 - c) simple pole d) two poles
- 13) If the gain of the critical damped system is increased it will behave as
 - a) oscillatory

- b) critically damped
- c) overdamped d) underdamped
- 14) Which of the following is the electrical analogous element for displacement in force-voltage analogy?
 - a) Flux
 - c) Charge

- b) Voltage
- d) Current



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12

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

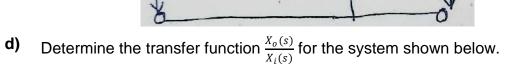
Section – I

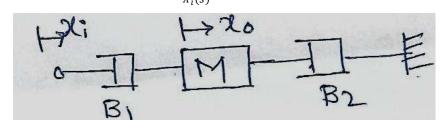
Electrical Engineering CONTROL SYSTEMS – I

Q.2 Solve any four.

- Explain the classification of control system. a)
- Explain force to voltage and force to current analogy. b)
- Determine the transfer function $\frac{V_o(s)}{V_i(s)}$ of the network shown below. C)

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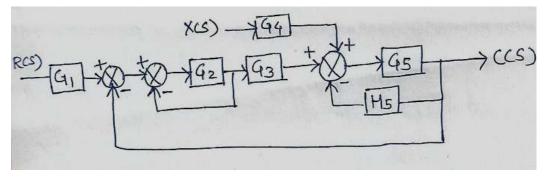
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C7

- With the help of neat sketch explain closed loop control system. e)
- Explain the terminology of signal flow graph. **f**)

Q.3 Solve any two.

Determine the total output of following system using block diagram a) reduction technique.



Max. Marks: 56

16

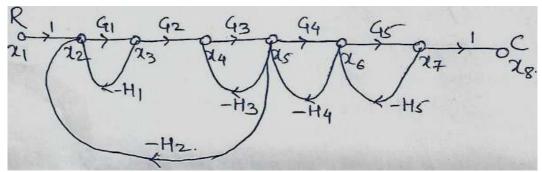
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b) Determine the transfer function of a system shown below.



c) Derive on expression for transfer function of a field controlled dc servomotor.

Section – II

Q.4 Solve any four.

- a) For a unity feedback system with closed loop transfer function $\frac{c(s)}{R(s)} = \frac{K_s + b}{S^2 + as + b}$, show that the steady state error with unit ramp input is given by $\frac{a-k}{b}$.
- b) With the help of Routh's array method determine the stability of a system given by $s^8 + 5s^6 + 2s^4 + 3s^2 + 1 = 0$.
- c) Explain different rules for the construction of root locus.
- d) The response of a control system after applying unit step input is $c(t)=1 + e^{-40t} 2e^{-20t}$. Determine.
 - 1) w_n
 - 2) *ξ*
 - 3) closed loop transfer function
- e) With the help of neat sketch explain transient response specification.
- f) A unity feedback system has G(s) = 100(s+12)/s(s+4)(s+5). Determine.
 - 1) Type of system
 - 2) All error coefficients
 - 3) steady state error when input is 4t

Q.5 Solve any two.

12

16

a) A unity feedback control system has $G(s) \frac{80}{s(s+2)(s+20)}$. Draw the Bode plot. Determine gain margin, phase margin, gain crossover frequency, phase

crossover frequency. Comment on stability.

b) The open loop transfer function of a system is $G(s) \cdot H(s) = \frac{K}{s(s+2+2j)(s+2-2j)}$

Draw a root locus and comment on the stability of the closed loop system.

- c) With the help of neat sketch and mathematical expressions explain:
 - 1) PI controller
 - 2) PD controller
 - 3) PID controller

Cho	ose the correct alternatives from the options and rewrite the sentence.
1)	The type 2 system has at the origin.a) no net poleb) net polec) simple poled) two poles
2)	If the gain of the critical damped system is increased it will behave as
	a) oscillatoryb) critically dampedc) overdampedd) underdamped
3)	Which of the following is the electrical analogous element for displacement
	in force-voltage analogy? a) Flux b) Voltage c) Charge d) Current
4)	The step response of the system described by the differential equation.
	$ \frac{dy}{dx} + 6y = x(t) \text{ will be } $ a) $(1/6)^*(1 - e^{-6t})$ b) $e^{-3t}u(t)$ c) e^{6t} d) none of above
5)	Which of the following transfer functions represent under damped second
	order systems?a) $1/(s^2 + s + 1)$ b) $4/(s^2 + 2s + 4)$ c) $2/(s^2 + 2s + 2)$ d) all of the above
6)	Type and order of transfer function G (s) = K/{s(s + 2)}a) 1, 2b) 2, 1c) 0, 2d) 1, 1
7)	The characteristic equation of a feedback control is $2s^4 + s^3 + 3s^2 + 5s + 10 =$ The number of roots in the right half of the s-plane is a) 2 b) 3 c) 0 d) 4
8)	If the phase angle at gain crossover frequency is estimated to be -105°, what will be the value of phase margin of the system? a) 23° b) 45°

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEMS – I**

2) Figure to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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Max. Marks: 70

43 C) d) 75° 60°

Seat No.

Q.1





- 9) Asymptotic stability is concerned with .
 - a) A system under influence of input
 - b) A system not under influence of input
 - A system under influence of output c)
 - d) A system not under influence of output
- 10) The addition of open loop poles pulls the root locus towards _____.
 - The right and system becomes stable a)
 - Imaginary axis and system becomes marginally stable b)
 - The left and system becomes unstable C)
 - The right and system becomes unstable d)
- 11) In closed loop control system, with positive value of feedback gain the overall gain of the system will
 - decrease a) c) be unaffected

b) increase

- d) any of the above
- 12) A system is stable for _____.
 - GM and PM both +ve a) GM -ve PM + ve
- b) GM and PM both -ve d) GM +ve and PM -ve
- 13) Which of the following statements is correct for a system with gain margin close to unity or a phase margin close to zero?
 - The system is relatively stable a)
 - The system is highly stable b)
 - The system is highly oscillatory C)
 - d) None of the above
- 14) In control system integrator is represented by _____.
 - b) S^2 S a)
 - $1/S^{2}$ c)

c)

d) 1/S



T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

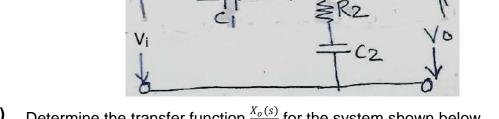
2) Figure to the right indicates full marks.

Section – I

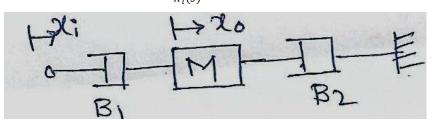
Q.2 Solve any four.

- a) Explain the classification of control system.
- b) Explain force to voltage and force to current analogy.
- **c)** Determine the transfer function $\frac{V_0(s)}{V_1(s)}$ of the network shown below.

RI



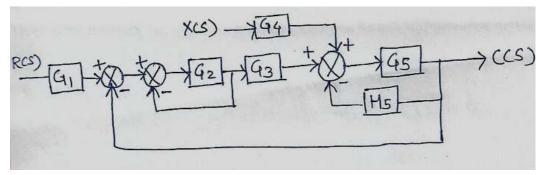
d) Determine the transfer function $\frac{X_o(s)}{X_i(s)}$ for the system shown below.



- e) With the help of neat sketch explain closed loop control system.
- f) Explain the terminology of signal flow graph.

Q.3 Solve any two.

a) Determine the total output of following system using block diagram reduction technique.



Max. Marks: 56

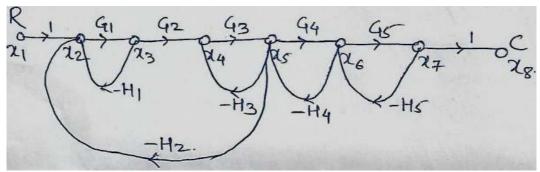
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b) Determine the transfer function of a system shown below.



c) Derive on expression for transfer function of a field controlled dc servomotor.

Section – II

Q.4 Solve any four.

- a) For a unity feedback system with closed loop transfer function $\frac{c(s)}{R(s)} = \frac{K_s + b}{S^2 + as + b}$, show that the steady state error with unit ramp input is given by $\frac{a-k}{b}$.
- b) With the help of Routh's array method determine the stability of a system given by $s^8 + 5s^6 + 2s^4 + 3s^2 + 1 = 0$.
- c) Explain different rules for the construction of root locus.
- d) The response of a control system after applying unit step input is $c(t)=1 + e^{-40t} 2e^{-20t}$. Determine.
 - 1) w_n
 - ξ
 - 3) closed loop transfer function
- e) With the help of neat sketch explain transient response specification.
- f) A unity feedback system has G(s) = 100(s+12)/s(s+4)(s+5). Determine.
 - 1) Type of system
 - 2) All error coefficients
 - 3) steady state error when input is 4t

Q.5 Solve any two.

12

16

a) A unity feedback control system has $G(s) \frac{80}{s(s+2)(s+20)}$. Draw the Bode plot.

Determine gain margin, phase margin, gain crossover frequency, phase crossover frequency. Comment on stability.

b) The open loop transfer function of a system is $G(s) \cdot H(s) = \frac{K}{s(s+2+2j)(S+2-2j)}$

Draw a root locus and comment on the stability of the closed loop system.

- c) With the help of neat sketch and mathematical expressions explain:
 - 1) PI controller
 - 2) PD controller
 - 3) PID controller

		Electrical Engir CONTROL SYST	-
		e: Monday, 09-12-2019 30 PM To 05:30 PM	Max. Marks: 70
Instr	uctio	ns: 1) Q. No. 1 is compulsory and shoul book.	d be solved in first 30 minutes in answer
		 Figure to the right indicates full ma 	rks.
		MCQ/Objective Type	Questions
Dura	tion: 3	30 Minutes	Marks: 14
Q.1	Cho 1)		
	2)	The number of roots in the right half of t a) 2 b)	ck control is $2s^4 + s^3 + 3s^2 + 5s + 10 = 0$. he s-plane is 3 4
	3)	If the phase angle at gain crossover free what will be the value of phase margin (a) 23° b) c) 60° d)	
	4)	 Asymptotic stability is concerned with a) A system under influence of input b) A system not under influence of input c) A system under influence of output d) A system not under influence of output 	out
	5)	 The addition of open loop poles pulls th a) The right and system becomes sta b) Imaginary axis and system becomes c) The left and system becomes unsta d) The right and system becomes unsta 	ble es marginally stable able
	6)	In closed loop control system, with position overall gain of the system will a) decrease b) c) be unaffected d)	tive value of feedback gain the increase any of the above
	7)	A system is stable fora) GM and PM both +veb)c) GM -ve PM + ved)	

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

Seat No.



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- Which of the following statements is correct for a system with gain margin 8) close to unity or a phase margin close to zero?
 - The system is relatively stable a)
 - The system is highly stable b)
 - The system is highly oscillatory c)
 - None of the above d)

9) In control system integrator is represented by _____.

- b) S^2 a) S
- $1/S^{2}$ c) d) 1/S
- 10) The type 2 system has _____ at the origin.
 - a) no net pole b) net pole
 - d) two poles c) simple pole
- 11) If the gain of the critical damped system is increased it will behave as
 - oscillatory a)

- b) critically damped
- overdamped d) underdamped c)
- 12) Which of the following is the electrical analogous element for displacement in force-voltage analogy?
 - a) Flux b) Voltage
 - Charge d) Current C)
- 13) The step response of the system described by the differential equation. $\frac{dy}{dx} + 6y = x(t) \text{ will be } ____.$
 - dx
 - $(1/6)^{*}(1-e^{-6t})$ a) c)
 - b) $e^{-3t}u(t)$ d) none of above
- 14) Which of the following transfer functions represent under damped second order systems?
 - a) $1/(s^2 + s + 1)$
- b) $4/(s^2 + 2s + 4)$
- c) $2/(s^2 + 2s + 2)$
- b) $4/(s^2 + 2s + 4)$ d) all of the above

12

Seat No.

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

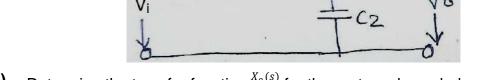
2) Figure to the right indicates full marks.

Section – I

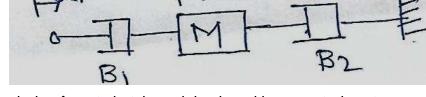
Q.2 Solve any four.

- a) Explain the classification of control system.
- b) Explain force to voltage and force to current analogy.
- **c)** Determine the transfer function $\frac{V_0(s)}{V_1(s)}$ of the network shown below.

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d) Determine the transfer function $\frac{X_o(s)}{X_i(s)}$ for the system shown below.



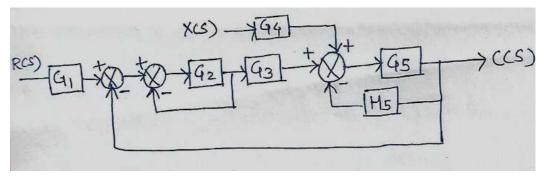
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- e) With the help of neat sketch explain closed loop control system.
- f) Explain the terminology of signal flow graph.

Q.3 Solve any two.

a) Determine the total output of following system using block diagram reduction technique.



Max. Marks: 56

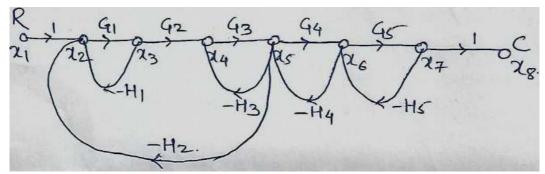
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b) Determine the transfer function of a system shown below.



c) Derive on expression for transfer function of a field controlled dc servomotor.

Section – II

Q.4 Solve any four.

- a) For a unity feedback system with closed loop transfer function $\frac{c(s)}{R(s)} = \frac{K_s + b}{S^2 + as + b}$, show that the steady state error with unit ramp input is given by $\frac{a-k}{b}$.
- b) With the help of Routh's array method determine the stability of a system given by $s^8 + 5s^6 + 2s^4 + 3s^2 + 1 = 0$.
- c) Explain different rules for the construction of root locus.
- d) The response of a control system after applying unit step input is $c(t)=1 + e^{-40t} 2e^{-20t}$. Determine.
 - 1) w_n
 - ξ
 - 3) closed loop transfer function
- e) With the help of neat sketch explain transient response specification.
- f) A unity feedback system has G(s) = 100(s+12) / s(s+4)(s+5). Determine.
 - 1) Type of system
 - 2) All error coefficients
 - 3) steady state error when input is 4t

Q.5 Solve any two.

12

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a) A unity feedback control system has $G(s) \frac{80}{s(s+2)(s+20)}$. Draw the Bode plot.

Determine gain margin, phase margin, gain crossover frequency, phase crossover frequency. Comment on stability.

b) The open loop transfer function of a system is $G(s) \cdot H(s) = \frac{K}{s(s+2+2j)(S+2-2j)}$

Draw a root locus and comment on the stability of the closed loop system.

- c) With the help of neat sketch and mathematical expressions explain:
 - 1) PI controller
 - 2) PD controller
 - 3) PID controller

Seat No.				Set P			
	T.E	E. (Part - I) (New) (CBCS) E					
		Electrical Eng					
		/ednesday, 11-12-2019 // To 05:30 PM		Max. Marks: 70			
Instru	Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer						
	book. 2) Figures to the right indicate full marks.						
Duratio	on: 30 M	MCQ/Objective Ty inutes	pe Qi	Marks: 14			
		the correct alternatives from the	-				
I	,	ich of the following register is use truction?	u as a	address pointer to the next			
	a) c)	SP PC	b) d)	HL IR			
2	,	reset stack pointer in 8051 micro					
	a) c)	8H 7H	b) d)	9H 5H			
3	3) The	e contents of accumulator after thi	s ope	ration will be			
		MOV A, #0CH ANL A, #2CH					
	a) c)	00001100 00001001	b) d)	00001101 00001000			
4	4) When 8085 goes in reset condition the status of PC, IR and buses						
	(ad a)	dress, data, control signal) respection 0000H,3EH,Z-State	b)				
	c)	C0000H,00H,Z-State	d)	None of above			
5	5) a)	Pins of 8051 microcontroller a P3.6 and P3.7		ed for External RAM interface. P3.4 and P3.5			
	c)	P3.0 and P3.1	d)	P3.2 and P3.3			
6		e instruction that are used for reac t respectively are	ling in	put port and writing an output			
	a)	MOV,XCHG	b)				
7	c) 7) ISR	IN,MOV R ends with	d)	IN,OUT			
	, a) c)	IE RI,TI	b) d)	RET None			
8	,	ernal Interrupt 1 is given on	,				
	a) c)	P3.0 P3.3	b) d)	P3.1 P3.2			
ç	-	ner0 overflow flag is available on _					
	a) c)	SBUF SCON	b) d)	TCON TMOD			

10) If we need to operate a key of a keyboard in an interrupt mode, then it will generate what kind of interrupt?

- a) ES b) EX0/EX1 c) T0/T1 d) RESET
- 11) An alternate function of port pin P3.4 in 8051 microcontroller is _____.
 - a) Timer 0 b) Timer 1
 - c) Interrupt 0 d) Interrupt 1

12) If Memory size is 4KB and starting address is 2000H, then ending address is _____.

- a) 1FFFH b) 2FFFH
- c) 3FFFH d) 4FFFH
- 13) Which pin of the LCD is used for adjusting its contrast?
 - a) pin no 1 b) pin no 2
 - c) pin no 3 d) pin no 4
- 14) While interfacing 8051 microcontroller with 16x2 LCD, what is status of enable line for write operation?
 - a) High
- b) Low

c) High to Low

d) Low to High

SLR-FM-418

Set | P

Seat	
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T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any Four.

- a) Explain register organization of 8085 microprocessor.
- b) Explain DAA instruction in 8085 microprocessor.
- c) Write an ALP to perform addition of R1 with the content at 30H Memory Location and store the result at memory location 40H.
- d) Explain any four bit oriented instructions in 8051 microcontroller with example.
- e) Explain features of 8051 microcontroller.

Q.3 Solve any Two.

- a) Explain in brief all registers in 8051 microcontroller.
- **b)** Explain following instructions of 8085 microprocessor.
 - 1) ALE
 - 2) HOLD and HLDA
 - 3) READY
- c) Write an ALP using 8085 to perform addition of two 16-bit numbers, result should be in decimal format.

Section – II

Q.4 Solve any Four.

- a) Explain various SFR's related with interrupt.
- **b)** Draw the interfacing diagram of 8051 microcontroller with 4kb ROM also mention starting and ending address of interfaced memory.
- c) Write an ALP to generate a square wave using DAC 0808.
- d) Draw and explain structure of Port 0 of 8051 microcontroller in detail.
- e) Explain Temperature indicator and controller interfacing with 8051 microcontroller with example.

Q.5 Solve any Two.

- a) Draw the interfacing diagram for 16x2 LCD display with 8051 microcontroller and write an ALP to display "INDIA "on LCD display.
- **b)** Interface matrix keyboard with 8051 microcontrollers. Write an ALP to read the key code and display on Port 2 of 8051 microcontroller
- c) Draw the interfacing of DC motor with 8051 microcontrollers. Write an ALP to rotate the DC motor in clockwise direction.

Max. Marks: 56

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Seat No.			Set Q				
	T	.E. (Part - I) (New) (CBCS) Examin					
		Electrical Enginee	-				
	Day & Date: Wednesday, 11-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM						
Instru	Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer						
	book. 2) Figures to the right indicate full marks. MCQ/Objective Type Questions						
Duratio	on: 30	Minutes	Marks: 14				
		e the correct alternatives from the optio					
	1) E a cj	, , , , , , , , , , , , , , , , , , , ,	P3.2				
2	2) T a cj	, , , , , , , , , , , , , , , , , , , ,	SFR of 8051 microcontroller. TCON TMOD				
3		· · · · · · · · · · · · · · · · · · ·	n an interrupt mode, then it will EX0/EX1 RESET				
2	4) A a c)		i1 microcontroller is Timer 1 Interrupt 1				
5	,	Memory size is 4KB and starting address	is 2000H, then ending address				
			2FFFH 4FFFH				
6	6) V a cj	, i ,	ts contrast? pin no 2 pin no 4				
7		Vhile interfacing 8051 microcontroller with nable line for write operation?	16x2 LCD, what is status of				
	a c) High b)	Low Low to High				
8		Which of the following register is used as anstruction?)SPb)	address pointer to the next				
	a C	, , , , , , , , , , , , , , , , , , , ,	IR				
ç	9) C a c		ler is initialized to 9H 5H				

10) The contents of accumulator after this operation will be . MOV A, #0CH

- ANL A, #2CH
- 00001100

a)

c)

- 00001101 b)
- 00001001 d) 00001000 C)
- 11) When 8085 goes in reset condition the status of PC, IR and buses (address, data, control signal) respectively are _____.
 - 0000H,3EH,Z-State a)
- 0000H,00H,Z-State b)

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Set Q

- C0000H,00H,Z-State C) d)
- None of above
- 12) _ Pins of 8051 microcontroller are used for External RAM interface.
 - P3.6 and P3.7 a) P3.0 and P3.1
- P3.4 and P3.5 b) P3.2 and P3.3 d)
- 13) The instruction that are used for reading input port and writing an output port respectively are _____.
 - MOV, XCHG b) MOV.IN a)
 - C) IN,MOV d) IN,OUT
- ISR ends with _____. 14)
 - a) IE
 - C) RI,TI

- RET b)
- d) None

Seat	
No.	

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any Four.

- a) Explain register organization of 8085 microprocessor.
- b) Explain DAA instruction in 8085 microprocessor.
- c) Write an ALP to perform addition of R1 with the content at 30H Memory Location and store the result at memory location 40H.
- d) Explain any four bit oriented instructions in 8051 microcontroller with example.
- e) Explain features of 8051 microcontroller.

Q.3 Solve any Two.

- a) Explain in brief all registers in 8051 microcontroller.
- **b)** Explain following instructions of 8085 microprocessor.
 - 1) ALE
 - 2) HOLD and HLDA
 - 3) READY
- c) Write an ALP using 8085 to perform addition of two 16-bit numbers, result should be in decimal format.

Section – II

Q.4 Solve any Four.

- a) Explain various SFR's related with interrupt.
- **b)** Draw the interfacing diagram of 8051 microcontroller with 4kb ROM also mention starting and ending address of interfaced memory.
- c) Write an ALP to generate a square wave using DAC 0808.
- d) Draw and explain structure of Port 0 of 8051 microcontroller in detail.
- e) Explain Temperature indicator and controller interfacing with 8051 microcontroller with example.

Q.5 Solve any Two.

- a) Draw the interfacing diagram for 16x2 LCD display with 8051 microcontroller and write an ALP to display "INDIA "on LCD display.
- **b)** Interface matrix keyboard with 8051 microcontrollers. Write an ALP to read the key code and display on Port 2 of 8051 microcontroller
- c) Draw the interfacing of DC motor with 8051 microcontrollers. Write an ALP to rotate the DC motor in clockwise direction.

Max. Marks: 56

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	T.E. (Part - I) (New) (CBCS) Exar					
	Electrical Engin					
	MICROPROCESSOR AND MI					
Day & Date: Wednesday, 11-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM Max. Marks: 70						
Instruct	tions: 1) Q. No. 1 is compulsory and should book.					
	 Figures to the right indicate full ma MCQ/Objective Type 					
Duratior	n: 30 Minutes	Marks: 14				
Q.1 Cł	hoose the correct alternatives from the o	ptions and rewrite the sentence. 14				
1)						
	a) P3.6 and P3.7 b c) P3.0 and P3.1 d	 P3.4 and P3.5 P3.2 and P3.3 				
2)	,	/				
_/	port respectively are					
	,) MOV,IN				
3)	c) IN,MOV d) ISR ends with) IN,OUT				
5)	a) IE b) RET				
	c) RI,TI d	,				
4)						
	/	b) P3.1 d) P3.2				
5)) Timer0 overflow flag is available on	SFR of 8051 microcontroller.				
	a) SBUF b	/				
0)	c) SCON d					
6)	If we need to operate a key of a keyboar generate what kind of interrupt?	d in an interrupt mode, then it will				
	a) ES b					
	c) T0/T1 d) RESET				
7)	· · · ·					
	a) Timer 0 b c) Interrupt 0 d	,				
8)) If Memory size is 4KB and starting addre					
	is a) 1FFFH b) 2FFFH				
	c) 3FFFH d	,				
9)) Which pin of the LCD is used for adjusti	ng its contrast?				
	a) pin no 1 b					
40	c) pin no 3 d					
10	0) While interfacing 8051 microcontroller w enable line for write operation?	INT TOXE LOD, WHAT IS STATUS OF				
	a) High b					
	c) High to Low d) Low to High				

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- 11) Which of the following register is used as a address pointer to the next instruction?
 - SP a) b) HL PC d) IR C)
- On reset stack pointer in 8051 microcontroller is initialized to _____. 12)
 - a) 8H b) 9H c)
 - d) 7H 5H
- The contents of accumulator after this operation will be _____. 13) MOV A, #0CH ANL A, #2CH
 - 00001100 b)
 - 00001101 a) 00001001 d) 00001000 C)
- 14) When 8085 goes in reset condition the status of PC, IR and buses (address, data, control signal) respectively are
 - 0000H,3EH,Z-State a)

c)

- b) 0000H,00H,Z-State
- C0000H,00H,Z-State d) None of above

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T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any Four.

- a) Explain register organization of 8085 microprocessor.
- b) Explain DAA instruction in 8085 microprocessor.
- c) Write an ALP to perform addition of R1 with the content at 30H Memory Location and store the result at memory location 40H.
- d) Explain any four bit oriented instructions in 8051 microcontroller with example.
- e) Explain features of 8051 microcontroller.

Q.3 Solve any Two.

- a) Explain in brief all registers in 8051 microcontroller.
- **b)** Explain following instructions of 8085 microprocessor.
 - 1) ALE
 - 2) HOLD and HLDA
 - 3) READY
- c) Write an ALP using 8085 to perform addition of two 16-bit numbers, result should be in decimal format.

Section – II

Q.4 Solve any Four.

- a) Explain various SFR's related with interrupt.
- **b)** Draw the interfacing diagram of 8051 microcontroller with 4kb ROM also mention starting and ending address of interfaced memory.
- c) Write an ALP to generate a square wave using DAC 0808.
- d) Draw and explain structure of Port 0 of 8051 microcontroller in detail.
- e) Explain Temperature indicator and controller interfacing with 8051 microcontroller with example.

Q.5 Solve any Two.

- a) Draw the interfacing diagram for 16x2 LCD display with 8051 microcontroller and write an ALP to display "INDIA "on LCD display.
- **b)** Interface matrix keyboard with 8051 microcontrollers. Write an ALP to read the key code and display on Port 2 of 8051 microcontroller
- c) Draw the interfacing of DC motor with 8051 microcontrollers. Write an ALP to rotate the DC motor in clockwise direction.

Max. Marks: 56

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Seat No.								Set	S
		T.E. (Part - I)	(New) (CBC	S) Exam	nin	ation Nov/Dec-201	9	
				Electrica	-		-		
		MI	CROPR		AND MIC	CR	OCONTROLLER		
			esday, 1 c 05:30 P	1-12-2019 M			Ma	ax. Marks	: 70
Instru	ction	,		compulsory an	d should	be	solved in first 30 minute	es in ansv	ver
		-	ook.	the right indicat	full mar	·ko			
		Z) F	igures to	the right indicat MCQ/Objectiv					
Duratio	on: 3(0 Minut	es					Marks	: 14
Q.1 (Choo	se the	correct a	alternatives fro	m the op	otio	ons and rewrite the ser	ntence.	14
1	-			-	-	d ir	n an interrupt mode, the	n it will	
		genera a) E		ind of interrupt?	, b)		EX0/EX1		
		,	0/T1		d)		RESET		
2		,	rnate fun	ction of port pin	P3 4 in 8	305	1 microcontroller is		
-	,		imer 0		b)		Timer 1		
		c) In	nterrupt 0		d)		Interrupt 1		
3	3)	If Mem	ory size i	s 4KB and start	ing addre	SS	is 2000H, then ending a	address	
		is	 FFFH		ہ ا		2FFFH		
		,	FFFH		b) d)		4FFFH		
Z		,		LCD is used fo	,				
	,		in no 1		b)	•	pin no 2		
		c) pi	in no 3		d)		pin no 4		
5	,		•		ntroller wi	th '	16x2 LCD, what is statu	s of	
			ligh	vrite operation?	b)		Low		
			ligh to Lov	N	d)		Low to High		
6	5)	Which	of the foll	owing register i	s used as	sa	address pointer to the r	ext	
		instruct			F)		1.0		
		a) S c) P			b) d)		HL IR		
7		,		ointer in 8051 i	,		ler is initialized to		
,	,	a) 8	•		b)		9H	-•	
		c) 71	Н		d)		5H		
8	3)	l	ntents of MOV A, # ANL A, #	ŧ0CH	ter this op	era	ation will be		
			0001100		b)		00001101		
		c) 00	0001001		d)		00001000		
ç	,		•				us of PC, IR and buses		
		•		control signal) r - Z-State	espective (h		are		

0000H,3EH,Z-State a) C0000H,00H,Z-State

C)

- 0000H,00H,Z-State b) None of above
- d)

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Seat

Pins of 8051 microcontroller are used for External RAM interface. 10)

- P3.6 and P3.7 b) P3.4 and P3.5 a)
- P3.0 and P3.1 d) P3.2 and P3.3 C)

The instruction that are used for reading input port and writing an output 11) port respectively are .

	a) MOV,XCHG c) IN,MOV	b) MOV,IN d) IN,OUT
12)	ISR ends with a) IE	b) RET
	c) RI,TI	d) None
13)	External Interrupt 1 is given on _ a) P3.0 c) P3.3	Pin of 8051 microcontroller. b) P3.1 d) P3.2

Timer0 overflow flag is available on ____ _ SFR of 8051 microcontroller. 14)

- SBUF b) TCON a) d)
 - SCON C)

TMOD

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Set S

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T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any Four.

- a) Explain register organization of 8085 microprocessor.
- b) Explain DAA instruction in 8085 microprocessor.
- c) Write an ALP to perform addition of R1 with the content at 30H Memory Location and store the result at memory location 40H.
- d) Explain any four bit oriented instructions in 8051 microcontroller with example.
- e) Explain features of 8051 microcontroller.

Q.3 Solve any Two.

- a) Explain in brief all registers in 8051 microcontroller.
- **b)** Explain following instructions of 8085 microprocessor.
 - 1) ALE
 - 2) HOLD and HLDA
 - 3) READY
- c) Write an ALP using 8085 to perform addition of two 16-bit numbers, result should be in decimal format.

Section – II

Q.4 Solve any Four.

- a) Explain various SFR's related with interrupt.
- **b)** Draw the interfacing diagram of 8051 microcontroller with 4kb ROM also mention starting and ending address of interfaced memory.
- c) Write an ALP to generate a square wave using DAC 0808.
- d) Draw and explain structure of Port 0 of 8051 microcontroller in detail.
- e) Explain Temperature indicator and controller interfacing with 8051 microcontroller with example.

Q.5 Solve any Two.

- a) Draw the interfacing diagram for 16x2 LCD display with 8051 microcontroller and write an ALP to display "INDIA "on LCD display.
- **b)** Interface matrix keyboard with 8051 microcontrollers. Write an ALP to read the key code and display on Port 2 of 8051 microcontroller
- c) Draw the interfacing of DC motor with 8051 microcontrollers. Write an ALP to rotate the DC motor in clockwise direction.

Max. Marks: 56

Set

12

16

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Set T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

ENGINEERING ECONOMICS AND MANAGEMENT

Day & Date: Friday, 13-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

b)

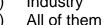
d)

- Pavback period does not account for 1)
 - Risk of investment a)
 - C) Time value of money
- 2) Macro economy deals with _____.
 - Whole economy a)
 - Study of aggregate of various forms b)
 - Study of specific market condition c)
 - Study of particular production process d)
- 3) Micro economy deals with _____.
 - Whole economy a)
 - b) Smaller unit of economy Only public sector d) Only private sector C)
- Break-even point is _ 4)
 - Where total contribution equals variable cost a)
 - Where total revenue equals total cost b)
 - Where total revenue equals fixed cost c)
 - All of the above d)

What are the objectives of business? 5)

- National objective a) Social objective C)
- Business includes _____. 6)
 - Trade a)
 - C) Commerce d)
- Co-operative society least think about 7)
 - Customer satisfaction a) b) Loss
 - Profit All of them C) d)
- What are the objectives of value Engg _____. 8)
 - To use efficient and economic Process a)
 - b) To reduce cost of product
 - To increase the profit C)
 - All of them d)

- Economic objective
- All of the above
- b) Industry

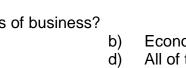


Max. Marks: 70

Marks: 14

Opportunity cost

All of the above





Ρ

Set P Military organisation is known as ____ 9) line and staff organisation b) line organization a) c) functional organization d) all of the above 10) Distinction between private sector and public sector is determined on the basis of _____. a) Economic system b) Motive Principle of pricing d) All of the above c) 11) PERT has following time estimate _____ b) one time estimate two time estimate a) three time estimate d) four time estimate C) Goods produced on small scale have _ 12) Relatively inelastic supply b) Highly elastic supply a) c) Perfectly elastic supply d) None of the above Break-even analysis consists of _____ 13) a) fixed cost b) variable cost fixed and variable costs c) d) operation costs Functions of management are _____ 14) Planning b) Controlling a) c) Organising d) All of these

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No.						Sel	Г
T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019							
				al Engineer			
_				IOMICS AND	D MANAGEMEN		
		ate: Friday, 13-12-2 30 PM To 05:30 F				Max. Marks	s: 56
Instr	uctio	ons: 1) All questio 2) Figure to t		lsory. tes full marks.			
			S	Section – I			
Q.2	Sol a) b) c) d) e)	ve any four. Write the short ne Explain the deve Describe importa Write short notes Explain the term	lopment of cou ince of engine s on pay-back	untry in agricult ering economic period with exa	tural sector. cs.		16
Q.3	Sol a) b) c)	ve any two. Explain the scien Explain the indivi Explain in detail l	dual ownershi Electrical Ener	p and partners	hip forms of the bu	usiness.	12
			S	ection – II			
Q.4	Sol a) b) c) d) e)	ve any four. Write rules &adva Write the importa Explain the vario Wire the various State and explain	ance and adva us steps for se facilities for er	ntages of SSI. etting the SSI. htrepreneur giv	ren by the governm ur in brief.	ient.	16
Q.5		ve any two. Write the salient State and Explain					12

c) Explain the various methods of reducing the project cost.

SLR-FM-419 Set P

Seat

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T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ENGINEERING ECONOMICS AND MANAGEMENT

Day & Date: Friday, 13-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) What are the objectives of value Engg _
 - a) To use efficient and economic Process
 - b) To reduce cost of product
 - c) To increase the profit
 - d) All of them
- 2) Military organisation is known as _____
 - a) line organization b) line and staff organisation
 - c) functional organization d) all of the above
- 3) Distinction between private sector and public sector is determined on the basis of _____.
 - a) Economic system b) Motive
 - c) Principle of pricing d) All of the above
- 4) PERT has following time estimate _____.
 - a) one time estimateb) two time estimatec) three time estimated) four time estimate
- 5) Goods produced on small scale have _____.
 - a) Relatively inelastic supply b) Highly elastic supply
 - c) Perfectly elastic supply d) None of the above
- 6) Break-even analysis consists of _____.a) fixed cost b) variable cost
 - c) fixed and variable costs d) operation costs
- 7) Functions of management are _____.a) Planning ______ b) Controlling
 - c) Organising d) All of these
- Payback period does not account for _____.
 - a) Risk of investment b) Opportunity cost
 - c) Time value of money d) All of the above
- 9) Macro economy deals with _____.
 - a) Whole economy
 - b) Study of aggregate of various forms
 - c) Study of specific market condition
 - d) Study of particular production process

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Set

Max. Marks: 70

Marks: 14

Micro economy deals with _____. 10)

- Whole economy a)
- c) Only public sector
- b) Smaller unit of economy

SLR-FM-419

Set Q

d) Only private sector

- Break-even point is 11)
 - Where total contribution equals variable cost a)
 - b) Where total revenue equals total cost
 - Where total revenue equals fixed cost c)
 - All of the above d)
- 12) What are the objectives of business?
 - a) National objective b)
 - c) Social objective d)
- Economic objective
 - All of the above

Industry

Business includes _____. 13)

c)

- a) Trade
 - All of them Commerce d)
- 14) Co-operative society least think about _
 - Loss b)

b)

a) Customer satisfaction C) Profit All of them d)

No.						Set	Q	
T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering								
	ENG	SINEE	RING ECONO	DMICS AND	MANAGEME	NT		
	& Date: Friday, : 02:30 PM To					Max. Mark	s: 56	
Instr	,	•	ns are compuls he right indicate					
			Se	ction – I				
Q.2	b) Explain thc) Described) Write shot	short no ne devel importa ort notes	ote on Line and opment of cour nce of engineer on pay-back pe value engineeri	ntry in agriculte ring economic eriod with exa	ural sector. s.		16	
Q.3	 a) Explain the science and technological development in Indian. b) Explain the individual ownership and partnership forms of the business. c) Explain in detail Electrical Energy scenario of the country. 			usiness.	12			
• •			Se	ction – II				
Q.4	b) Write thec) Explain thed) Wire the	es &adva importa ne vario various	antages of indus nce and advant us steps for sett facilities for entr the qualities of	tages of SSI. ting the SSI. repreneur give	en by the governn r in brief.	nent.	16	
Q.5		salient	features of India the various fur				12	

Set Q

- c) Explain the various methods of reducing the project cost.

Seat

SLR-FM-419

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ENGINEERING ECONOMICS AND MANAGEMENT Day & Date: Friday, 13-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM **Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. 2) Figures to the right indicate full marks. **MCQ/Objective Type Questions**

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

d)

Economic objective

All of the above

- What are the objectives of business? 1) b)
 - National objective a)
 - C) Social objective
- 2) Business includes _____. Trade
 - a) b) Industry All of them c) Commerce d)

Co-operative society least think about _ 3) Loss

- Customer satisfaction a) b)
- Profit d) All of them c)

4) What are the objectives of value Engg _

- To use efficient and economic Process a)
- To reduce cost of product b)
- To increase the profit c)
- All of them d)

5) Military organisation is known as _

- line organization line and staff organisation a) b) functional organization all of the above C) d)
- Distinction between private sector and public sector is determined on the 6) basis of
 - Economic system b) Motive a)
 - Principle of pricing All of the above C) d)
- PERT has following time estimate _____ 7) one time estimate b) two time estimate a)
 - three time estimate four time estimate C) d)
- Goods produced on small scale have 8)
 - Relatively inelastic supply Highly elastic supply a) b)
 - None of the above Perfectly elastic supply d) c)
- Break-even analysis consists of 9) b) a) fixed cost variable cost
 - fixed and variable costs d) operation costs C)

Seat No.

SLR-FM-419



R

Set

Marks: 14

Set R

SLR-FM-419

- Functions of management are _____. 10)
 - b) a) Planning
 - All of these c) Organising d)
- Payback period does not account for _ 11)
 - a) Risk of investment Time value of money
- **Opportunity cost** b) d) All of the above

Controlling

- Macro economy deals with _____. 12)
 - a) Whole economy

C)

- b) Study of aggregate of various forms
- Study of specific market condition c)
- d) Study of particular production process
- Micro economy deals with _____. 13)
 - a) Whole economy
 - Only public sector C)
- b) Smaller unit of economy
- d) Only private sector

- 14) Break-even point is _
 - Where total contribution equals variable cost a)
 - Where total revenue equals total cost b)
 - C) Where total revenue equals fixed cost
 - All of the above d)

No.		Set	ĸ				
	T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering						
	ENGINEERING ECONOMICS AND MANAGEMENT						
	& Date: Friday, 13-12-2019 Ma :: 02:30 PM To 05:30 PM	ax. Marks	s: 56				
Instr	uctions: 1) All questions are compulsory.2) Figure to the right indicates full marks.						
	Section – I						
Q.2	 Solve any four. a) Write the short note on Line and staff organization. b) Explain the development of country in agricultural sector. c) Describe importance of engineering economics. d) Write short notes on pay-back period with example. e) Explain the term value engineering. 		16				
Q.3	 Solve any two. a) Explain the science and technological development in Indian. b) Explain the individual ownership and partnership forms of the busine c) Explain in detail Electrical Energy scenario of the country. 	SS.	12				
~ ^	Section – II		40				
Q.4	 Solve any four. a) Write rules &advantages of industrial safety. b) Write the importance and advantages of SSI. c) Explain the various steps for setting the SSI. d) Wire the various facilities for entrepreneur given by the government. e) State and explain the qualities of Entrepreneur in brief. 		16				
Q.5	 Solve any two. a) Write the salient features of Indian electricity act 2003. b) State and Explain the various functions of management. 		12				

c) Explain the various methods of reducing the project cost.

SLR-FM-419

Seat



T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ENGINEERING ECONOMICS AND MANAGEMENT

Day & Date: Friday, 13-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Distinction between private sector and public sector is determined on the 1) basis of .
 - Economic system a) b) Motive Principle of pricing C)
- PERT has following time estimate 2)
 - one time estimate b) two time estimate a) three time estimate d)
 - c)

Goods produced on small scale have 3)

- a) Relatively inelastic supply Highly elastic supply b) None of the above Perfectly elastic supply d)
- c)
- 4) Break-even analysis consists of ____ a) fixed cost b) variable cost
 - fixed and variable costs c) d) operation costs
- Functions of management are ____ 5) b) Controlling a) Planning
 - All of these c) Organising d)
- 6) Payback period does not account for _
 - **Opportunity cost** Risk of investment b) a) C)
 - All of the above Time value of money d)
- 7) Macro economy deals with _____.
 - Whole economy a)
 - Study of aggregate of various forms b)
 - Study of specific market condition C)
 - Study of particular production process d)
- Micro economy deals with . 8)
 - Whole economy b) a)
 - Only public sector d) c)
- 9) Break-even point is
 - Where total contribution equals variable cost a)
 - Where total revenue equals total cost b)
 - Where total revenue equals fixed cost c)
 - All of the above d)





Max. Marks: 70

Marks: 14

- d) All of the above
 - - four time estimate

Smaller unit of economy

Only private sector

10) What are the objectives of business?

- a) National objective
- c) Social objective
- b) Economic objective

SLR-FM-419

Set S

d) All of the above

Industry

.

- 11) Business includes _____.
 - a) Trade b)
 - c) Commerce d) All of them
- 12) Co-operative society least think about ____
 - a) Customer satisfactionb) Lossc) Profitd) All of them
- 13) What are the objectives of value Engg ____
 - a) To use efficient and economic Process
 - b) To reduce cost of product
 - c) To increase the profit
 - d) All of them
- 14) Military organisation is known as ____
 - a) line organization
 - c) functional organization
- b) line and staff organisation
- d) all of the above

Seat No.	t	Set	S
	T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-20 ⁻ Electrical Engineering ENGINEERING ECONOMICS AND MANAGEMENT	19	
Time	& Date: Friday, 13-12-2019 M e: 02:30 PM To 05:30 PM	lax. Marks	56 56
Instr	ructions: 1) All questions are compulsory. 2) Figure to the right indicates full marks. Section – I		
Q.2	 Section – I Solve any four. a) Write the short note on Line and staff organization. b) Explain the development of country in agricultural sector. c) Describe importance of engineering economics. d) Write short notes on pay-back period with example. e) Explain the term value engineering. 		16
Q.3	 Solve any two. a) Explain the science and technological development in Indian. b) Explain the individual ownership and partnership forms of the busin c) Explain in detail Electrical Energy scenario of the country. 	ess.	12
Q.4	 Section – II Solve any four. a) Write rules &advantages of industrial safety. b) Write the importance and advantages of SSI. c) Explain the various steps for setting the SSI. d) Wire the various facilities for entrepreneur given by the government e) State and explain the qualities of Entrepreneur in brief. 		16
Q.5	 Solve any two. a) Write the salient features of Indian electricity act 2003. b) State and Explain the various functions of management. 		12

c) Explain the various methods of reducing the project cost.

SLR-FM-419

Seat No.

a capacitor is not		•
en plates	b)	area of plates
tes	d)	all of the above
f turns and the fl	ux is	called
	b)	Magnetic field
	d)	Area linkage

Gauss's law

Seat	
No.	

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 - 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- 1) The differential volume (dv) in cylindrical coordinate system is given by _____.
 - a) $dr d\Phi dz$ b) rdrdΦdz
 - c) $rdrd\Phi$ d)

2) The spherical coordinate $'\Phi'$ can be derived from Cartesian coordinate svstem as

- a) $x^2 + y^2$
- c) $\tan^{-1}(x/y)$
- Unit vector is having 3)
 - a) Direction with one magnitude
 - b) Magnitude is one but not direction
 - c) Not both magnitude and direction
 - d) None of above

The flux density due to infinite surface charge is _____. 4)

- b) $(\rho_s/2) a_n$ a) $(\rho_s/\epsilon_0 2) a_n$
- d) c) $(\rho_s/2)$ $(\rho_{\rm s}\epsilon_0/2)$
- 5) "The total electric flux through any closed surface surrounding charges is equal to the amount of charge enclosed". The above statement is associated with

b)

- a) Coulomb's square law
- c) Maxwell's first law d) Maxwell's second law
- 6) The units of capacitance are _____
 - a) volts/coulomb b) coulombs/volt henry/Wb
 - c) ohms d)
- 7) The capacitance of a
 - a) distance betweer
 - c) thickness of plate
- 8) The product of no. of
 - a) Field linkage c) Flux linkage



Max. Marks: 70

Marks: 14

14

- rdΦdz
- - b) $(x^2 + y^2)^{0.5}$ d) $\tan^{-1}(y/x)$

SLR-FM-420

9)	Relation between electric field inten a) $D = \epsilon E$	· · ·	nd permittivity is given by _ $E = D\epsilon$
	c) $D = E/\epsilon$	d)	$E = \epsilon / d$
10)	Energy density of magnetic field is _		·
	a) $\frac{1}{2}\mu H^2$		μH^2
	c) $\overline{2}\mu H$	d)	$\frac{1}{2}\mu^2 H$
11)	Lorentz force equation is a) $F = Q \times [E + V \times B]$	b)	$F = Q \ [E + V \times B]$
	c) $F = Q \times [E + V \times B]$		$F = Q \left[E + V \times B \right]$ $F = Q \left[B + V \times E \right]$
12)	Displacement current density is		I
	a) D c) $\frac{\partial D}{\partial t}$	d)	$J_{\partial J_{\partial t}}$
13)	The unit of relative permeability is _		<i>-</i> •
	a) Henry/Meter c) Henry/sq. m	b) d)	Henry It is dimensionless
		,	
14)	The vector projection of G on F is gi a) <i>G</i> . <i>F</i>		$g_{\underline{a_F}}$.
	c) $(G.a_F)a_F$,	$F.a_G$
		,	ŭ

Set P

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Seat	
No.	

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Transform $\overline{A} = 3a_x + 4a_y + 5a_z$ to Spherical coordinate system at point (3, 4, 5)
- b) If curl of vector \overline{A} is zero. Find constants a, b and c if $\overline{A} = (x + 2y + az)a_x + (bx - 3y - z)a_y + (4x + cy + 2z)a_z$
- c) Find the electric field intensity at P (0, 0, 4) produced by system of charges of comprising.
 - 1) $Q_1 = 0.5\mu C$ at (0, 0, 2)
 - 2) $Q_2 = -0.6\mu C$ at (3,0,0)
 - 3) $Q_3 = 0.35 \mu C$ at (0, 4, 0)
- d) Explain in detail Uniqueness theorem.
- e) Let $\varepsilon_{r1} = 2.5$ for 0 < y < 1mm, $\varepsilon_{r2} = 4$ for 1 < y < 3mm, ε_{r3} for 3 < y < 5mm, conducting surfaces are at y = 0mm and y = 5mm. Calculate capacitance per m²area if
 - 1) ε_{r3} is that for air
 - 2) $\varepsilon_{r3} = \varepsilon_{r1}$
 - 3) $\varepsilon_{r3} = \varepsilon_{r2}$

Q.3 Solve any two.

a) If $\overline{D} = 4xya_x + 2(x^2 + z^2)a_y + 4yza_z$ Evaluate surface integral to find total charge enclosed by rectangular parallelepiped.

 $0 \le x \le 2, 0 \le y \le 3, 0 \le z \le 5$

- **b)** State Gauss law with mathematical expression and it's any two applications in detail.
- **c)** Find force on $100\mu C$ charge at (0, 0, 3) if four like charges of $20\mu C$ are located on x and y axis at $\pm 4m$

Section – II

Q.4 Solve any four.

- a) A finite current filament through which current I = 1 A current is passed from y = 0 to y = 2. Find \overline{H} at P(1,1)
- **b)** Derive an expression for inductance of toroid due to rectangular cress section area.
- **c)** The point charge of 10C moves with uniform velocity of $(2a_x 4a_z)$ m/s in an electromagnetic field having electric field $E = a_x 3a_y + 8a_z$ and magnetic field having $B = 0.3a_x + 0.1a_y$ Wb/m². Find
 - 1) Electric force
 - 2) Magnetic force

Max. Marks: 56

16

16

d) Derive expression for force on a wire carrying a current.

e) Derive Maxwell's equation in point and integral form from Gauss law for static electric field.

Q.5 Solve any two.

- a) State and prove Ampere's circuital law.
- **b)** Evaluate both sides of Stroke's theorem for the field $\overline{H} = 6xya_x 3y^2a_y$ and the rectangular path around the region $2 \le x \le 5, -1 \le y \le 1, z = 0$ Let the direction of ds to be a_z
- c) Derive expression for boundary conditions in magnetic field.

SLR-FM-420

Set P

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Seat No.							Set C	2
		T.E	. (Part – I)	• • •	-		ination Nov/Dec-2019	
			ELE		trical En	-	ering IGINEERING	
			onday, 16-12 1 To 05:30 P				Max. Marks: 7	0
-		-			ory and sho	ould b	be solved in first 30 minutes in answei	-
		2)	book.) Figures to t	he right in	dicate full	mark	S.	
		,	-				Questions	
Durati	on: 3	0 Mi	nutes				Marks: 1	4
	Choc 1)		he correct a			-	tions. 1 called	4
	''	a)	Field linkag	е	5 and the I	b)	Magnetic field	
	2)	,	Flux linkage		field inton	,	Area linkage	
	2)		$D = \epsilon E$			-	nd permittivity is given by $E = D\epsilon$	
		,	$D = E/\epsilon$,	$E = \epsilon / d$	
	3)	Ene a)	ergy density	of magnet	ic field is _	b)	$-\frac{1}{\mu}H^2$	
			$\frac{1}{2}\mu H^2$			-		
		C)	2μΗ			a)	$\frac{1}{2}\mu^2 H$	
	4)		entz force ed			F)		
		a) c)	$F = Q \times [E]$ $F = Q [V +]$	$E \times B$		(d	$F = Q [E + V \times B]$ $F = Q [B + V \times E]$	
	5)		placement c	urrent den	sity is			
		a) c)	$\frac{D}{\partial D}_{\partial t}$			b) d)	$J_{\partial J_{\partial t}}$	
						-		
	6)	The	e unit of relat Henry/Mete	ive perme	ability is _		_• _ ! !	
		a) c)	Henry/Mete Henry/sq. n	יר ז		d)	Henry It is dimensionless	
	7)		e vector proje	ection of G	on F is gi			
		'	G.F $(G.a_F)a_F$				$G.a_F$ $F.a_G$	
	8)			volume (d	v) in cylinc	,	coordinate system is given by	
		a) c)	drdΦdz rdrdΦ			b) d)	rdrdΦdz rdΦdz	
	9)	,		oordinate	'Φ' can be	,	red from Cartesian coordinate	
	,	sys	tem as					
			$x^2 + y^2$ $\tan^{-1}(x/y)$			d)	$(x^2 + y^2)^{0.5}$ tan ⁻¹ (y/x)	
			-					

SLR-FM-420 Set Q

- 10) Unit vector is having _____.
 - a) Direction with one magnitude
 - b) Magnitude is one but not direction
 - c) Not both magnitude and direction
 - d) None of above

11) The flux density due to infinite surface charge is _____.

- a) $(\rho_s/\epsilon_0 2) a_n$ b) $(\rho_s/2) a_n$
- c) $(\rho_s/2)$ d) $(\rho_s\epsilon_0/2)$
- 12) "The total electric flux through any closed surface surrounding charges is equal to the amount of charge enclosed". The above statement is associated with _____.
 - a) Coulomb's square law
- b) Gauss's law
- c) Maxwell's first law
- d) Maxwell's second law
- 13) The units of capacitance are _____.a) volts/coulomb

c) ohms

- b) coulombs/volt
- d) henry/Wb
- 14) The capacitance of a capacitor is not affected by _____.
 - a) distance between plates
 - c) thickness of plates
- b) area of plates
- d) all of the above

Page **6** of **16**

Seat	
No.	

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Transform $\overline{A} = 3a_x + 4a_y + 5a_z$ to Spherical coordinate system at point (3, 4, 5)
- b) If curl of vector \overline{A} is zero. Find constants a, b and c if $\overline{A} = (x + 2y + az)a_x + (bx - 3y - z)a_y + (4x + cy + 2z)a_z$
- c) Find the electric field intensity at P (0, 0, 4) produced by system of charges of comprising.
 - 1) $Q_1 = 0.5 \mu C$ at (0, 0, 2)
 - 2) $Q_2 = -0.6\mu C$ at (3,0,0)
 - 3) $Q_3 = 0.35 \mu C$ at (0, 4, 0)
- d) Explain in detail Uniqueness theorem.
- e) Let $\varepsilon_{r1} = 2.5$ for 0 < y < 1mm, $\varepsilon_{r2} = 4$ for 1 < y < 3mm, ε_{r3} for 3 < y < 5mm, conducting surfaces are at y = 0mm and y = 5mm. Calculate capacitance per m²area if
 - 1) ε_{r3} is that for air
 - 2) $\varepsilon_{r3} = \varepsilon_{r1}$
 - 3) $\varepsilon_{r3} = \varepsilon_{r2}$

Q.3 Solve any two.

- a) If $\overline{D} = 4xya_x + 2(x^2 + z^2)a_y + 4yza_z$ Evaluate surface integral to find total charge enclosed by rectangular parallelepiped.
 - $0 \le x \le 2, 0 \le y \le 3, 0 \le z \le 5$
- **b)** State Gauss law with mathematical expression and it's any two applications in detail.
- c) Find force on $100\mu C$ charge at (0, 0, 3) if four like charges of $20\mu C$ are located on x and y axis at $\pm 4m$

Section – II

Q.4 Solve any four.

- a) A finite current filament through which current I = 1 A current is passed from y = 0 to y = 2. Find \overline{H} at P(1,1)
- **b)** Derive an expression for inductance of toroid due to rectangular cress section area.
- **c)** The point charge of 10C moves with uniform velocity of $(2a_x 4a_z)$ m/s in an electromagnetic field having electric field $E = a_x 3a_y + 8a_z$ and magnetic field having $B = 0.3a_x + 0.1a_y$ Wb/m². Find
 - 1) Electric force
 - 2) Magnetic force

Max. Marks: 56

16

16

SLR-FM-420 Set Q

- d) Derive expression for force on a wire carrying a current.
- e) Derive Maxwell's equation in point and integral form from Gauss law for static electric field.

Q.5 Solve any two.

- a) State and prove Ampere's circuital law.
- **b)** Evaluate both sides of Stroke's theorem for the field $\overline{H} = 6xya_x 3y^2a_y$ and the rectangular path around the region $2 \le x \le 5, -1 \le y \le 1, z = 0$ Let the direction of ds to be a_z
- c) Derive expression for boundary conditions in magnetic field.

1)	"The total electric flux through any e equal to the amount of charge encl with	osed".	The above statement is a
	a) Coulomb's square lawc) Maxwell's first law	b) d)	Gauss's law Maxwell's second law
2)	The units of capacitance are a) volts/coulomb c) ohms	 b) d)	coulombs/volt henry/Wb
3)	The capacitance of a capacitor is n a) distance between plates c) thickness of plates		area of plates
4)	The product of no. of turns and the a) Field linkage c) Flux linkage	flux is b) d)	called Magnetic field Area linkage
5)	Relation between electric field inter a) $D = \epsilon E$ c) $D = E/\epsilon$	b)	nd permittivity is given by _ $E = D\epsilon$ $E = \epsilon / d$
6)	Energy density of magnetic field is a) $\frac{1}{2}\mu H^2$		$_{\mu H^2}$
	c) $\tilde{2}\mu H$	d)	$\frac{1}{2}\mu^2 H$
7)	Lorentz force equation is a) $F = Q \times [E + V \times B]$ c) $F = Q [V + E \times B]$		$F = Q [E + V \times B]$ $F = Q [B + V \times E]$
8)	Displacement current density is a) D	 b)	J

 $\frac{\partial J}{\partial t}$

Henry

It is dimensionless

d)

b)

d)

Duration: 30 Minutes

book.

Q.1

2) Figures to the right indicate full marks.

.. ges is

MCQ/Objective Type Questions

- associated
- Marks: 14 Choose the correct alternatives from the options. 14

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

C)

9)

 $\frac{\partial D}{\partial t}$

a) Henry/Meter

c) Henry/sq. m

The unit of relative permeability is _

Seat

No.

ELECTROMAGNETIC ENGINEERING

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

Max. Marks: 70

Set

R

SLR-FM-420

Set | R

- 10) The vector projection of G on F is given by _____.
 - a) *G*.*F*
- b) $G.a_F$
- c) $(G.a_F)a_F$ d) $F.a_G$
- 11) The differential volume (dv) in cylindrical coordinate system is given by _____.
 - a) $dr d\Phi dz$ b) $r dr d\Phi dz$
 - c) $rdrd\Phi$ d) $rd\Phi dz$
- 12) The spherical coordinate $'\Phi'$ can be derived from Cartesian coordinate system as _____

a)
$$x^2 + y^2$$

- b) $(x^2 + y^2)^{0.5}$
- c) $\tan^{-1}(x/y)$
- d) $\tan^{-1}(y/x)$
- 13) Unit vector is having _____.
 - a) Direction with one magnitude
 - b) Magnitude is one but not direction
 - c) Not both magnitude and direction
 - d) None of above

14) The flux density due to infinite surface charge is _____.

a) $(\rho_s/\epsilon_0 2) a_n$ c) $(\rho_s/2)$ b) $(\rho_s/2) a_n$ d) $(\rho_s\epsilon_0/2)$

Seat	
No.	

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Transform $\overline{A} = 3a_x + 4a_y + 5a_z$ to Spherical coordinate system at point (3, 4, 5)
- b) If curl of vector \overline{A} is zero. Find constants a, b and c if $\overline{A} = (x + 2y + az)a_x + (bx - 3y - z)a_y + (4x + cy + 2z)a_z$
- c) Find the electric field intensity at P (0, 0, 4) produced by system of charges of comprising.
 - 1) $Q_1 = 0.5 \mu C$ at (0, 0, 2)
 - 2) $Q_2 = -0.6\mu C$ at (3,0,0)
 - 3) $Q_3 = 0.35 \mu C$ at (0, 4, 0)
- d) Explain in detail Uniqueness theorem.
- e) Let $\varepsilon_{r1} = 2.5$ for 0 < y < 1mm, $\varepsilon_{r2} = 4$ for 1 < y < 3mm, ε_{r3} for 3 < y < 5mm, conducting surfaces are at y = 0mm and y = 5mm. Calculate capacitance per m²area if
 - 1) ε_{r3} is that for air
 - 2) $\varepsilon_{r3} = \varepsilon_{r1}$
 - 3) $\varepsilon_{r3} = \varepsilon_{r2}$

Q.3 Solve any two.

- a) If $\overline{D} = 4xya_x + 2(x^2 + z^2)a_y + 4yza_z$ Evaluate surface integral to find total charge enclosed by rectangular parallelepiped.
 - $0 \le x \le 2, 0 \le y \le 3, 0 \le z \le 5$
- **b)** State Gauss law with mathematical expression and it's any two applications in detail.
- **c)** Find force on $100\mu C$ charge at (0, 0, 3) if four like charges of $20\mu C$ are located on x and y axis at $\pm 4m$

Section – II

Q.4 Solve any four.

- a) A finite current filament through which current I = 1 A current is passed from y = 0 to y = 2. Find \overline{H} at P(1,1)
- **b)** Derive an expression for inductance of toroid due to rectangular cress section area.
- **c)** The point charge of 10C moves with uniform velocity of $(2a_x 4a_z)$ m/s in an electromagnetic field having electric field $E = a_x 3a_y + 8a_z$ and magnetic field having $B = 0.3a_x + 0.1a_y$ Wb/m². Find
 - 1) Electric force
 - 2) Magnetic force

Max. Marks: 56

16

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d) Derive expression for force on a wire carrying a current.

e) Derive Maxwell's equation in point and integral form from Gauss law for static electric field.

Q.5 Solve any two.

- a) State and prove Ampere's circuital law.
- **b)** Evaluate both sides of Stroke's theorem for the field $\overline{H} = 6xya_x 3y^2a_y$ and the rectangular path around the region $2 \le x \le 5, -1 \le y \le 1, z = 0$ Let the direction of ds to be a_z
- c) Derive expression for boundary conditions in magnetic field.

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	T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering						
		e: Monday, 16-12-2019 0 PM To 05:30 PM		Max. Marks: 70			
Instr	uctior	ns: 1) Q. No. 1 is compulsory and sho	uld b	e solved in first 30 minutes in answer			
		book. 2) Figures to the right indicate full					
		, ,					
Dura	tion: 3	MCQ/Objective Ty 0 Minutes	he	Marks: 14			
Q.1		ose the correct alternatives from th	e on				
Q .1	1)	Energy density of magnetic field is _	-				
		a) $\frac{1}{2}\mu H^2$		μH^2			
		c) $2\mu H$	d)	$\frac{1}{2}\mu^2 H$			
	2)	Lorentz force equation is a) $F = Q \times [E + V \times B]$ c) $F = Q [V + E \times B]$	b) d)	$F = Q [E + V \times B]$ $F = Q [B + V \times E]$			
	3)	Displacement current density is a) D c) $\frac{\partial D}{\partial t}$	b) d)	$J_{\partial J/\partial t}$			
	4)	The unit of relative permeability is a) Henry/Meter c) Henry/sq. m	b) d)	 Henry It is dimensionless			
	5)	The vector projection of G on F is given a) $G.F$ c) $(G.a_F)a_F$	b)				
	6)	The differential volume (dv) in cylind a) drdΦdz c) rdrdΦ	rical b) d)	coordinate system is given by rdrdΦdz rdΦdz			
	7)	The spherical coordinate $'\Phi'$ can be system as a) $x^2 + y^2$ c) $\tan^{-1}(x/y)$	b)	ted from Cartesian coordinate $(x^2 + y^2)^{0.5}$ $\tan^{-1}(y/x)$			
	8)	 Unit vector is having a) Direction with one magnitude b) Magnitude is one but not direction c) Not both magnitude and direction d) None of above 					

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- 9) The flux density due to infinite surface charge is _____.
 - a) $(\rho_s/\epsilon_0 2) a_n$ b) $(\rho_s/2) a_n$
 - c) $(\rho_s/2)$ d) $(\rho_s\epsilon_0/2)$
- 10) "The total electric flux through any closed surface surrounding charges is equal to the amount of charge enclosed". The above statement is associated with _____.
 - a) Coulomb's square law b) Gauss's law
 - c) Maxwell's first law d) Maxwell's second law

11) The units of capacitance are _____

- a) volts/coulomb b) coulombs/volt
- c) ohms d) henry/Wb

12) The capacitance of a capacitor is not affected by _____.

a) distance between plates

a) Field linkage

- b) area of plates
- c) thickness of plates d) all of the above
- 13) The product of no. of turns and the flux is called _____
 - b) Magnetic field
 - c) Flux linkage d) Area linkage

14) Relation between electric field intensity and permittivity is given by _____.

- a) $D = \epsilon E$ b) $E = D\epsilon$
- c) $D = E/\epsilon$ d) $E = \epsilon/d$

Seat	
No.	

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Transform $\overline{A} = 3a_x + 4a_y + 5a_z$ to Spherical coordinate system at point (3, 4, 5)
- b) If curl of vector \overline{A} is zero. Find constants a, b and c if $\overline{A} = (x + 2y + az)a_x + (bx - 3y - z)a_y + (4x + cy + 2z)a_z$
- c) Find the electric field intensity at P (0, 0, 4) produced by system of charges of comprising.
 - 1) $Q_1 = 0.5 \mu C$ at (0, 0, 2)
 - 2) $Q_2 = -0.6\mu C$ at (3,0,0)
 - 3) $Q_3 = 0.35 \mu C$ at (0, 4, 0)
- d) Explain in detail Uniqueness theorem.
- e) Let $\varepsilon_{r1} = 2.5$ for 0 < y < 1mm, $\varepsilon_{r2} = 4$ for 1 < y < 3mm, ε_{r3} for 3 < y < 5mm, conducting surfaces are at y = 0mm and y = 5mm. Calculate capacitance per m²area if
 - 1) ε_{r3} is that for air
 - 2) $\varepsilon_{r3} = \varepsilon_{r1}$
 - 3) $\varepsilon_{r3} = \varepsilon_{r2}$

Q.3 Solve any two.

- a) If $\overline{D} = 4xya_x + 2(x^2 + z^2)a_y + 4yza_z$ Evaluate surface integral to find total charge enclosed by rectangular parallelepiped.
 - $0 \le x \le 2, 0 \le y \le 3, 0 \le z \le 5$
- **b)** State Gauss law with mathematical expression and it's any two applications in detail.
- **c)** Find force on $100\mu C$ charge at (0, 0, 3) if four like charges of $20\mu C$ are located on x and y axis at $\pm 4m$

Section – II

Q.4 Solve any four.

- a) A finite current filament through which current I = 1 A current is passed from y = 0 to y = 2. Find \overline{H} at P(1,1)
- **b)** Derive an expression for inductance of toroid due to rectangular cress section area.
- **c)** The point charge of 10C moves with uniform velocity of $(2a_x 4a_z)$ m/s in an electromagnetic field having electric field $E = a_x 3a_y + 8a_z$ and magnetic field having $B = 0.3a_x + 0.1a_y$ Wb/m². Find
 - 1) Electric force
 - 2) Magnetic force

Max. Marks: 56

16

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d) Derive expression for force on a wire carrying a current.

e) Derive Maxwell's equation in point and integral form from Gauss law for static electric field.

Q.5 Solve any two.

- a) State and prove Ampere's circuital law.
- **b)** Evaluate both sides of Stroke's theorem for the field $\overline{H} = 6xya_x 3y^2a_y$ and the rectangular path around the region $2 \le x \le 5, -1 \le y \le 1, z = 0$ Let the direction of ds to be a_z
- c) Derive expression for boundary conditions in magnetic field.

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Set S

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL UTILIZATION**

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The most economical method of electric braking is . 1)
 - a) plugging
 - dynamic braking with separate excitation b)
 - dynamic braking with self excitation c)
 - regenerative braking d)

2) Long distance railways operate on ____

- a) 600 V dc b) 25 kV single phase ac 25 kV three phase ac d) 15 kV three phase ac
- c)

Trapezoidal speed-time curve pertains to 3) b) urban service

- a) main line service
- sub-urban service d) urban/sub-urban service C)
- 4) Average speed of a train is independent of _____.
 - a) duration of stops
 - acceleration and braking retardation b)
 - c) distance between stops
 - d) running time

8)

Specific energy consumption is maximum in _____ services. 5)

- suburban b) urban a)
- main line d) equal for all types C)
- 6) When two or more motors are used for traction service, the method of speed control used will be
 - a) rheostatic control b) field control d) motor generator control
 - C) series-parallel control
- 7) Parallel operation of traction motors is easier with _ b) dc series motors
 - a) dc shunt motors
 - c) induction motors
 - Dielectric loss is proportional to ____ a) frequency b)
 - (frequency)² d) (frequency)^{1/2} (frequency)³ C)
- The power factor will be leading in case of ____ 9)
 - induction heating a) electric arc heating C)
- b) dielectric heating

d) none of these

d) resistance heating

Max. Marks: 70

Marks: 14

Set

10)	Projection welding	can be considered as a	a mass production form of $_$
-----	--------------------	------------------------	--------------------------------

a) seam welding

b) flash welding

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c) upset welding

- d) spot welding
- 11) In an electric arc welding, the voltage required to maintain the are will be _____.
 - a) 250 500 V

- b) 150 250 V d) 100 V
- c) 20 30 V
- 12) The main application of indirect arc furnace is to melt _____.
 - a) iron b) steel
 - c) non-ferrous d) None of the above

_.

- The lamp used in cinema projector is _____.
 - a) carbon arc lampb) tc) fluorescent lampd) t
- b) tungsten filament lampd) sodium vapour lamp
- 14) Flood lighting is not used for _____
 - a) industrial purposes b) adve
 - c) aesthetic purposes d)
- b) advertising purposes
- d) any of the above

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Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Explain series-parallel control.
- b) A train is required to run between two stations 1.6 km apart at an average speed of 40 kmph. The run is to be made to a simplified quadrilateral speed-time curve. If the maximum speed is limited to 64 kmph, acceleration to 2.0 kmphps, coasting and braking retardation to 0.16 kmphps and 3.2 kmphps, determine the duration of acceleration, coasting and braking periods.
- c) Write short note on motor selection in textile industries.
- d) Explain mono rail system.
- e) Classify transition methods. Explain shunt transition in detail.

Q.3 Solve any two.

- a) Derive an expression for Trapezoidal Speed-Time Curve.
- b) An electric train has an average speed of 42 kmph on a level track between stops 1,400 m apart. It is accelerated at 1.7 kmphps and is braked at 3 kmphps. Estimate the energy consumption at the axle of the train per tonne-km. Take tractive resistance constant at 50 N per tonne and allow 10% for rotational inertia.
- c) Explain train lighting system.

Section – II

Q.4 Solve any four.

- a) Explain the principle of direct and indirect core type induction furnace.
- **b**) Explain the laws of illumination.
- c) Explain energy conservation in households.
- d) Explain direct and indirect resistance heating techniques.
- e) Explain the following terms:
 - i) Luminous Flux
 - ii) Illumination
 - iii) Brightness
 - iv) Glare
- Q.5 Solve any two.
 - a) Explain resistance welding.
 - **b)** Explain flood lighting.
 - c) Write short notes on:
 - i) Energy conservation in agriculture
 - ii) Energy conservation in industries

Max. Marks: 56

12

16

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ELECTRICAL UTILIZATION Max. Marks: 70 book. 2) Figures to the right indicate full marks. **MCQ/Objective Type Questions Duration: 30 Minutes** Choose the correct alternatives from the options and rewrite the sentence. 1) Dielectric loss is proportional to (frequency)² a) frequency b) (frequency)³ d) (frequency)^{1/2} c) The power factor will be leading in case of ____ 2) induction heating b) dielectric heating a) electric arc heating d) resistance heating c) Projection welding can be considered as a mass production form of _____. 3) seam welding b) flash welding a) upset welding d) spot welding c) 4) be 250 - 500 V b) 150 - 250 V a) d) 100 V c) 20 - 30 V

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Q.1

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

In an electric arc welding, the voltage required to maintain the are will

- The main application of indirect arc furnace is to melt _____. 5) iron
 - b) steel a) non-ferrous d) None of the above c)

6) The lamp used in cinema projector is _____

- carbon arc lamp b) tungsten filament lamp a) fluorescent lamp C)
 - sodium vapour lamp d)
- Flood lighting is not used for _____ 7)
 - industrial purposes b) advertising purposes a)
 - aesthetic purposes c) d) any of the above
- 8) The most economical method of electric braking is _____.
 - plugging a)

c)

- dynamic braking with separate excitation b)
- dynamic braking with self excitation c)
- d) regenerative braking

Long distance railways operate on _ 9)

- 600 V dc a)
- b) 25 kV single phase ac
- 25 kV three phase ac d) 15 kV three phase ac



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Marks: 14

		Set	Q
10)	Trapezoidal speed-time curve pertains toa) main line serviceb) urban servicec) sub-urban serviced) urban/sub-urban service		
11)	 Average speed of a train is independent of a) duration of stops b) acceleration and braking retardation c) distance between stops d) running time 		
12)	Specific energy consumption is maximum in services.a) suburbanb) urbanc) main lined) equal for all types		
13)	When two or more motors are used for traction service, the method ofspeed control used will bea) rheostatic controlb) field control	of	

- c) series-parallel control d) motor generator control
- Parallel operation of traction motors is easier with _____ a) dc shunt motors b) dc series m 14)

 - c) induction motors
- b) dc series motors

d) none of these

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Explain series-parallel control.
- A train is required to run between two stations 1.6 km apart at an average speed of 40 kmph. The run is to be made to a simplified quadrilateral speed-time curve. If the maximum speed is limited to 64 kmph, acceleration to 2.0 kmphps, coasting and braking retardation to 0.16 kmphps and 3.2 kmphps, determine the duration of acceleration, coasting and braking periods.
- c) Write short note on motor selection in textile industries.
- d) Explain mono rail system.
- e) Classify transition methods. Explain shunt transition in detail.

Q.3 Solve any two.

- a) Derive an expression for Trapezoidal Speed-Time Curve.
- b) An electric train has an average speed of 42 kmph on a level track between stops 1,400 m apart. It is accelerated at 1.7 kmphps and is braked at 3 kmphps. Estimate the energy consumption at the axle of the train per tonne-km. Take tractive resistance constant at 50 N per tonne and allow 10% for rotational inertia.
- **c)** Explain train lighting system.

Section – II

Q.4 Solve any four.

- a) Explain the principle of direct and indirect core type induction furnace.
- **b**) Explain the laws of illumination.
- c) Explain energy conservation in households.
- d) Explain direct and indirect resistance heating techniques.
- e) Explain the following terms:
 - i) Luminous Flux
 - ii) Illumination
 - iii) Brightness
 - iv) Glare
- Q.5 Solve any two.
 - a) Explain resistance welding.
 - **b)** Explain flood lighting.
 - c) Write short notes on:
 - i) Energy conservation in agriculture
 - ii) Energy conservation in industries

Max. Marks: 56

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Max. Marks: 70

Marks: 14

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL UTILIZATION**

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

5)

c)

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Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

- Specific energy consumption is maximum in _____ services. 1)
 - a) suburban
 - main line c) d) equal for all types
- 2) When two or more motors are used for traction service, the method of speed control used will be _____
 - b) field control a) rheostatic control
 - c) series-parallel control

3) Parallel operation of traction motors is easier with _____

- dc shunt motors a)
- induction motors c)
- 4) Dielectric loss is proportional to ____
 - $(frequency)^2$ a) frequency b)
 - (frequency)³ C)
 - The power factor will be leading in case of _____
 - a) induction heating
 - electric arc heating c)
- 6) Projection welding can be considered as a mass production form of _____.
 - b) flash welding
 - a) seam welding upset welding d) spot welding
- 7) In an electric arc welding, the voltage required to maintain the are will be
 - a) 250 - 500 V b) 150 - 250 V d) 100 V
 - 20 30 V c)
- The main application of indirect arc furnace is to melt _____. 8)
 - a) iron b) steel c)
 - non-ferrous d) None of the above

9) The lamp used in cinema projector is

- a) carbon arc lamp
- fluorescent lamp d) sodium vapour lamp c)
- b) tungsten filament lamp

d) resistance heating

- d) motor generator control b) dc series motors d) none of these

b) urban

- (frequency)^{1/2} d)

b) dielectric heating

- Flood lighting is not used for _____ 10) b) advertising purposes d) any of the city industrial purposes a) aesthetic purposes d) any of the above c) 11) The most economical method of electric braking is _____. a) plugging dynamic braking with separate excitation b) dynamic braking with self excitation c) d) regenerative braking Long distance railways operate on ____ 12) b) 25 kV single phase ac a) 600 V dc c) 25 kV three phase ac d) 15 kV three phase ac 13) Trapezoidal speed-time curve pertains to ____
 - a) main line service b) urban service
 - c) sub-urban service d) urban/sub-urban service
 - 14) Average speed of a train is independent of ______.
 - a) duration of stops
 - b) acceleration and braking retardation
 - c) distance between stops
 - d) running time

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T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

Seat No.

- a) Explain series-parallel control.
- b) A train is required to run between two stations 1.6 km apart at an average speed of 40 kmph. The run is to be made to a simplified quadrilateral speed-time curve. If the maximum speed is limited to 64 kmph, acceleration to 2.0 kmphps, coasting and braking retardation to 0.16 kmphps and 3.2 kmphps, determine the duration of acceleration, coasting and braking periods.
- c) Write short note on motor selection in textile industries.
- d) Explain mono rail system.
- e) Classify transition methods. Explain shunt transition in detail.

Q.3 Solve any two.

- a) Derive an expression for Trapezoidal Speed-Time Curve.
- b) An electric train has an average speed of 42 kmph on a level track between stops 1,400 m apart. It is accelerated at 1.7 kmphps and is braked at 3 kmphps. Estimate the energy consumption at the axle of the train per tonne-km. Take tractive resistance constant at 50 N per tonne and allow 10% for rotational inertia.
- c) Explain train lighting system.

Section – II

Q.4 Solve any four.

- a) Explain the principle of direct and indirect core type induction furnace.
- b) Explain the laws of illumination.
- c) Explain energy conservation in households.
- d) Explain direct and indirect resistance heating techniques.
- e) Explain the following terms:
 - i) Luminous Flux
 - ii) Illumination
 - iii) Brightness
 - iv) Glare

Q.5 Solve any two.

- a) Explain resistance welding.
- **b)** Explain flood lighting.
- c) Write short notes on:
 - i) Energy conservation in agriculture
 - ii) Energy conservation in industries

Max. Marks: 56

16

12

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			iday, 22-11-2019 / To 01:00 PM		Max. Marks: 70
Instr	uctio		 Q. No. 1 is compulsory and sl book. Figures to the right indicate full 		be solved in first 30 minutes in answer
			MCQ/Objective T		
	tion. 0		-	ype	
	tion: 3				Marks: 14
Q.1	Choo 1)			ed as	ptions and rewrite the sentence. 14 s a mass production form of flash welding spot welding
	2)	In a be a) c)	an electric arc welding, the voltag 250 - 500 V 20 - 30 V		quired to maintain the are will 150 - 250 V 100 V
	3)	Th∉ a) c)	e main application of indirect arc iron non-ferrous	furna b) d)	ace is to melt steel None of the above
	4)		e lamp used in cinema projector carbon arc lamp fluorescent lamp	b)	tungsten filament lamp sodium vapour lamp
	5)	Flo a) c)	od lighting is not used for industrial purposes aesthetic purposes	 b) d)	advertising purposes any of the above
	6)	The a) b) c) d)	e most economical method of ele plugging dynamic braking with separate dynamic braking with self excita regenerative braking	exci	tation
	7)	Lor a)	ng distance railways operate on _ 600 V dc	b)	 25 kV single phase ac

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- larks: 14
- Choos 1) F

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL UTILIZATION**

- 2)

5)

- 6)

7) 2

- d) 15 kV three phase ac 25 kV three phase ac C)
- 8) Trapezoidal speed-time curve pertains to _____
 - main line service a) b) urban service
 - sub-urban service c) d) urban/sub-urban service

Average speed of a train is independent of _____. 9)

- a) duration of stops
- acceleration and braking retardation b)
- distance between stops c)
- running time d)

10) Specific energy consumption is maximum in _____ services.

suburban a) main line

C)

c)

- b) urban
- d) equal for all types
- 11) When two or more motors are used for traction service, the method of speed control used will be _____.
 - rheostatic control a) series-parallel control c)
- b) field control
- d) motor generator control

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Set S

- 12) Parallel operation of traction motors is easier with ____
 - b) dc series motors dc shunt motors a)
 - induction motors C) d) none of these
- 13) Dielectric loss is proportional to ____ (frequency)²
 - b) a) frequency
 - d) (frequency)^{1/2} (frequency)³ C)
- 14) The power factor will be leading in case of _
 - a) induction heating
- b) dielectric heating d) resistance heating
- electric arc heating

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Explain series-parallel control.
- A train is required to run between two stations 1.6 km apart at an average speed of 40 kmph. The run is to be made to a simplified quadrilateral speed-time curve. If the maximum speed is limited to 64 kmph, acceleration to 2.0 kmphps, coasting and braking retardation to 0.16 kmphps and 3.2 kmphps, determine the duration of acceleration, coasting and braking periods.
- c) Write short note on motor selection in textile industries.
- d) Explain mono rail system.
- e) Classify transition methods. Explain shunt transition in detail.

Q.3 Solve any two.

- a) Derive an expression for Trapezoidal Speed-Time Curve.
- b) An electric train has an average speed of 42 kmph on a level track between stops 1,400 m apart. It is accelerated at 1.7 kmphps and is braked at 3 kmphps. Estimate the energy consumption at the axle of the train per tonne-km. Take tractive resistance constant at 50 N per tonne and allow 10% for rotational inertia.
- c) Explain train lighting system.

Section – II

Q.4 Solve any four.

- a) Explain the principle of direct and indirect core type induction furnace.
- **b**) Explain the laws of illumination.
- c) Explain energy conservation in households.
- d) Explain direct and indirect resistance heating techniques.
- e) Explain the following terms:
 - i) Luminous Flux
 - ii) Illumination
 - iii) Brightness
 - iv) Glare
- Q.5 Solve any two.
 - a) Explain resistance welding.
 - **b)** Explain flood lighting.
 - **c)** Write short notes on:
 - i) Energy conservation in agriculture
 - ii) Energy conservation in industries

Max. Marks: 56

12

16

16

	2) Figures to the right indicate full marks.3) Assume the suitable data if necessary.			
		MCQ/Objective Type Questions		
Dura	tion: 3		s: 14	
Q.1	Cho	se the correct alternatives from the options and rewrite the sentence.		
	1)	The function of Snubber circuit connected across the SCR is to		
		 a) Suppress dv/dt b) Increase dv/dt c) Decrease dv/dt d) Decrease di/dt 		
	2)	In thyristor, holding current is		
	_/	 a) more than the latching current b) less than the latching current c) equal to latching current d) none of the above 		
	3)	The uncontrolled electronic switch employed in power-electronic		
		converters is		
		a) SCR b) BJT		
		c) Diode d) MOSFET		
	4)	In step-down chopper output voltage is given by		
		a) $Vo = \alpha Vs$ b) $\frac{Vs}{\sqrt{\alpha}}$		
		c) $\frac{1}{1-\alpha}V_S$ d) $(1-\alpha)V_S$		
	5) If the chopper frequency is 200 Hz and ton time is 2 ms, the duty cycle is			
		a) 0.4 b) 0.8		
		c) 0.6 d) None of these		
	6)	Thyristor may be termed as		
		a) D.C. switch b) A.C. switch		
		c) A.C. and D.C. switch d) Square wave switch		
	 For continuous conduction, in single phase full converter each pair of SCR conduct for 			
		a) $\pi - \alpha$ b) π		
		c) α d) $\pi + \alpha$		
	8) For discontinuous load current and extinction angle $B > \pi$ in 1 ϕ full converter each SCR conduct for			
		a) α b) $\beta - \alpha$		
		c) β d) $\beta + \alpha$		
	9)	In 3φ full converter, output voltage pulsates at a frequency equal to a) supply frequency f b) 2f		

Day & Date: Saturday, 23-11-2019 Max. Marks: 70 Time: 10:00 AM To 01:00 PM Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

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T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering POWER ELECTRONICS**

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- a) supply frequency f b) 21
 - C) 3f d) 6f

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 $A1 - \phi$ brid VSI has inductor L as the load. For a constant source voltage 10) the current through inductor is _____.

- Square wave a)
- Triangular wave b)

SLR-FM-422

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- C) Sine wave
- d) Pulsed wave
- 11) A step-up chopper is fed from a 220 V d.c, source to deliver a load voltage of 660 V. If a non-conduction time of the thyristor is 100 μ s, the required pulse width would be .
 - 100 µs b) 200 μs a)
 - c) 220 µs d) 660 μs
- For eleminating third harmonic from output voltage of inverter using series 12) connection of inverters, the required phase difference between output voltages of two inverters is _____. b) 45⁰
 - 60° a)
 - 90⁰ d) 180⁰ c)
- 13) Half bridge inverter require _____.
 - 3 wire d.c. a)
 - b) may use 2 wire or 3 wire d.c.
 - has higher output voltage if fed from 3 wire d.c. C)
 - has higher efficiency if fed from 3 wire d.c. d)
- A single phase half bridge inverter required to feed R-L loads needs _____. 14)
 - 2 thyristors a)

- b) 4 thyristors
- C) 2 thyristor 2 diodes
- d) 4 thyristors and 4 diodes

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data if necessary.

Section I

Q.2 Attempt any four.

Seat

No.

- a) Draw gate characteristics of SCR and explain.
- Explain Class A commutation in detail. b)
- For full wave controlled rectifier with R-L load, draw waveform for load c) voltage and derive expression for average load voltage.
- A mid point converter is supplying a DC load. The firing angle of SCR is d) 45[°] and the average load voltage is 75 V. Determine the RMS secondary voltage of the transformer. Assume primary to secondary turns ratio of transformer is 1:2.
- A 230 V, 50 Hz, 1 pulse SCR is triggered at a firing angle 40⁰ and the load e) current extinguishes at an angle of 210°. Find average load voltage and average load current for R = 5 Ω , L= 2 mH.

Q.3 Attempt any two.

- a) With the help of neat construction diagram explain four operating modes of TRIAC.
- b) Draw the circuit for two transistor analogy of SCR and find expression for anode current I_A .
- A1 ϕ halfwave controlled rectifier with resistive load, if firing angle $\alpha = \pi/4$, C) rad $E_s \equiv 230 \text{ V}, \text{ R} = 5\Omega \text{ Find}$
 - Average output voltage 1)
 - RMS output voltage 2)
 - 3) Power delivered to load

Section –II

Q.4 Attempt any four.

- Draw and Explain single phase bidirectional AC voltage controller with R a) load. Derive expression for average and RMS load voltage.
- Explain various methods of voltage control in inverter. b)
- Draw & explain single phase full bridge inverter with R load. Also derive c) expression for RMS value of output voltage.
- Draw and Explain step up chopper. Also derive expression of average d) output voltage.
- What is meant by PWM? Explain Single Pulse Width Modulation in detail. e)

Max. Marks: 56

12

16

Set

SLR-FM-422 Set P

Q.5 Attempt any two.

- a) Discuss the principle of working of 3 phase bridge inverter with appropriate waveform and circuit diagram on assumption that each thyristor conduct for 180⁰ and resistive load is star connected. Also derive expression for RMS output phase & line voltage.
- b) Draw and Explain Buck-Boost regulator.
- c) Write a note on "speed control of Electric Motor using Power Electronics converters".

Electrical Engineering POWER ELECTRONICS Day & Date: Saturday, 23-11-2019 Max. Marks: 70 book. 2) Figures to the right indicate full marks. 3) Assume the suitable data if necessary. **MCQ/Objective Type Questions** Marks: 14 Q.1 Choose the correct alternatives from the options and rewrite the sentence. For discontinuous load current and extinction angle $B > \pi$ in 1 ϕ full converter each SCR conduct for a) b) $\beta - \alpha$ α d) $\beta + \alpha$ C) β In 3 ϕ full converter, output voltage pulsates at a frequency equal to_____. a) supply frequency f b) 2f d) 6f C) 3f the current through inductor is _____. b) Triangular wave Square wave a) C) Sine wave d) Pulsed wave

Duration: 30 Minutes

1)

2)

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Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

3) $A1 - \phi$ brid VSI has inductor L as the load. For a constant source voltage

- A step-up chopper is fed from a 220 V d.c, source to deliver a load voltage 4) of 660 V. If a non-conduction time of the thyristor is 100 μ s, the required pulse width would be _____.
 - 100 µs b) 200 μs a)
 - d) 660 us c) 220 µs
- For eleminating third harmonic from output voltage of inverter using series 5) connection of inverters, the required phase difference between output voltages of two inverters is _____.
 - b) 45⁰ 60° a) 90⁰ d) 180⁰ c)
- Half bridge inverter require _____. 6)
 - 3 wire d.c. a)
 - may use 2 wire or 3 wire d.c. b)
 - has higher output voltage if fed from 3 wire d.c. C)
 - d) has higher efficiency if fed from 3 wire d.c.
- A single phase half bridge inverter required to feed R-L loads needs _____. 7) a)
 - 2 thyristors b) 4 thyristors d) 4 thyristors and 4 diodes
 - 2 thyristor 2 diodes C)
- The function of Snubber circuit connected across the SCR is to . 8)
 - Suppress dv/dt a) Decrease *dv/dt* C)
- b) Increase dv/dt
- d) Decrease *di/dt*

SLR-FM-422

Set Q

		•=
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9)	 In thyristor, holding current is a) more than the latching current c) equal to latching current 	
10)	The uncontrolled electronic switch em converters is a) SCR c) Diode	ployed in power-electronic b) BJT d) MOSFET
11)	In step-down chopper output voltage i a) $Vo = \alpha Vs$ c) $\frac{1}{1-\alpha}Vs$	s given by b) $\frac{Vs}{\sqrt{\alpha}}$ d) $(1 - \alpha)Vs$
12)	If the chopper frequency is 200 Hz an a) 0.4 c) 0.6	d ton time is 2 ms, the duty cycle is b) 0.8 d) None of these
13)	Thyristor may be termed as <u>.</u> a) D.C. switch c) A.C. and D.C. switch	b) A.C. switchd) Square wave switch
14)	For continuous conduction, in single p conduct for a) $\pi - \alpha$	bhase full converter each pair of SCR b) π

a) $\pi - \alpha$ c) α b) π d) $\pi + \alpha$ SLR-FM-422

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T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data if necessary.

Section I

Q.2 Attempt any four.

- a) Draw gate characteristics of SCR and explain.
- **b**) Explain Class A commutation in detail.
- c) For full wave controlled rectifier with R-L load, draw waveform for load voltage and derive expression for average load voltage.
- d) A mid point converter is supplying a DC load. The firing angle of SCR is 45[°] and the average load voltage is 75 V. Determine the RMS secondary voltage of the transformer. Assume primary to secondary turns ratio of transformer is 1:2.
- e) A 230 V, 50 Hz, 1 pulse SCR is triggered at a firing angle 40° and the load current extinguishes at an angle of 210° . Find average load voltage and average load current for R = 5 Ω , L= 2 mH.

Q.3 Attempt any two.

- a) With the help of neat construction diagram explain four operating modes of TRIAC.
- b) Draw the circuit for two transistor analogy of SCR and find expression for anode current I_A .
- c) A1 ϕ halfwave controlled rectifier with resistive load, if firing angle $\alpha = \pi/4$, rad E_s=230 V, R = 5 Ω Find
 - 1) Average output voltage
 - 2) RMS output voltage
 - 3) Power delivered to load

Section –II

Q.4 Attempt any four.

- a) Draw and Explain single phase bidirectional AC voltage controller with R load. Derive expression for average and RMS load voltage.
- **b)** Explain various methods of voltage control in inverter.
- c) Draw & explain single phase full bridge inverter with R load. Also derive expression for RMS value of output voltage.
- d) Draw and Explain step up chopper. Also derive expression of average output voltage.
- e) What is meant by PWM? Explain Single Pulse Width Modulation in detail.

Max. Marks: 56

Set

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SLR-FM-422 Set Q

Q.5 Attempt any two.

- a) Discuss the principle of working of 3 phase bridge inverter with appropriate waveform and circuit diagram on assumption that each thyristor conduct for 180⁰ and resistive load is star connected. Also derive expression for RMS output phase & line voltage.
- b) Draw and Explain Buck-Boost regulator.
- c) Write a note on "speed control of Electric Motor using Power Electronics converters".

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ons:	1) Q. No. 1 is compulsory and shou book.		e solved in first 30 minutes in answ
	2) Figures to the right indicate full n	nark	S.
	3) Assume the suitable data if nece	essar	у.
	MCQ/Objective Type	e Qu	estions
30 N	linutes		Marks:
oose	the correct alternatives from the	opti	ons and rewrite the sentence.
	he chopper frequency is 200 Hz and	-	
a)	0.4	b)	0.8
c)	0.6	d)	None of these
Th	yristor may be termed as		
	D.C. switch	b)	A.C. switch
	A.C. and D.C. switch	'	Square wave switch
Fo	r continuous conduction, in single pl	nase	full converter each pair of SCR
	nduct for		
a)	$\pi - \alpha$	b)	π
c)	α	d)	$\pi + \alpha$
Fo	r discontinuous load current and ext	inctio	on angle $B > \pi$ in 1 ϕ full
COI	nverter each SCR conduct for		
a)	α		$\beta - \alpha$
c)	β	d)	$\beta + \alpha$
In	3φ full converter, output voltage puls	sates	s at a frequency equal to
a)	supply frequency f	b)	2f
c)	3f	d)	6f
A1	$-\phi$ brid VSI has inductor L as the l	oad.	For a constant source voltage
	current through inductor is		5
a)	Square wave	b)	Triangular wave
c)	Sine wave	d)	Pulsed wave
As	step-up chopper is fed from a 220 V	d.c.	source to deliver a load voltage
	660 V. If a non-conduction time of		-
	se width would be		

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER ELECTRONICS

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- 14 1) ___·
 - 2)
 - 3)
 - 4)
 - 5)
 - 6)
 - 7)
 - 100 µs b) 200 μs a)
 - 220 µs d) 660 µs c)
 - For eleminating third harmonic from output voltage of inverter using series 8) connection of inverters, the required phase difference between output voltages of two inverters is _____.
 - b) 45⁰ 60⁰ a) 90⁰ d) 180⁰ c)

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- 9) Half bridge inverter require _____.
 - a) 3 wire d.c.
 - may use 2 wire or 3 wire d.c. b)
 - has higher output voltage if fed from 3 wire d.c. c)
 - has higher efficiency if fed from 3 wire d.c. d)
- 10) A single phase half bridge inverter required to feed R-L loads needs _____.
 - a) 2 thyristors

- b) 4 thyristors
- 2 thyristor 2 diodes c)
- d) 4 thyristors and 4 diodes
- 11) The function of Snubber circuit connected across the SCR is to _____.
 - Suppress *dv/dt* a)
 - Decrease *dv/dt* C)
- b) Increase dv/dtd) Decrease *di/dt*
- 12) In thyristor, holding current is _____.
 - a)
 - equal to latching current c)
- more than the latching current b) less than the latching current
 - d) none of the above
- 13) The uncontrolled electronic switch employed in power-electronic converters is _____.
 - a) SCR b) BJT Diode d) MOSFET c)
- 14) In step-down chopper output voltage is given by _____.
 - $Vo = \alpha Vs$ a)
 - $\frac{1}{1-\alpha}Vs$ C)

- $\frac{Vs}{\sqrt{\alpha}}$ b)
- d) $(1-\alpha)Vs$

SLR-FM-422 Set R

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T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data if necessary.

Section I

Q.2 Attempt any four.

- a) Draw gate characteristics of SCR and explain.
- b) Explain Class A commutation in detail.
- c) For full wave controlled rectifier with R-L load, draw waveform for load voltage and derive expression for average load voltage.
- d) A mid point converter is supplying a DC load. The firing angle of SCR is 45[°] and the average load voltage is 75 V. Determine the RMS secondary voltage of the transformer. Assume primary to secondary turns ratio of transformer is 1:2.
- e) A 230 V, 50 Hz, 1 pulse SCR is triggered at a firing angle 40° and the load current extinguishes at an angle of 210° . Find average load voltage and average load current for R = 5 Ω , L= 2 mH.

Q.3 Attempt any two.

- a) With the help of neat construction diagram explain four operating modes of TRIAC.
- b) Draw the circuit for two transistor analogy of SCR and find expression for anode current I_A .
- c) A1 ϕ halfwave controlled rectifier with resistive load, if firing angle $\alpha = \pi/4$, rad E_s=230 V, R = 5 Ω Find
 - 1) Average output voltage
 - 2) RMS output voltage
 - 3) Power delivered to load

Section –II

Q.4 Attempt any four.

- a) Draw and Explain single phase bidirectional AC voltage controller with R load. Derive expression for average and RMS load voltage.
- **b)** Explain various methods of voltage control in inverter.
- c) Draw & explain single phase full bridge inverter with R load. Also derive expression for RMS value of output voltage.
- d) Draw and Explain step up chopper. Also derive expression of average output voltage.
- e) What is meant by PWM? Explain Single Pulse Width Modulation in detail.

Max. Marks: 56

12

16



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SLR-FM-422 Set R

Q.5 Attempt any two.

- a) Discuss the principle of working of 3 phase bridge inverter with appropriate waveform and circuit diagram on assumption that each thyristor conduct for 180⁰ and resistive load is star connected. Also derive expression for RMS output phase & line voltage.
- b) Draw and Explain Buck-Boost regulator.
- c) Write a note on "speed control of Electric Motor using Power Electronics converters".

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

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No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- $A1 \phi$ brid VSI has inductor L as the load. For a constant source voltage 1) the current through inductor is _____.
 - Square wave a)
 - Sine wave
- 2) A step-up chopper is fed from a 220 V d.c, source to deliver a load voltage of 660 V. If a non-conduction time of the thyristor is 100 μ s, the required pulse width would be _____.
 - 100 µs b) 200 μs a)
 - C) 220 µs d) 660 us
- For eleminating third harmonic from output voltage of inverter using series 3) connection of inverters, the required phase difference between output voltages of two inverters is _____. a)
 - 45^{0} 60° b)
 - 90^{0} d) 180⁰ c)
- 4) Half bridge inverter require _____.
 - 3 wire d.c. a)
 - may use 2 wire or 3 wire d.c. b)
 - has higher output voltage if fed from 3 wire d.c. C)
 - d) has higher efficiency if fed from 3 wire d.c.

A single phase half bridge inverter required to feed R-L loads needs _____. 5)

2 thyristors a)

b) 4 thyristors d) 4 thyristors and 4 diodes

b) Triangular wave

d) Pulsed wave

- 2 thyristor 2 diodes C)
- 6) The function of Snubber circuit connected across the SCR is to _____.
 - Suppress *dv/dt* a)
- b) Increase dv/dt
- Decrease *dv/dt* d) Decrease *di/dt*
- In thyristor, holding current is _____. 7)
 - more than the latching current a)
 - equal to latching current C)
- b) less than the latching current
- d) none of the above
- 8) The uncontrolled electronic switch employed in power-electronic converters is _____.
 - SCR a)

c)

C) Diode

- b) BJT
- d) MOSFET

Max. Marks: 70

Marks: 14

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9)	In step-down chopper output voltage is a) $Vo = \alpha Vs$	s given by b) $\frac{Vs}{\sqrt{\alpha}}$
	$C) \qquad \frac{1}{1-\alpha}VS$	d) $(1-\alpha)Vs$
10)	If the chopper frequency is 200 Hz and a) 0.4 c) 0.6	d ton time is 2 ms, the duty cycle is b) 0.8 d) None of these
11)	Thyristor may be termed as <u>.</u> a) D.C. switch c) A.C. and D.C. switch	b) A.C. switchd) Square wave switch
12)	For continuous conduction, in single p conduct for a) $\pi - \alpha$	b) π
13)	c) α For discontinuous load current and ex converter each SCR conduct for a) α	b) $\beta - \alpha$
14)	 c) β In 3φ full converter, output voltage pul a) supply frequency f c) 3f 	d) $\beta + \alpha$ sates at a frequency equal to b) 2f d) 6f

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T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data if necessary.

Section I

Q.2 Attempt any four.

- a) Draw gate characteristics of SCR and explain.
- Explain Class A commutation in detail. b)
- For full wave controlled rectifier with R-L load, draw waveform for load c) voltage and derive expression for average load voltage.
- A mid point converter is supplying a DC load. The firing angle of SCR is d) 45[°] and the average load voltage is 75 V. Determine the RMS secondary voltage of the transformer. Assume primary to secondary turns ratio of transformer is 1:2.
- A 230 V, 50 Hz, 1 pulse SCR is triggered at a firing angle 40⁰ and the load e) current extinguishes at an angle of 210°. Find average load voltage and average load current for R = 5 Ω , L= 2 mH.

Q.3 Attempt any two.

- a) With the help of neat construction diagram explain four operating modes of TRIAC.
- b) Draw the circuit for two transistor analogy of SCR and find expression for anode current I_A .
- A1 ϕ halfwave controlled rectifier with resistive load, if firing angle $\alpha = \pi/4$, C) rad $E_s \equiv 230 \text{ V}, \text{ R} = 5\Omega \text{ Find}$
 - Average output voltage 1)
 - RMS output voltage 2)
 - 3) Power delivered to load

Section –II

Q.4 Attempt any four.

- Draw and Explain single phase bidirectional AC voltage controller with R a) load. Derive expression for average and RMS load voltage.
- Explain various methods of voltage control in inverter. b)
- Draw & explain single phase full bridge inverter with R load. Also derive c) expression for RMS value of output voltage.
- Draw and Explain step up chopper. Also derive expression of average d) output voltage.
- What is meant by PWM? Explain Single Pulse Width Modulation in detail. e)

Max. Marks: 56

12

16

Set

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Q.5 Attempt any two.

- a) Discuss the principle of working of 3 phase bridge inverter with appropriate waveform and circuit diagram on assumption that each thyristor conduct for 180⁰ and resistive load is star connected. Also derive expression for RMS output phase & line voltage.
- b) Draw and Explain Buck-Boost regulator.
- c) Write a note on "speed control of Electric Motor using Power Electronics converters".

Figures to the right indicate full marks. MCQ/Objective Type Questions **Duration: 30 Minutes** Choose the correct alternatives from the options and rewrite the sentence. What is the effect of phase lead compensator on gain crossover frequency (ω_{gc}) and on the bandwidth (ω_b) _____. Both are increased a) b) ω_{ac} is increased but ω_{b} is decreased ω_{gc} is decreased but ω_b is increased C) Both are decreased d) The transfer function is $\frac{s+2}{s+3}$ It represents a _____. a) lead network b) lag network d) proportional controller lag-lead network C) If the eigenvalues of a 3x3 matrix A are 1, -2, and 4. What are the eigenvalues of P⁻¹ AP where P is a linear transformation? a) 1, -1/2, 1/4 b) -1.2.-4d) 1.−2.4 C) 1, 4, 16 The transfer function of a lead Compensator is $G_{\mathcal{C}}(s) = \frac{1+0.12s}{1+0.04s}$ b) 45°d) 15° a) 60° 30° C) a > 1 and T > 0. The maximum phase shift provided by such a compensator is b) $\tan^{-1}\left(\frac{a-1}{a+1}\right)$ d) $\sin^{-1}\left(\frac{a-1}{a+1}\right)$ $\tan^{-1}\left(\frac{a+1}{a-1}\right)$ a) $\sin^{-1}\left(\frac{a+1}{a-1}\right)$ c) For an nth order system the state equations will be of the order of _____. a) b) 1 п d) (n+1)/2C) n/2the system must be completely observable a) b) completely controllable not observable d) not controllable c)

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

Q.1 1)

- 2)
- 3)

4) The maximum phase shift that can be obtained from this compensator is

5) The transfer function of a phase lead compensator is given by $\frac{1+aTs}{1+Ts}$ where

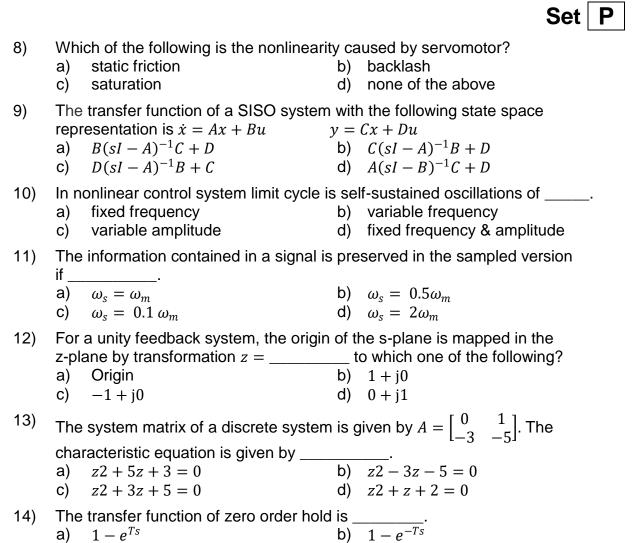
- 6)
- The necessary and sufficient condition for full order state observer is that 7)

Max. Marks: 70

Set

Seat No.

Marks: 14



a) $1 - e^{Ts}$ b) $1 - e^{-Ts}$ c) $\frac{1 - e^{Ts}}{s}$ d) $\frac{1 - e^{-Ts}}{s}$ **SLR-FM-423**

16

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T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Attempt any four of the following questions. Q.2

- a) Explain the design steps for lag compensator by Root Locus Technique.
- b) Test the controllability of the system whose state equations are given as +u

$$\dot{x}_1 = x_1 + x_2$$

 $\dot{x}_1 = -x_2$

c) Determine the Transfer function from the data given as below.

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix}; B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}; C = \begin{bmatrix} 1 & 1 \end{bmatrix} and D = 0$$

- d) Write the properties of state transition matrix.
- Explain realization of Lead compensator e)
- Obtain state model for the system described in phase variable form. f)

$$\frac{d^3y}{dt^3} + 11 \frac{d^2y}{dt^2} + 4\frac{dy}{dx} + 8y = 9 u(t)$$

Q.3 Attempt any two of the following questions.

a) Obtain state Transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 2 & 3 \\ 0 & -3 \end{bmatrix}$$

b) Consider the system having transfer function $G(s) = \frac{K}{S(S+8)}$ with unity

feedback. Design a lead compensator to meet following specifications.

- Natural Frequency = 12 rad/sec 2)
- 3) $Kv \geq 10$
- c) A unity feedback type 1 system has Open Loop Transfer Function $G(s) = \frac{K}{S(2S+1)}$ Design the suitable lag network for the system to meet following specifications.
 - 1) $k_v = 0.2 sec^{-1}$
 - 2) $PM = 40^{\circ}$

Section – II

Q.4 Attempt any four of the following questions.

- a) Explain common physical nonlinearities.
- b) Explain in short jump resonance.
- c) Explain in short limit cycle.
- d) Derive pulse transfer function of cascaded elements.
- e) Explain in short mapping between s-plane and z -plane.
- Determine the kind of singularity for the following differential equation. f)

$$\ddot{y} + 3\dot{y} + 2y = 0$$

16

12

Max. Marks: 56

SLR-FM-423 Set P

P

Q.5 Attempt any two of the following questions.

a) Examine the stability of the system by using Bilinear transformation coupled with Routh's criteria.

$$5Z^2 - 2Z + 2 = 0$$

b) Consider a system defined by $\dot{X} = Ax + Bu$ Where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

By using state feedback control u = -kx. It is desired to have the closed loop poles at $s = -2 \pm j4$ and s = -10 Determine the state feedback gain matrix 'K' for controller.

c) Examine the stability of the system given; by Jury's stability test.

$$Z^3 - 1.1Z^2 - 0.1Z + 0.2 = 0$$

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Duration: 30 Minutes

Seat

No.

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Choose the correct alternatives from the options and rewrite the sentence. Q.1

- Which of the following is the nonlinearity caused by servomotor? 1)
 - a) static friction b) backlash c) saturation d) none of the above
- The transfer function of a SISO system with the following state space 2) y = Cx + Du
 - representation is $\dot{x} = Ax + Bu$
 - a) $B(sI A)^{-1}C + D$
 - d) $A(sI B)^{-1}C + D$ c) $D(sI - A)^{-1}B + C$

In nonlinear control system limit cycle is self-sustained oscillations of _____. 3)

b) $C(sI - A)^{-1}B + D$

- a) fixed frequency b) variable frequency
- variable amplitude d) fixed frequency & amplitude C)
- 4) The information contained in a signal is preserved in the sampled version if .

a)
$$\omega_s = \omega_m$$

b) $\omega_s = 0.5\omega_m$
d) $\omega_s = 2\omega_m$

c)
$$\omega_s = 0.1 \, \omega_m$$
 d) $\omega_s = 2 \omega_m$

- For a unity feedback system, the origin of the s-plane is mapped in the 5) z-plane by transformation z =_____ to which one of the following? a) Origin b) 1 + i0
 - d) 0 + j1 c) -1 + i0

6) The system matrix of a discrete system is given by $A = \begin{bmatrix} 0 & 1 \\ -3 & -5 \end{bmatrix}$. The characteristic equation is given by ____

- b) $z^2 3z 5 = 0$ a) $z^2 + 5z + 3 = 0$
- $z^2 + 3z + 5 = 0$ d) $z^2 + z + 2 = 0$ c)
- 7) The transfer function of zero order hold is b) $1 - e^{-Ts}$ a) $1 - e^{Ts}$ $1-e^{Ts}$ d) $1-e^{-Ts}$ c)

8) What is the effect of phase lead compensator on gain crossover frequency (ω_{ac}) and on the bandwidth (ω_b) _____

- Both are increased a)
- b) ω_{ac} is increased but ω_b is decreased
- ω_{ac} is decreased but ω_{b} is increased c)
- Both are decreased d)

SLR-FM-423

Set

Marks: 14

14

Max. Marks: 70

		SLR-FM-423			
		Set Q	-		
9)	The transfer function is $\frac{s+2}{s+3}$ It represent a) lead network c) lag-lead network	nts a b) lag network d) proportional controller			
10)	If the eigenvalues of a 3x3 matrix A a eigenvalues of P^{-1} AP where P is a line a) $1, -1/2, 1/4$ c) $1, 4, 16$	are 1, -2, and 4. What are the near transformation? b) $-1, 2, -4$ d) $1, -2, 4$			
11)) The transfer function of a lead Compensator is $G_C(s) = \frac{1+0.12s}{1+0.04s}$ The maximum phase shift that can be obtained from this compensator is				
	a) 60° c) 30°	b) 45° d) 15°			
12)	The transfer function of a phase lead a > 1 and $T > 0$. The maximum phase compensator is a) tan ⁻¹ $\left(\frac{a+1}{a-1}\right)$ c) sin ⁻¹ $\left(\frac{a+1}{a-1}\right)$				
13)	For an n th order system the state equation n				

a) п n/2 c)

b) 1 d) (n+1)/2

- The necessary and sufficient condition for full order state observer is that 14) the system must be _____
 a) completely observable
 c) not observable
- b) completely controllabled) not controllable

Seat	
No.	

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Attempt any four of the following questions. Q.2

- a) Explain the design steps for lag compensator by Root Locus Technique.
- b) Test the controllability of the system whose state equations are given as +u

$$\dot{x}_1 = x_1 + x_2$$

 $\dot{x}_1 = -x_2$

c) Determine the Transfer function from the data given as below.

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix}; B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}; C = \begin{bmatrix} 1 & 1 \end{bmatrix} and D = 0$$

- d) Write the properties of state transition matrix.
- Explain realization of Lead compensator e)
- Obtain state model for the system described in phase variable form. f)

$$\frac{d^3y}{dt^3} + 11 \frac{d^2y}{dt^2} + 4\frac{dy}{dx} + 8y = 9 u(t)$$

Q.3 Attempt any two of the following questions.

a) Obtain state Transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 2 & 3 \\ 0 & -3 \end{bmatrix}$$

b) Consider the system having transfer function $G(s) = \frac{K}{S(S+8)}$ with unity

feedback. Design a lead compensator to meet following specifications.

- 1) Damping ratio= 0.6
- 2) Natural Frequency = 12 rad/sec
- 3) $Kv \geq 10$
- c) A unity feedback type 1 system has Open Loop Transfer Function $G(s) = \frac{K}{S(2S+1)}$ Design the suitable lag network for the system to meet following specifications.
 - 1) $k_v = 0.2 sec^{-1}$
 - 2) $PM = 40^{\circ}$

Section – II

Q.4 Attempt any four of the following questions.

- a) Explain common physical nonlinearities.
- b) Explain in short jump resonance.
- c) Explain in short limit cycle.
- d) Derive pulse transfer function of cascaded elements.
- e) Explain in short mapping between s-plane and z -plane.
- Determine the kind of singularity for the following differential equation. f)

$$\ddot{y} + 3\dot{y} + 2y = 0$$

Max. Marks: 56

16

16

Set Q

Q.5 Attempt any two of the following questions.

a) Examine the stability of the system by using Bilinear transformation coupled with Routh's criteria.

$$5Z^2 - 2Z + 2 = 0$$

b) Consider a system defined by $\dot{X} = Ax + Bu$ Where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

By using state feedback control u = -kx. It is desired to have the closed loop poles at $s = -2 \pm j4$ and s = -10 Determine the state feedback gain matrix 'K' for controller.

c) Examine the stability of the system given; by Jury's stability test.

$$Z^3 - 1.1Z^2 - 0.1Z + 0.2 = 0$$

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T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

a)

1)

Seat No.

Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

The transfer function of a phase lead compensator is given by $\frac{1+aTs}{1+Ts}$ where a > 1 and T > 0. The maximum phase shift provided by such a compensator is

 $\tan^{-1}\left(\frac{a+1}{a-1}\right)$ $\sin^{-1}\left(\frac{a+1}{a-1}\right)$ a) c)

For an nth order system the state equations will be of the order of _____. 2)

- a) b) 1 п
- d) (n+1)/2C) n/2
- 3) The necessary and sufficient condition for full order state observer is that the system must be _
 - completely observable a)

static friction

- b) completely controllable not observable d) not controllable
- 4) Which of the following is the nonlinearity caused by servomotor?
 - none of the above c) saturation d)
- 5) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu$ y = Cx + Dub) $C(sI - A)^{-1}B + D$
 - a) $B(sI A)^{-1}C + D$
 - $D(sI A)^{-1}B + C$ d) $A(sI - B)^{-1}C + D$ C)

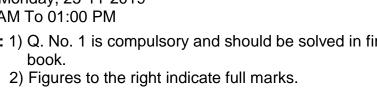
In nonlinear control system limit cycle is self-sustained oscillations of _____. 6)

- fixed frequency b) variable frequency a) variable amplitude d) fixed frequency & amplitude c)
- The information contained in a signal is preserved in the sampled version 7) if
 - a) b) $\omega_s = 0.5\omega_m$ $\omega_s = \omega_m$ d) $\omega_s = 2\omega_m$ $\omega_s = 0.1 \, \omega_m$ C)
- For a unity feedback system, the origin of the s-plane is mapped in the 8)
 - z-plane by transformation z =_____ to which one of the following? a) Origin b) 1 + i0
 - C) -1 + i0d) 0 + i1

SLR-FM-423

Max. Marks: 70

Marks: 14



b) $\tan^{-1}\left(\frac{a-1}{a+1}\right)$ d) $\sin^{-1}\left(\frac{a-1}{a+1}\right)$

b) backlash

	SLR-FM-423
	Set R
9)	The system matrix of a discrete system is given by $A = \begin{bmatrix} 0 & 1 \\ -3 & -5 \end{bmatrix}$. The characteristic equation is given by a) $z^2 + 5z + 3 = 0$ b) $z^2 - 3z - 5 = 0$ c) $z^2 + 3z + 5 = 0$ d) $z^2 + z + 2 = 0$
10)	The transfer function of zero order hold is a) $1 - e^{Ts}$ b) $1 - e^{-Ts}$. c) $\frac{1 - e^{Ts}}{s}$ d) $\frac{1 - e^{-Ts}}{s}$
11)	What is the effect of phase lead compensator on gain crossover frequency (ω_{gc}) and on the bandwidth (ω_b) a) Both are increased b) ω_{gc} is increased but ω_b is decreased c) ω_{gc} is decreased but ω_b is increased d) Both are decreased
12)	The transfer function is $\frac{s+2}{s+3}$ It represents aa) lead networkb) lag networkc) lag-lead networkd) proportional controller
13)	If the eigenvalues of a 3x3 matrix A are 1, -2, and 4. What are the eigenvalues of P^{-1} AP where P is a linear transformation? a) 1, -1/2, 1/4 b) -1, 2, -4 c) 1, 4, 16 d) 1, -2, 4
14)	The transfer function of a lead Compensator is $G_C(s) = \frac{1+0.12s}{1+0.04s}$ The maximum phase shift that can be obtained from this compensator is

The maximum phase shift that can be obtained from this compensator is

b) 45° d) 15° 60° a) c) 30°

_•

16

SLR-FM-423

Seat No.

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Attempt any four of the following questions. Q.2

- a) Explain the design steps for lag compensator by Root Locus Technique.
- b) Test the controllability of the system whose state equations are given as +u

$$\dot{x}_1 = x_1 + x_2$$

 $\dot{x}_1 = -x_2$

c) Determine the Transfer function from the data given as below.

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix}; B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}; C = \begin{bmatrix} 1 & 1 \end{bmatrix} and D = 0$$

- d) Write the properties of state transition matrix.
- Explain realization of Lead compensator e)
- Obtain state model for the system described in phase variable form. f)

$$\frac{d^3y}{dt^3} + 11 \frac{d^2y}{dt^2} + 4\frac{dy}{dx} + 8y = 9 u(t)$$

Attempt any two of the following questions. Q.3

a) Obtain state Transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 2 & 3 \\ 0 & -3 \end{bmatrix}$$

b) Consider the system having transfer function $G(s) = \frac{K}{S(S+8)}$ with unity

feedback. Design a lead compensator to meet following specifications.

- Natural Frequency = 12 rad/sec 2)
- 3) $Kv \geq 10$
- c) A unity feedback type 1 system has Open Loop Transfer Function $G(s) = \frac{K}{S(2S+1)}$ Design the suitable lag network for the system to meet following specifications.
 - $k_v = 0.2 sec^{-1}$ 1)
 - 2) $PM = 40^{\circ}$

Section – II

Q.4 Attempt any four of the following questions.

- a) Explain common physical nonlinearities.
- b) Explain in short jump resonance.
- c) Explain in short limit cycle.
- d) Derive pulse transfer function of cascaded elements.
- e) Explain in short mapping between s-plane and z -plane.
- Determine the kind of singularity for the following differential equation. f)

$$\ddot{y} + 3\dot{y} + 2y = 0$$

Max. Marks: 56

12

Set R

Q.5 Attempt any two of the following questions.

a) Examine the stability of the system by using Bilinear transformation coupled with Routh's criteria.

$$5Z^2 - 2Z + 2 = 0$$

b) Consider a system defined by $\dot{X} = Ax + Bu$ Where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

By using state feedback control u = -kx. It is desired to have the closed loop poles at $s = -2 \pm j4$ and s = -10 Determine the state feedback gain matrix 'K' for controller.

c) Examine the stability of the system given; by Jury's stability test.

$$Z^3 - 1.1Z^2 - 0.1Z + 0.2 = 0$$

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Duration: 30 Minutes

Seat

No.

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

Figures to the right indicate full marks.

MCQ/Objective Type Questions

Choose the correct alternatives from the options and rewrite the sentence. 14 Q.1

- In nonlinear control system limit cycle is self-sustained oscillations of _____. 1)
 - b) variable frequency fixed frequency a) c)
 - variable amplitude d) fixed frequency & amplitude

The information contained in a signal is preserved in the sampled version 2)

- if _____. a) $\omega_s = \omega_m$ b) $\omega_s = 0.5\omega_m$
- d) $\omega_s = 2\omega_m$ c) $\omega_s = 0.1 \, \omega_m$

For a unity feedback system, the origin of the s-plane is mapped in the 3) z-plane by transformation z =_____ to which one of the following? b) 1 + i0a) Origin

d) 0+j1 c) -1 + i0

The system matrix of a discrete system is given by $A = \begin{bmatrix} 0 & 1 \\ -3 & -5 \end{bmatrix}$. The 4) characteristic equation is given by

0110		0 0940			· · ·			
a)	z2 + 5z	+3 =	= 0	b)	z2 –	- 3 <i>z</i> –	5 =	0
``		_	-	• •	-	-	-	-

- d) $z^2 + z + 2 = 0$ C) $z^2 + 3z + 5 = 0$
- 5) The transfer function of zero order hold is b) $1 - e^{-Ts}$
 - a) $1 e^{Ts}$ $1 - e^{Ts}$ d) $1-e^{-Ts}$ c)

6) What is the effect of phase lead compensator on gain crossover frequency (ω_{ac}) and on the bandwidth (ω_{b}) _____.

- Both are increased a)
- ω_{ac} is increased but ω_b is decreased b)
- ω_{ac} is decreased but ω_{b} is increased c)
- Both are decreased d)

The transfer function is $\frac{s+2}{s+3}$ It represents a _____. 7)

- lead network a) b) lag network
- d) proportional controller c) lag-lead network
- If the eigenvalues of a 3x3 matrix A are 1, -2, and 4. What are the 8) eigenvalues of P⁻¹ AP where P is a linear transformation?
 - a) 1, -1/2, 1/4b) -1, 2, -4
 - C) 1, 4, 16 d) 1.−2.4

Max. Marks: 70

Marks: 14

SLR-FM-423

Set



- 9) The transfer function of a lead Compensator is $G_C(s) = \frac{1+0.12s}{1+0.04s}$ The maximum phase shift that can be obtained from this compensator is
 - a) 60° b) 45°
 - c) 30° d) 15°

10) The transfer function of a phase lead compensator is given by $\frac{1+aTs}{1+Ts}$ where a > 1 and T > 0. The maximum phase shift provided by such a compensator is _____.

a) $\tan^{-1}\left(\frac{a+1}{a-1}\right)$ b) $\tan^{-1}\left(\frac{a-1}{a+1}\right)$ c) $\sin^{-1}\left(\frac{a+1}{a-1}\right)$ d) $\sin^{-1}\left(\frac{a-1}{a+1}\right)$

11) For an nth order system the state equations will be of the order of _____.

- a) n b) 1
- c) n/2 d) (n+1)/2
- 12) The necessary and sufficient condition for full order state observer is that the system must be _____.
 - a) completely observable
 - c) not observable
- b) completely controllable

SLR-FM-423

Set S

- d) not controllable
- 13) Which of the following is the nonlinearity caused by servomotor?
 - a) static frictionc) saturation

- b) backlashd) none of the above
- 14) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu$ y = Cx + Du
 - a) $B(sI A)^{-1}C + D$
 - c) $D(sI A)^{-1}B + C$

- b) $C(sI A)^{-1}B + D$
- d) $A(sI B)^{-1}C + D$

16

SLR-FM-423

Seat No.

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Attempt any four of the following questions. Q.2

- a) Explain the design steps for lag compensator by Root Locus Technique.
- b) Test the controllability of the system whose state equations are given as +u

$$\dot{x}_1 = x_1 + x_2$$

 $\dot{x}_1 = -x_2$

c) Determine the Transfer function from the data given as below.

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix}; B = \begin{bmatrix} 1 \\ 1 \end{bmatrix}; C = \begin{bmatrix} 1 & 1 \end{bmatrix} and D = 0$$

- d) Write the properties of state transition matrix.
- Explain realization of Lead compensator e)
- Obtain state model for the system described in phase variable form. f)

$$\frac{d^3y}{dt^3} + 11 \frac{d^2y}{dt^2} + 4\frac{dy}{dx} + 8y = 9 u(t)$$

Attempt any two of the following questions. Q.3

a) Obtain state Transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 2 & 3 \\ 0 & -3 \end{bmatrix}$$

b) Consider the system having transfer function $G(s) = \frac{K}{S(S+8)}$ with unity

feedback. Design a lead compensator to meet following specifications.

- Natural Frequency = 12 rad/sec 2)
- 3) $Kv \geq 10$
- c) A unity feedback type 1 system has Open Loop Transfer Function $G(s) = \frac{K}{S(2S+1)}$ Design the suitable lag network for the system to meet following specifications.
 - $k_v = 0.2 sec^{-1}$ 1)
 - 2) $PM = 40^{\circ}$

Section – II

Q.4 Attempt any four of the following questions.

- a) Explain common physical nonlinearities.
- b) Explain in short jump resonance.
- c) Explain in short limit cycle.
- d) Derive pulse transfer function of cascaded elements.
- e) Explain in short mapping between s-plane and z -plane.
- Determine the kind of singularity for the following differential equation. f)

$$\ddot{y} + 3\dot{y} + 2y = 0$$

Max. Marks: 56

12



Set S

12

Q.5 Attempt any two of the following questions.

a) Examine the stability of the system by using Bilinear transformation coupled with Routh's criteria.

$$5Z^2 - 2Z + 2 = 0$$

b) Consider a system defined by $\dot{X} = Ax + Bu$ Where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

By using state feedback control u = -kx. It is desired to have the closed loop poles at $s = -2 \pm j4$ and s = -10 Determine the state feedback gain matrix 'K' for controller.

c) Examine the stability of the system given; by Jury's stability test.

$$Z^3 - 1.1Z^2 - 0.1Z + 0.2 = 0$$

Page **16** of **16**

Seat No. T.E. (Part – II) (New) (CBCS

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The signal operation $x(-t + t_0)$ is known as _____. (where t_0 is shifting factor)
 - a) Amplitude scaling
 - b) Time scaling
 - c) Time shifting
 - d) Combined time reversal and time shifting

2) A system is said to be linear if _____

- a) Its output is dependent on the present and past values of inputs
- b) Its input is dependent on present and future values of outputs
- c) Its output is dependent only on present values of inputs
- d) It obeys superposition property
- 3) With u(n) as unit step function, u (n + 1) u (n) is _____ a) $\delta(n)$ b) $\delta(n) - \delta(n + 1)$
 - a) $\delta(n)$ c) $\delta(n-1)$
 - d) $\delta(n+1)$
- 4) The convolution of two sequences $x(n) = \{3,3,3,3\} \& h(n) = \{1,1,1\}$ is _____.
 - a) {3,6,9,9,6,3} b) {6,3,9,9,3,6}
 - c) {9,3,6,6,3,9} d) None of these
- 5) If two LTI systems with same input are connected in parallel then equivalent system is _____.
 - a) Multiplication of individual impulse response
 - b) Sum of individual impulse response
 - c) Convolution of individual impulse response
 - d) None of these
- 6) The signal $x(n) = \{5,1,1,1,5\}$ in terms of unit impulse signal is _____.
 - a) $\delta(n) + \delta(n-1) + 5\delta(n-2) + \delta(n+1) + 5\delta(n+2)$
 - b) $5\delta(n) + \delta(n-1) + \delta(n-2) + \delta(n-3) + 5\delta(n-4)$
 - c) $5\delta(n) + \delta(n+1) + \delta(n+2) + \delta(n+3) + 5\delta(n+4)$
 - d) None of these

Set P

Max. Marks: 70

Set 7) Which property is true for convolution sum? $h_1(n)^*h_2(n) = h_2(n)^*h_1(n)$ i) $[h_1(n) + h_2(n)]^*h_3(n) = h_1(n)^*h_2(n) + h_2(n)^*h_3(n)$ ii) $[h_1(n) + h_2(n)]^* h_3(n) = h_1(n) h_3(n) + h_2(n) h_3(n)$ iii) iv) $[h_1(n) + h_2(n)]^* h_3(n) = h_1(n)^* h_3(n) + h_2(n)^* h_3(n)$ b) Only iii a) Only i c) i&iv d) All of the above The response of DT-LTI system in Z domain is given by _____ 8) a) Addition Multiplication b) None of these c) Both a & b d) 9) The ROC of bilateral Z transform is _____. a) Entire Z plane except Z = 0b) Entire Z plane except $Z = \infty$ c) Entire Z plane except $Z = 0 \& Z = \infty$ d) Entire Z plane 10) if $X(\omega)$ is the Fourier transform of the signal x(n), then what is the Fourier transform of the signal x(n - k)? b) $e^{j\omega k} . X(\omega)$ a) $e^{j\omega k} \cdot X(-\omega)$ c) $e^{-j\omega k} \cdot X(-\omega)$ d) $e^{-j\omega k}.X(\omega)$ DIT algorithm divides the sequence into _____. 11) a) Positive and negative values b) Even and odd samples c) Upper higher and lower spectrum d) Small and large samples The Fourier transform of u(t) is _____ 12) b) 1 a) iw iw 1 d) None of these c) 1-iwThe number of complex multiplications needed to be performed for 13) determination of N-point DFT is _____. a) N-1 b) 2N c) N^2 d) (N - 1)The 4 point DFT of sequence $x[n] = \{2,2,2,2\}$ 14) a) {8,0,0,8} b) {8,0,0,0} c) $\{0,0,0,8\}$ d) {0,8,8,0}

SLR-FM-424

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section - I

Q.2 Solve any four.

- a) Derive the expression for even & odd components of DT signal x[n].
- b) State condition for periodicity (CT & DT) and find the fundamental time period of signal x(t).

$$x(t) = \sin\left(\frac{2\pi}{3}t\right)\cos\left(\frac{4\pi}{5}t\right)$$

- c) Determine the energy and power of the signal. $x(t) = 14 \sin(2\pi t), -\infty < t < \infty$
- d) Find the convolution sum of signals $x[n] = \{1,4,9,16\}$ and $h[n] = \{3,1,1,3\}$
- e) Determine whether the given signals x[n] or x[t] are casual or non-casual signals.

1)
$$x[n] = u[-2n+3] + u[\frac{-n}{2}]$$

2)
$$x(t) = u(2t)r(t-2) + u(t+3)r(-t)$$

Q.3 Attempt any two.

a) Determine and sketch the response of CT-LTI system having impulse response h(t) with an input signal x(t) as shown in figure below.

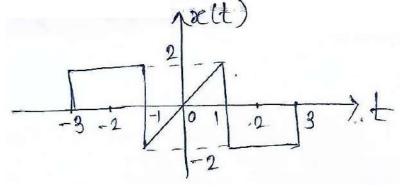
$$x(t) = \begin{cases} 5, & 0 \le t \le 2\\ 0, & otherwise \end{cases} \quad h(t) = \begin{cases} 2, & 1 \le t \le 3\\ 0, & otherwise \end{cases}$$

- **b)** Check the general properties of the system governed by the equation y[n] = n x[5n]
- c) Sketch the following signals for given x(t)

1)
$$x(\frac{1}{2}+3)$$

2)
$$x(-2-\frac{t}{3})$$

3)
$$\{x(t-2) + x(2t-2)\}u(2t)$$



Max. Marks: 56

Set

12

Section - II

Q.4 Attempt any four.

- State & prove the linearity property of the CT Fourier transform. a)
- State the time shifting property of Z transform & Determine Z transform of b) x[n] = 4u[n + 8]. Also comment of ROC of the Z transform.
- Find 4 point DFT of sequence $x[n] = \{2,4,3,9\}$. c)
- d) Find the Fourier transform of $x[n] = 3^n u[n] - 4^n u[n + 3]$
- State & prove the periodicity property of Discrete Time Fourier Transform. e)

Q.5 Attempt any two.

- Find 8 point DFT of sequence $x[n] = \{1,3,5,7,2,4,6,8\}$ by using DITFFT a) algorithm.
- Find inverse Z transform of $X(Z) = \frac{z+2}{z^2+3z-1}$ using power series expansion b)

method if

- x[n] is casual 1)
- 2) x[n] is non-casual
- Find 8 point DFT of given signal x[n] by using DIF-FFT algorithm. C)

$$x[n] = \begin{cases} n+2 & 0 \le n \le 3\\ n-2 & 4 \le n \le 7 \end{cases}$$

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SLR-FM-424

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The response of DT-LTI system in Z domain is given by .
 - a) Addition
 - c) Both a & b d)
- The ROC of bilateral Z transform is _____. 2)
 - a) Entire Z plane except Z = 0
 - b) Entire Z plane except $Z = \infty$
 - c) Entire Z plane except $Z = 0 \& Z = \infty$
 - d) Entire Z plane

3) if $X(\omega)$ is the Fourier transform of the signal x(n), then what is the Fourier transform of the signal x(n - k)?

- a) $e^{j\omega k} \cdot X(-\omega)$ b) $e^{j\omega k} . X(\omega)$
- d) $e^{-j\omega k} X(\omega)$ c) $e^{-j\omega k} \cdot X(-\omega)$
- 4) DIT algorithm divides the sequence into _____.
 - a) Positive and negative values
 - b) Even and odd samples
 - c) Upper higher and lower spectrum
 - d) Small and large samples
- The Fourier transform of u(t) is _____ 5)
 - 1 b) a) iw jw d) None of these c)
- The number of complex multiplications needed to be performed for 6) determination of N-point DFT is
 - a) N-1 b) 2N c) N^2 d) (N - 1)
- 7) The 4 point DFT of sequence $x[n] = \{2,2,2,2\}$
 - a) {8,0,0,8} b) {8,0,0,0}
 - c) $\{0,0,0,8\}$ d) {0,8,8,0}

Set

Max. Marks: 70

Marks: 14

SLR-FM-424

- None of these
- Multiplication b)



- 8) The signal operation $x(-t + t_0)$ is known as _____. (where t_0 is shifting factor)
 - a) Amplitude scaling
 - b) Time scaling
 - c) Time shifting
 - d) Combined time reversal and time shifting
- A system is said to be linear if _____
 - a) Its output is dependent on the present and past values of inputs
 - b) Its input is dependent on present and future values of outputs
 - c) Its output is dependent only on present values of inputs
 - d) It obeys superposition property

10) With u(n) as unit step function, u(n + 1) - u(n) is _____

- a) $\delta(n)$ b) $\delta(n) \delta(n+1)$
- c) $\delta(n-1)$ d) $\delta(n+1)$

11) The convolution of two sequences $x(n) = \{3,3,3,3\} \& h(n) = \{1,1,1\}$ is _____.

- a) {3,6,9,9,6,3} b) {6,3,9,9,3,6}
- c) {9,3,6,6,3,9} d) None of these
- 12) If two LTI systems with same input are connected in parallel then equivalent system is _____.
 - a) Multiplication of individual impulse response
 - b) Sum of individual impulse response
 - c) Convolution of individual impulse response
 - d) None of these

13) The signal $x(n) = \{5,1,1,1,5\}$ in terms of unit impulse signal is _____.

- a) $\delta(n) + \delta(n-1) + 5\delta(n-2) + \delta(n+1) + 5\delta(n+2)$
- b) $5\delta(n) + \delta(n-1) + \delta(n-2) + \delta(n-3) + 5\delta(n-4)$
- c) $5\delta(n) + \delta(n+1) + \delta(n+2) + \delta(n+3) + 5\delta(n+4)$
- d) None of these

14) Which property is true for convolution sum?

- i) $h_1(n)^*h_2(n) = h_2(n)^*h_1(n)$
- ii) $[h_1(n) + h_2(n)]^*h_3(n) = h_1(n)^*h_2(n) + h_2(n)^*h_3(n)$
- iii) $[h_1(n) + h_2(n)]^* h_3(n) = h_1(n) h_3(n) + h_2(n) h_3(n)$
- iv) $[h_1(n) + h_2(n)]^* h_3(n) = h_1(n)^* h_3(n) + h_2(n)^* h_3(n)$
- a) Only i b) Only iii
- c) i & iv d) All of the above

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section - I

Q.2 Solve any four.

- a) Derive the expression for even & odd components of DT signal x[n].
- b) State condition for periodicity (CT & DT) and find the fundamental time period of signal x(t).

$$x(t) = \sin\left(\frac{2\pi}{3}t\right)\cos\left(\frac{4\pi}{5}t\right)$$

- c) Determine the energy and power of the signal. $x(t) = 14 \sin(2\pi t), -\infty < t < \infty$
- d) Find the convolution sum of signals $x[n] = \{1,4,9,16\}$ and $h[n] = \{3,1,1,3\}$
- e) Determine whether the given signals x[n] or x[t] are casual or non-casual signals.

1)
$$x[n] = u[-2n+3] + u[\frac{-n}{2}]$$

2)
$$x(t) = u(2t)r(t-2) + u(t+3)r(-t)$$

Q.3 Attempt any two.

a) Determine and sketch the response of CT-LTI system having impulse response h(t) with an input signal x(t) as shown in figure below.

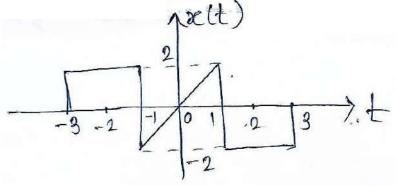
$$x(t) = \begin{cases} 5, & 0 \le t \le 2\\ 0, & otherwise \end{cases} \quad h(t) = \begin{cases} 2, & 1 \le t \le 3\\ 0, & otherwise \end{cases}$$

- b) Check the general properties of the system governed by the equation y[n] = n x[5n]
- c) Sketch the following signals for given x(t)

1)
$$x(\frac{1}{2}+3)$$

2)
$$x(-2-\frac{t}{3})$$

3)
$$\{x(t-2) + x(2t-2)\}u(2t)$$





Max. Marks: 56

16

Section – II

Q.4 Attempt any four.

- State & prove the linearity property of the CT Fourier transform. a)
- State the time shifting property of Z transform & Determine Z transform of b) x[n] = 4u[n + 8]. Also comment of ROC of the Z transform.
- Find 4 point DFT of sequence $x[n] = \{2,4,3,9\}$. c)
- d) Find the Fourier transform of $x[n] = 3^n u[n] - 4^n u[n + 3]$
- State & prove the periodicity property of Discrete Time Fourier Transform. e)

Q.5 Attempt any two.

- Find 8 point DFT of sequence $x[n] = \{1,3,5,7,2,4,6,8\}$ by using DITFFT a) algorithm.
- Find inverse Z transform of $X(Z) = \frac{z+2}{z^2+3z-1}$ using power series expansion b)

method if

- x[n] is casual 1)
- 2) x[n] is non-casual
- Find 8 point DFT of given signal x[n] by using DIF-FFT algorithm. c)

$$x[n] = \begin{cases} n+2 & 0 \le n \le 3\\ n-2 & 4 \le n \le 7 \end{cases}$$

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SLR-FM-424

Set Q

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) If two LTI systems with same input are connected in parallel then equivalent system is _____.
 - a) Multiplication of individual impulse response
 - b) Sum of individual impulse response
 - c) Convolution of individual impulse response
 - d) None of these
- 2) The signal $x(n) = \{5,1,1,1,5\}$ in terms of unit impulse signal is _____.
 - a) $\delta(n) + \delta(n-1) + 5\delta(n-2) + \delta(n+1) + 5\delta(n+2)$
 - b) $5\delta(n) + \delta(n-1) + \delta(n-2) + \delta(n-3) + 5\delta(n-4)$
 - c) $5\delta(n) + \delta(n+1) + \delta(n+2) + \delta(n+3) + 5\delta(n+4)$
 - d) None of these

3) Which property is true for convolution sum?

- i) $h_1(n)^*h_2(n) = h_2(n)^*h_1(n)$
- ii) $[h_1(n) + h_2(n)]^*h_3(n) = h_1(n)^*h_2(n) + h_2(n)^*h_3(n)$
- iii) $[h_1(n) + h_2(n)]^* h_3(n) = h_1(n) h_3(n) + h_2(n) h_3(n)$
- iv) $[h_1(n) + h_2(n)]^* h_3(n) = h_1(n)^* h_3(n) + h_2(n)^* h_3(n)$
- a) Only i b) Only iii
- c) i & iv d) All of the above
- 4) The response of DT-LTI system in Z domain is given by _____

- c) Both a & b d) None of these
- 5) The ROC of bilateral Z transform is _____.
 - a) Entire Z plane except Z = 0
 - b) Entire Z plane except $Z = \infty$
 - c) Entire Z plane except $Z = 0 \& Z = \infty$
 - d) Entire Z plane
- 6) if $X(\omega)$ is the Fourier transform of the signal x(n), then what is the Fourier transform of the signal x(n k)?
 - a) $e^{j\omega k} X(-\omega)$ b) $e^{j\omega k} X(\omega)$
 - c) $e^{-j\omega k} X(-\omega)$ d) $e^{-j\omega k} X(\omega)$



Max. Marks: 70

Marks: 14

Set 7) DIT algorithm divides the sequence into . a) Positive and negative values b) Even and odd samples c) Upper higher and lower spectrum d) Small and large samples The Fourier transform of u(t) is _____ 8) __. b) a) <u>1</u> jw jw d) None of these C) 9) The number of complex multiplications needed to be performed for determination of N-point DFT is b) 2N a) N-1 c) N² d) (N - 1)10) The 4 point DFT of sequence $x[n] = \{2,2,2,2\}$ a) {8,0,0,8} b) {8,0,0,0} d) c) $\{0,0,0,8\}$ {0,8,8,0} The signal operation $x(-t + t_0)$ is known as _____. (where t_0 is shifting 11) factor) a) Amplitude scaling b) Time scaling c) Time shifting d) Combined time reversal and time shifting 12) A system is said to be linear if a) Its output is dependent on the present and past values of inputs Its input is dependent on present and future values of outputs b) c) Its output is dependent only on present values of inputs d) It obeys superposition property With u(n) as unit step function, u(n + 1) - u(n) is 13) $\delta(n) - \delta(n + 1)$ a) $\delta(n)$ b) c) $\delta(n-1)$ d) $\delta(n+1)$ 14) The convolution of two sequences $x(n) = \{3,3,3,3\} \& h(n) = \{1,1,1\}$ is _____. a) {3,6,9,9,6,3} b) {6,3,9,9,3,6} None of these c) {9,3,6,6,3,9} d)

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section - I

Q.2 Solve any four.

- a) Derive the expression for even & odd components of DT signal x[n].
- b) State condition for periodicity (CT & DT) and find the fundamental time period of signal x(t).

$$x(t) = \sin\left(\frac{2\pi}{3}t\right)\cos\left(\frac{4\pi}{5}t\right)$$

- c) Determine the energy and power of the signal. $x(t) = 14 \sin(2\pi t), -\infty < t < \infty$
- d) Find the convolution sum of signals $x[n] = \{1,4,9,16\}$ and $h[n] = \{3,1,1,3\}$
- e) Determine whether the given signals x[n] or x[t] are casual or non-casual signals.

1)
$$x[n] = u[-2n+3] + u[\frac{-n}{2}]$$

2)
$$x(t) = u(2t)r(t-2) + u(t+3)r(-t)$$

Q.3 Attempt any two.

a) Determine and sketch the response of CT-LTI system having impulse response h(t) with an input signal x(t) as shown in figure below.

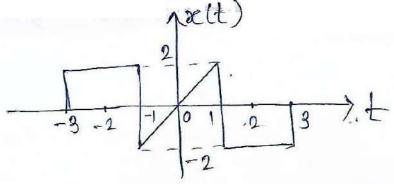
$$x(t) = \begin{cases} 5, & 0 \le t \le 2\\ 0, & otherwise \end{cases} \quad h(t) = \begin{cases} 2, & 1 \le t \le 3\\ 0, & otherwise \end{cases}$$

- **b)** Check the general properties of the system governed by the equation y[n] = n x[5n]
- c) Sketch the following signals for given x(t)

1)
$$x(\frac{t}{2}+3)$$

2)
$$x(-2-\frac{t}{3})$$

3)
$$\{x(t-2) + x(2t-2)\}u(2t)$$





Max. Marks: 56

16

Section - II

Q.4 Attempt any four.

- State & prove the linearity property of the CT Fourier transform. a)
- State the time shifting property of Z transform & Determine Z transform of b) x[n] = 4u[n + 8]. Also comment of ROC of the Z transform.
- Find 4 point DFT of sequence $x[n] = \{2,4,3,9\}$. c)
- d) Find the Fourier transform of $x[n] = 3^n u[n] - 4^n u[n + 3]$
- State & prove the periodicity property of Discrete Time Fourier Transform. e)

Q.5 Attempt any two.

- Find 8 point DFT of sequence $x[n] = \{1,3,5,7,2,4,6,8\}$ by using DITFFT a) algorithm.
- Find inverse Z transform of $X(Z) = \frac{z+2}{z^2+3z-1}$ using power series expansion b)

method if

- x[n] is casual 1)
- 2) x[n] is non-casual
- Find 8 point DFT of given signal x[n] by using DIF-FFT algorithm. c)

$$x[n] = \begin{cases} n+2 & 0 \le n \le 3\\ n-2 & 4 \le n \le 7 \end{cases}$$

16

12

SLR-FM-424

Set R

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) if $X(\omega)$ is the Fourier transform of the signal x(n), then what is the Fourier transform of the signal x(n k)?
 - a) $e^{j\omega k} X(-\omega)$ b) $e^{j\omega k} X(\omega)$
 - c) $e^{-j\omega k} X(-\omega)$ d) $e^{-j\omega k} X(\omega)$
- 2) DIT algorithm divides the sequence into _____.
 - a) Positive and negative values
 - b) Even and odd samples
 - c) Upper higher and lower spectrum
 - d) Small and large samples
- 3) The Fourier transform of u(t) is _____.

a)
$$\frac{1}{jw}$$

c) $\frac{1}{1-jw}$
b) jw
d) None of these

- 4) The number of complex multiplications needed to be performed for determination of N-point DFT is _____.
 - a) N-1c) N^2 b) 2Nd) (N-1)
- 5) The 4 point DFT of sequence $x[n] = \{2, 2, 2, 2\}$

a)	{8,0,0,8}	b)	{8,0,0,0}
c)	{0,0,0,8}	d)	{0,8,8,0}

- 6) The signal operation $x(-t + t_0)$ is known as _____. (where t_0 is shifting factor)
 - a) Amplitude scaling
 - b) Time scaling
 - c) Time shifting
 - d) Combined time reversal and time shifting
- 7) A system is said to be linear if _____
 - a) Its output is dependent on the present and past values of inputs
 - b) Its input is dependent on present and future values of outputs
 - c) Its output is dependent only on present values of inputs
 - d) It obeys superposition property

Max. Marks: 70

Marks: 14

Set | S

- 8) With u(n) as unit step function, u(n + 1) u(n) is _____
 - a) $\delta(n)$ b) $\delta(n) \delta(n+1)$
 - c) $\delta(n-1)$ d) $\delta(n+1)$
 - 9) The convolution of two sequences $x(n) = \{3,3,3,3\} \& h(n) = \{1,1,1\}$ is _____.
 - a) {3,6,9,9,6,3} b) {6,3,9,9,3,6}
 - c) {9,3,6,6,3,9} d) None of these
 - 10) If two LTI systems with same input are connected in parallel then equivalent system is _____.
 - a) Multiplication of individual impulse response
 - b) Sum of individual impulse response
 - c) Convolution of individual impulse response
 - d) None of these

11) The signal $x(n) = \{5,1,1,1,5\}$ in terms of unit impulse signal is _____.

- a) $\delta(n) + \delta(n-1) + 5\delta(n-2) + \delta(n+1) + 5\delta(n+2)$
- b) $5\delta(n) + \delta(n-1) + \delta(n-2) + \delta(n-3) + 5\delta(n-4)$
- c) $5\delta(n) + \delta(n+1) + \delta(n+2) + \delta(n+3) + 5\delta(n+4)$
- d) None of these

12) Which property is true for convolution sum?

- i) $h_1(n)^*h_2(n) = h_2(n)^*h_1(n)$
- ii) $[h_1(n) + h_2(n)]^*h_3(n) = h_1(n)^*h_2(n) + h_2(n)^*h_3(n)$
- iii) $[h_1(n) + h_2(n)]^* h_3(n) = h_1(n) h_3(n) + h_2(n) h_3(n)$
- iv) $[h_1(n) + h_2(n)]^* h_3(n) = h_1(n)^* h_3(n) + h_2(n)^* h_3(n)$
- a) Only i b) Only iii
- c) i & iv d) All of the above
- 13) The response of DT-LTI system in Z domain is given by _____.
 - a) Addition b) Multiplication
 - d) None of these
- 14) The ROC of bilateral Z transform is _____.
 - a) Entire Z plane except Z = 0
 - b) Entire Z plane except $Z = \infty$
 - c) Entire Z plane except $Z = 0 \& Z = \infty$
 - d) Entire Z plane

Both a & b

c)

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section - I

Q.2 Solve any four.

- a) Derive the expression for even & odd components of DT signal x[n].
- b) State condition for periodicity (CT & DT) and find the fundamental time period of signal x(t).

$$x(t) = \sin\left(\frac{2\pi}{3}t\right)\cos\left(\frac{4\pi}{5}t\right)$$

- c) Determine the energy and power of the signal. $x(t) = 14 \sin(2\pi t), -\infty < t < \infty$
- d) Find the convolution sum of signals $x[n] = \{1,4,9,16\}$ and $h[n] = \{3,1,1,3\}$
- e) Determine whether the given signals x[n] or x[t] are casual or non-casual signals.

1)
$$x[n] = u[-2n+3] + u[\frac{-n}{2}]$$

2)
$$x(t) = u(2t)r(t-2) + u(t+3)r(-t)$$

Q.3 Attempt any two.

a) Determine and sketch the response of CT-LTI system having impulse response h(t) with an input signal x(t) as shown in figure below.

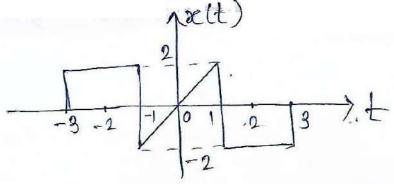
$$x(t) = \begin{cases} 5, & 0 \le t \le 2\\ 0, & otherwise \end{cases} \quad h(t) = \begin{cases} 2, & 1 \le t \le 3\\ 0, & otherwise \end{cases}$$

- **b)** Check the general properties of the system governed by the equation y[n] = n x[5n]
- c) Sketch the following signals for given x(t)

1)
$$x(\frac{t}{2}+3)$$

2)
$$x(-2-\frac{t}{3})$$

3)
$$\{x(t-2) + x(2t-2)\}u(2t)$$





Max. Marks: 56

12

Section - II

Q.4 Attempt any four.

- State & prove the linearity property of the CT Fourier transform. a)
- State the time shifting property of Z transform & Determine Z transform of b) x[n] = 4u[n + 8]. Also comment of ROC of the Z transform.
- Find 4 point DFT of sequence $x[n] = \{2,4,3,9\}$. c)
- d) Find the Fourier transform of $x[n] = 3^n u[n] - 4^n u[n + 3]$
- State & prove the periodicity property of Discrete Time Fourier Transform. e)

Q.5 Attempt any two.

- Find 8 point DFT of sequence $x[n] = \{1,3,5,7,2,4,6,8\}$ by using DITFFT a) algorithm.
- Find inverse Z transform of $X(Z) = \frac{z+2}{z^2+3z-1}$ using power series expansion b)

method if

- x[n] is casual 1)
- 2) x[n] is non-casual
- Find 8 point DFT of given signal x[n] by using DIF-FFT algorithm. c)

$$x[n] = \begin{cases} n+2 & 0 \le n \le 3\\ n-2 & 4 \le n \le 7 \end{cases}$$

16

SLR-FM-424

Set S

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE DESIGN**

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - 1) DC machines provided with a large value of air gap length .
 - provides comparatively quiet operation a)
 - provides better ventilation b)
 - c) provides poor ventilation
 - d) both (a) and (b)
 - 2) In a dc machine width of carbon brush shoul be equal to _____.
 - a) less than the width of one commutator segment
 - b) the width of 1 to 2 commutator segments
 - c) the width of 2 to 3 commutator segments
 - d) the width of more than 3 commutator segments
 - 3) The brushes of a dc motor suitable for rotation in any direction should be placed as
 - a) radial

- b) Reaction
- c) trailing d) any of the above
- 4) Which type of slots are normally used in induction motor?
 - a) Open b) Semi closed
 - c) Closed d) Round
- Which of the following quantity is affected by the leakage reactance of an 5) induction motor?
 - Starting current b) Starting torque a)
 - Maximum torque d) All of the above c)
- 6) The value of specific electric loading of induction motor is in the range of
 - 40 to 400 amps. Cond./m b) a)
 - 400 to 4000 amp. Cond./m 5000 to 45000 amp. Cond./m d) 30000 to 100,000amp.cond./m c)
- In the design of I.M to incorporate the design feature of good efficiency 7) what should be the ratio of core length to pole pitch.
 - 1.5 to 2.0 a) b) 1.0 1.5 to 2 1.5 d) c)

Set

Max. Marks: 70

Marks: 14

	Set P
8)	 The inductive reactance of a distribution core type transformer with concentric cylindrical coils of equal length can be reduced by a) Increasing the window height b) increasing the window width c) decreasing the yoke height d) increasing the operating flux density in the yoke
9)	If all the dimension of a transformer is doubled its iron loss will be a) half b) double c) four times d) 8 times
10)	In transformers cylindrical windings are not used for voltage exceeding
	a) 6kV b) 13kV c) 33kV d) 66kV
11)	In transformers the cylindrical windings employing circular conductors are used for current rating upto a) 20A b) 50A c) 80A d) 150A
12)	Helical windings are employed in transformers.a) distributionb) powerc) shell typed) none of these
13)	 DC machines designed with a large value of air gap length a) Provides better ventilation b) Reduces the pulsation losses c) Reduces the distortion effect d) All of the above
14)	The air gap provided in dc machines of smaller diameter and provided

- with lesser number of poles is comparatively _____.a) smallerb) longerc) any of thesed) none of the

none of these

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Explain the factors affecting the size of electromagnetic rotating machines.
- **b)** Distinguish between core transformer and shell transformer.
- c) Derive an output equation of 1 phase core type transformer.
- d) Determine the dimension of core and yoke for a 200 KVA, 50Hz, 1 phase core type transformer, A uniform core is used with distance between adjacent limbs equal to 1.6 times the width of core lamination. Assume voltage per turn 14 V, maximum flux density 1.1 Wb/m², window space factor=0.32, current density 3A/mm² and stacking factor=0.9. The net iron area is 0.56d² where'd' is the diameter of circumscribing circle. Also the width of largest stamping is 0.85d.
- e) The diameter and length of 500kW, 500V, 445r.p.m, 6 pole D.C generator are 84cm and 35cm respectively. If it is lap wound with 660 conductors, estimate the specific magnetic and electric loading.

Q.3 Attempt any two.

- a) Find the suitable values diameter and length armature of the core for 100Kw, 250V, 6 pole, 750 r.p.m, D.C. generator having 90% efficiency. Assume an average flux density in the air of about 0.58Wb/m² and amp. Cond. Per meter to be 28000. The ratio of core length to pole pitch is 0.67
- b) Design an adequate cooling arrangement for a 250 KVA 6600/400 V, 50 Hz, 3 phase Delta/Star, oil immersed natural cool transformer with following data:
 - 1) Winding temperature not to exceed 50° c
 - 2) Total loss at full load is 5.0 Kw.
 - 3) Tank dimensions, height \times length \times width=(125x100x50) cm sketch the diagram to show the arrangement.
- c) Find the main dimensions, and length of air gap of a 1000Kw, 500V, 10 Pole, 300r.p.m D.C generator. Assume the specific magnetic loading $B_{av}=0.7Wb/m^2$, ampere conductor per meter=40000, square pole face, ratio of pole arc to pole pitch is 0.7. Assume efficiency as 92% and gap contraction factor as 1.15.Neglect rotational losses. Assume (AT) _{gap}= 0.55 (AT)_{amature}

Max. Marks: 56

16

Section – II

Q.4 Attempt any four

- a) Discuss the effect of air gap length of 3-ph induction motor on following Factor.
 - 1. Power factor
 - 2. Overload capacity
 - 3. Pulsation loss and noise
 - 4. Unbalanced magnetic pull
- **b)** Discuss the choice of specific electric loading and specific magnetic loading of synchronous machine.
- c) Find the current in the bar and end rings of a cage rotor of a 6 poles, 3-ph, and induction motor having 72 stator slots with 15 conductors in each slot. If the stator current per phase is 20 amp and rotor slots are 55. Hence find the suitable size of the cage bars and end rings.
- d) Determine the main dimension for a 1000 KVÅ, 50Hz, 3-ph, 375rpm alternator. The average air gap flux density is 0.55 Wb/m² and the ampere conductor per meter are 28000. Use rectangular pole and assume suitable value for ratio of core length to pole pitch in order that bolted on pole construction is used for which the maximum permissible peripheral speed is 50 m/s. the runaway speed is 1.8 times the synchronous speed.
- e) Derive the output equation of three phase induction motor.

Q.5 Attempt any two.

- a) Find the main dimensions, Nos. of stator turns Nos. of stator slots of 5 HP, 400 V, 1500 syn. RPM sq. eage induction motor with following data Bav=0.46 web/m² A.C.=22000, Full load efficiency=0.83 full load P.f.=0.84.
- b) In the design of a 30 HP, 3-ph, 440 V. 960 rpm, 50 Hz. Delta connected induction motor. Assume specific electric loading of 25000 ac/m and specific magnetic loading of 0.46 Wb/m full load efficiency 86% and power factor 0.87. Estimate:
 - 1) Diameter of stator bore
 - 2) Length of stator core
 - 3) Peripheral velocity
 - 4) Turns per phase
 - 5) Slot pitch
- c) Determine the main dimensions of 12 MVA, 13.8 kV, 50 Hz, 1500 rpm, 3-ph, star connected alternator. The following particulars are provided. Ave. gap density =0.60 tesla Ampere conductors per meter =42000 Peripheral speed =80 m/sec Find also the maximum flux, the no. of stator slots if one conductor per slot is used, the no. of turns per phase.



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Set

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat No.

Q.1

sentence. 1) The inductive reactance of a distribution core type transformer with concentric cylindrical coils of equal length can be reduced by _____.

Choose the correct alternatives from the options and rewrite the

- Increasing the window height a)
- increasing the window width b)
- decreasing the voke height c)
- d) increasing the operating flux density in the yoke
- If all the dimension of a transformer is doubled its iron loss will be _____. 2)
 - a) half double b)
 - c) four times d) 8 times
- In transformers cylindrical windings are not used for voltage exceeding 3)
 - 6kV b) 13kV a)
 - 33kV d) 66kV C)
- 4) In transformers the cylindrical windings employing circular conductors are used for current rating upto
 - a) 20A b) 50A c) 80A d) 150A
- 5) Helical windings are employed in transformers.
 - distribution power b) a)
 - c) shell type d) none of these
- DC machines designed with a large value of air gap length 6)
 - a) Provides better ventilation Reduces the pulsation losses b) d) All of the above
 - Reduces the distortion effect C)
- The air gap provided in dc machines of smaller diameter and provided 7) with lesser number of poles is comparatively _
 - a) smaller longer b)
 - c) any of these none of these d)

Max. Marks: 70

Marks: 14





- Set Q
- 8) DC machines provided with a large value of air gap length _____.
 - a) provides comparatively quiet operation
 - b) provides better ventilation
 - c) provides poor ventilation
 - d) both (a) and (b)
- In a dc machine width of carbon brush shoul be equal to _____.
 - a) less than the width of one commutator segment
 - b) the width of 1 to 2 commutator segments
 - c) the width of 2 to 3 commutator segments
 - d) the width of more than 3 commutator segments
- 10) The brushes of a dc motor suitable for rotation in any direction should be placed as _____.
 - a) radial b) Reaction
 - c) trailing d) any of the above
- 11) Which type of slots are normally used in induction motor?
 - a) Open b) Semi closed
 - c) Closed d) Round
- 12) Which of the following quantity is affected by the leakage reactance of an induction motor?
 - a) Starting current
- b) Starting torque
- c) Maximum torque d) All of the above

13) The value of specific electric loading of induction motor is in the range of

- a) 40 to 400 amps. Cond./m
 - b) 400 to 4000 amp. Cond./m
- c) 5000 to 45000 amp. Cond./m d) 30000 to 100,000 amp.cond./m
- 14) In the design of I.M to incorporate the design feature of good efficiency what should be the ratio of core length to pole pitch.
 - a) 1.5 to 2.0 b) 1.0
 - c) 1.5 d) 1.5 to 2

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Explain the factors affecting the size of electromagnetic rotating machines.
- **b)** Distinguish between core transformer and shell transformer.
- c) Derive an output equation of 1 phase core type transformer.
- d) Determine the dimension of core and yoke for a 200 KVA, 50Hz, 1 phase core type transformer, A uniform core is used with distance between adjacent limbs equal to 1.6 times the width of core lamination. Assume voltage per turn 14 V, maximum flux density 1.1 Wb/m², window space factor=0.32, current density 3A/mm² and stacking factor=0.9. The net iron area is 0.56d² where'd' is the diameter of circumscribing circle. Also the width of largest stamping is 0.85d.
- e) The diameter and length of 500kW, 500V, 445r.p.m, 6 pole D.C generator are 84cm and 35cm respectively. If it is lap wound with 660 conductors, estimate the specific magnetic and electric loading.

Q.3 Attempt any two.

- a) Find the suitable values diameter and length armature of the core for 100Kw, 250V, 6 pole, 750 r.p.m, D.C. generator having 90% efficiency. Assume an average flux density in the air of about 0.58Wb/m² and amp. Cond. Per meter to be 28000. The ratio of core length to pole pitch is 0.67
- b) Design an adequate cooling arrangement for a 250 KVA 6600/400 V, 50 Hz, 3 phase Delta/Star, oil immersed natural cool transformer with following data:
 - 1) Winding temperature not to exceed 50° c
 - 2) Total loss at full load is 5.0 Kw.
 - 3) Tank dimensions, height \times length \times width=(125x100x50) cm sketch the diagram to show the arrangement.
- c) Find the main dimensions, and length of air gap of a 1000Kw, 500V, 10 Pole, 300r.p.m D.C generator. Assume the specific magnetic loading $B_{av}=0.7Wb/m^2$, ampere conductor per meter=40000, square pole face, ratio of pole arc to pole pitch is 0.7. Assume efficiency as 92% and gap contraction factor as 1.15.Neglect rotational losses. Assume (AT) _{gap}= 0.55 (AT)_{amature}

Max. Marks: 56

16

Section – II

Q.4 Attempt any four

- a) Discuss the effect of air gap length of 3-ph induction motor on following Factor.
 - 1. Power factor
 - 2. Overload capacity
 - 3. Pulsation loss and noise
 - 4. Unbalanced magnetic pull
- **b)** Discuss the choice of specific electric loading and specific magnetic loading of synchronous machine.
- c) Find the current in the bar and end rings of a cage rotor of a 6 poles, 3-ph, and induction motor having 72 stator slots with 15 conductors in each slot. If the stator current per phase is 20 amp and rotor slots are 55. Hence find the suitable size of the cage bars and end rings.
- d) Determine the main dimension for a 1000 KVÅ, 50Hz, 3-ph, 375rpm alternator. The average air gap flux density is 0.55 Wb/m² and the ampere conductor per meter are 28000. Use rectangular pole and assume suitable value for ratio of core length to pole pitch in order that bolted on pole construction is used for which the maximum permissible peripheral speed is 50 m/s. the runaway speed is 1.8 times the synchronous speed.
- e) Derive the output equation of three phase induction motor.

Q.5 Attempt any two.

- a) Find the main dimensions, Nos. of stator turns Nos. of stator slots of 5 HP, 400 V, 1500 syn. RPM sq. eage induction motor with following data Bav=0.46 web/m² A.C.=22000, Full load efficiency=0.83 full load P.f.=0.84.
- b) In the design of a 30 HP, 3-ph, 440 V. 960 rpm, 50 Hz. Delta connected induction motor. Assume specific electric loading of 25000 ac/m and specific magnetic loading of 0.46 Wb/m full load efficiency 86% and power factor 0.87. Estimate:
 - 1) Diameter of stator bore
 - 2) Length of stator core
 - 3) Peripheral velocity
 - 4) Turns per phase
 - 5) Slot pitch
- c) Determine the main dimensions of 12 MVA, 13.8 kV, 50 Hz, 1500 rpm, 3-ph, star connected alternator. The following particulars are provided. Ave. gap density =0.60 tesla Ampere conductors per meter =42000 Peripheral speed =80 m/sec Find also the maximum flux, the no. of stator slots if one conductor per slot is used, the no. of turns per phase.

16

12

Set Q

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Max. Marks: 70

Marks: 14

14

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer
Book.
2) Figures to the right indicate full marks

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - 1) Which of the following quantity is affected by the leakage reactance of an induction motor?
 - a) Starting current b) Starting torque
 - c) Maximum torque d) All of the above

2) The value of specific electric loading of induction motor is in the range of

- a) 40 to 400 amps. Cond./m b) 400 to 4000 amp. Cond./m
- c) 5000 to 45000 amp. Cond./m d) 30000 to 100,000 amp.cond./m
- 3) In the design of I.M to incorporate the design feature of good efficiency what should be the ratio of core length to pole pitch.
 - a) 1.5 to 2.0 b) 1.0
 - c) 1.5 d) 1.5 to 2
- 4) The inductive reactance of a distribution core type transformer with concentric cylindrical coils of equal length can be reduced by _____.
 - a) Increasing the window height
 - b) increasing the window width
 - c) decreasing the yoke height
 - d) increasing the operating flux density in the yoke
- 5) If all the dimension of a transformer is doubled its iron loss will be _____.
 - a) half b) double
 - c) four times d) 8 times
- 6) In transformers cylindrical windings are not used for voltage exceeding
 - a) 6kV b) 13kV
 - c) 33kV d) 66kV
- In transformers the cylindrical windings employing circular conductors are used for current rating upto _____.
 - a) 20A b) 50A
 - c) 80A d) 150A

8) Helical windings are employed in _____ transformers.

a) distribution

c) shell type

- b) power
- d) none of these
- 9) DC machines designed with a large value of air gap length _____.
 - a) Provides better ventilation
- b) Reduces the pulsation lossesd) All of the above

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Set

- c) Reduces the distortion effectd) All of the above0) The air gap provided in dc machines of smaller diameter and provided
- The air gap provided in dc machines of smaller diameter and provided with lesser number of poles is comparatively _____.
 - a) smaller
- b) longer
- c) any of these d) none of these
- 11) DC machines provided with a large value of air gap length _____.
 - a) provides comparatively quiet operation
 - b) provides better ventilation
 - c) provides poor ventilation
 - d) both (a) and (b)
- 12) In a dc machine width of carbon brush shoul be equal to _____.
 - a) less than the width of one commutator segment
 - b) the width of 1 to 2 commutator segments
 - c) the width of 2 to 3 commutator segments
 - d) the width of more than 3 commutator segments
- 13) The brushes of a dc motor suitable for rotation in any direction should be placed as _____.
 - a) radial
- b) Reaction
- c) trailing d) any of the above
- 14) Which type of slots are normally used in induction motor?
 - a) Open

b) Semi closed

c) Closed

d) Round

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

Seat

No.

- a) Explain the factors affecting the size of electromagnetic rotating machines.
- **b)** Distinguish between core transformer and shell transformer.
- c) Derive an output equation of 1 phase core type transformer.
- d) Determine the dimension of core and yoke for a 200 KVA, 50Hz, 1 phase core type transformer, A uniform core is used with distance between adjacent limbs equal to 1.6 times the width of core lamination. Assume voltage per turn 14 V, maximum flux density 1.1 Wb/m², window space factor=0.32, current density 3A/mm² and stacking factor=0.9. The net iron area is 0.56d² where'd' is the diameter of circumscribing circle. Also the width of largest stamping is 0.85d.
- e) The diameter and length of 500kW, 500V, 445r.p.m, 6 pole D.C generator are 84cm and 35cm respectively. If it is lap wound with 660 conductors, estimate the specific magnetic and electric loading.

Q.3 Attempt any two.

- a) Find the suitable values diameter and length armature of the core for 100Kw, 250V, 6 pole, 750 r.p.m, D.C. generator having 90% efficiency. Assume an average flux density in the air of about 0.58Wb/m² and amp. Cond. Per meter to be 28000. The ratio of core length to pole pitch is 0.67
- b) Design an adequate cooling arrangement for a 250 KVA 6600/400 V, 50 Hz, 3 phase Delta/Star, oil immersed natural cool transformer with following data:
 - 1) Winding temperature not to exceed 50° c
 - 2) Total loss at full load is 5.0 Kw.

3) Tank dimensions, height \times length \times width=(125x100x50) cm sketch the diagram to show the arrangement.

c) Find the main dimensions, and length of air gap of a 1000Kw, 500V, 10 Pole, 300r.p.m D.C generator. Assume the specific magnetic loading $B_{av}=0.7Wb/m^2$, ampere conductor per meter=40000, square pole face, ratio of pole arc to pole pitch is 0.7. Assume efficiency as 92% and gap contraction factor as 1.15.Neglect rotational losses. Assume (AT) _{gap}= 0.55 (AT)_{armature}

Max. Marks: 56

16

Section – II

Q.4 Attempt any four

- a) Discuss the effect of air gap length of 3-ph induction motor on following Factor.
 - 1. Power factor
 - 2. Overload capacity
 - 3. Pulsation loss and noise
 - 4. Unbalanced magnetic pull
- **b)** Discuss the choice of specific electric loading and specific magnetic loading of synchronous machine.
- c) Find the current in the bar and end rings of a cage rotor of a 6 poles, 3-ph, and induction motor having 72 stator slots with 15 conductors in each slot. If the stator current per phase is 20 amp and rotor slots are 55. Hence find the suitable size of the cage bars and end rings.
- d) Determine the main dimension for a 1000 KVÅ, 50Hz, 3-ph, 375rpm alternator. The average air gap flux density is 0.55 Wb/m² and the ampere conductor per meter are 28000. Use rectangular pole and assume suitable value for ratio of core length to pole pitch in order that bolted on pole construction is used for which the maximum permissible peripheral speed is 50 m/s. the runaway speed is 1.8 times the synchronous speed.
- e) Derive the output equation of three phase induction motor.

Q.5 Attempt any two.

- a) Find the main dimensions, Nos. of stator turns Nos. of stator slots of 5 HP, 400 V, 1500 syn. RPM sq. eage induction motor with following data Bav=0.46 web/m² A.C.=22000, Full load efficiency=0.83 full load P.f.=0.84.
- b) In the design of a 30 HP, 3-ph, 440 V. 960 rpm, 50 Hz. Delta connected induction motor. Assume specific electric loading of 25000 ac/m and specific magnetic loading of 0.46 Wb/m full load efficiency 86% and power factor 0.87. Estimate:
 - 1) Diameter of stator bore
 - 2) Length of stator core
 - 3) Peripheral velocity
 - 4) Turns per phase
 - 5) Slot pitch
- c) Determine the main dimensions of 12 MVA, 13.8 kV, 50 Hz, 1500 rpm, 3-ph, star connected alternator. The following particulars are provided. Ave. gap density =0.60 tesla Ampere conductors per meter =42000 Peripheral speed =80 m/sec Find also the maximum flux, the no. of stator slots if one conductor per slot is used, the no. of turns per phase.

16

Set R

12

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE DESIGN** Day & Date: Wednesday, 27-11-2019 Max. Marks: 70 Time: 10:00 AM To 01:00 PM Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book. 2) Figures to the right indicate full marks. MCQ/Objective Type Questions Choose the correct alternatives from the options and rewrite the In transformers cylindrical windings are not used for voltage exceeding 1 d) 66kV b) 50A c) 80A 150A d)

Duration: 30 Minutes

Seat No.

- Q.1 sentence. 1)

a)	6kV	b)	13kV
C)	33kV	d)	66kV

- In transformers the cylindrical windings employing circular conductors are 2) used for current rating upto _____.
 - a) 20A
- 3) Helical windings are employed in _____ transformers.
 - b) a) distribution power
 - c) shell type none of these d)
- 4) DC machines designed with a large value of air gap length ____ a) Provides better ventilation b) Reduces the pulsation losses
- c) Reduces the distortion effect All of the above d) 5) The air gap provided in dc machines of smaller diameter and provided
- with lesser number of poles is comparatively ____
 - a) smaller b) longer
 - c) any of these d) none of these
- DC machines provided with a large value of air gap length . 6)
 - a) provides comparatively quiet operation
 - b) provides better ventilation
 - c) provides poor ventilation
 - d) both (a) and (b)
- 7) In a dc machine width of carbon brush shoul be equal to _____.
 - a) less than the width of one commutator segment
 - b) the width of 1 to 2 commutator segments
 - c) the width of 2 to 3 commutator segments
 - d) the width of more than 3 commutator segments

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Marks: 14

- 8) The brushes of a dc motor suitable for rotation in any direction should be placed as _
 - a) radial c) trailing
- b) Reaction d) any of the above
- 9) Which type of slots are normally used in induction motor?
 - Semi closed a) Open b)
 - d) Closed Round C)
- 10) Which of the following quantity is affected by the leakage reactance of an induction motor?
 - a) Starting current
 - c) Maximum torque All of the above d)
- 11) The value of specific electric loading of induction motor is in the range of
 - 40 to 400 amps. Cond./m 400 to 4000 amp. Cond./m b) a)
 - c) 5000 to 45000 amp. Cond./m d) 30000 to 100,000amp.cond./m

b)

Starting torque

- In the design of I.M to incorporate the design feature of good efficiency 12) what should be the ratio of core length to pole pitch.
 - 1.5 to 2.0 b) 1.0 a)
 - 1.5 d) 1.5 to 2 c)
- 13) The inductive reactance of a distribution core type transformer with concentric cylindrical coils of equal length can be reduced by _____.
 - a) Increasing the window height
 - b) increasing the window width
 - decreasing the yoke height c)
 - d) increasing the operating flux density in the yoke
- 14) If all the dimension of a transformer is doubled its iron loss will be _____.
 - half a)

b) double

c) four times

- 8 times d)

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Set

Set

Max. Marks: 56

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Attempt any four. Q.2

Seat

No.

- Explain the factors affecting the size of electromagnetic rotating machines. a)
- Distinguish between core transformer and shell transformer. b)
- C) Derive an output equation of 1 phase core type transformer.
- Determine the dimension of core and yoke for a 200 KVA, 50Hz, 1 phase d) core type transformer, A uniform core is used with distance between adjacent limbs equal to 1.6 times the width of core lamination. Assume voltage per turn 14 V, maximum flux density 1.1 Wb/m², window space factor=0.32, current density 3A/mm² and stacking factor=0.9. The net iron area is 0.56d² where'd' is the diameter of circumscribing circle. Also the width of largest stamping is 0.85d.
- The diameter and length of 500kW, 500V, 445r.p.m, 6 pole D.C generator e) are 84cm and 35cm respectively. If it is lap wound with 660 conductors, estimate the specific magnetic and electric loading.

Q.3 Attempt any two.

- Find the suitable values diameter and length armature of the core for a) 100Kw, 250V, 6 pole, 750 r.p.m, D.C. generator having 90% efficiency. Assume an average flux density in the air of about 0.58Wb/m² and amp. Cond. Per meter to be 28000. The ratio of core length to pole pitch is 0.67
- Design an adequate cooling arrangement for a 250 KVA 6600/400 V, 50 b) Hz, 3 phase Delta/Star, oil immersed natural cool transformer with following data:
 - 1) Winding temperature not to exceed 50° c
 - 2) Total loss at full load is 5.0 Kw.
 - Tank dimensions, height \times length \times width=(125x100x50) cm 3) sketch the diagram to show the arrangement.
- Find the main dimensions, and length of air gap of a 1000Kw, 500V, 10 c) Pole, 300r.p.m D.C generator. Assume the specific magnetic loading $B_{av}=0.7Wb/m^2$, ampere conductor per meter=40000, square pole face, ratio of pole arc to pole pitch is 0.7. Assume efficiency as 92% and gap contraction factor as 1.15.Neglect rotational losses. Assume (AT) gap = 0.55 (AT)_{armature}

12

Section – II

Q.4 Attempt any four

- Discuss the effect of air gap length of 3-ph induction motor on following a) Factor.
 - 1. Power factor
 - 2. Overload capacity
 - Pulsation loss and noise 3.
 - 4. Unbalanced magnetic pull
- b) Discuss the choice of specific electric loading and specific magnetic loading of synchronous machine.
- Find the current in the bar and end rings of a cage rotor of a 6 poles, 3-ph, c) and induction motor having 72 stator slots with 15 conductors in each slot. If the stator current per phase is 20 amp and rotor slots are 55. Hence find the suitable size of the cage bars and end rings.
- Determine the main dimension for a 1000 KVA, 50Hz, 3-ph, 375rpm d) alternator. The average air gap flux density is 0.55 Wb/m² and the ampere conductor per meter are 28000. Use rectangular pole and assume suitable value for ratio of core length to pole pitch in order that bolted on pole construction is used for which the maximum permissible peripheral speed is 50 m/s. the runaway speed is 1.8 times the synchronous speed.
- Derive the output equation of three phase induction motor. e)

Q.5 Attempt any two.

- Find the main dimensions, Nos. of stator turns Nos. of stator slots of 5 HP, a) 400 V, 1500 syn. RPM sq. eage induction motor with following data Bav=0.46 web/m² A.C.=22000, Full load efficiency=0.83 full load P.f.=0.84.
- In the design of a 30 HP, 3-ph, 440 V. 960 rpm, 50 Hz. Delta connected b) induction motor. Assume specific electric loading of 25000 ac/m and specific magnetic loading of 0.46 Wb/m full load efficiency 86% and power factor 0.87. Estimate:
 - Diameter of stator bore 1)
 - 2) Length of stator core
 - 3) Peripheral velocity
 - 4) Turns per phase
 - 5) Slot pitch
- c) Determine the main dimensions of 12 MVA, 13.8 kV, 50 Hz, 1500 rpm, 3-ph, star connected alternator. The following particulars are provided. Ave. gap density =0.60 tesla Ampere conductors per meter =42000 Peripheral speed =80 m/sec Find also the maximum flux, the no. of stator slots if one conductor per slot is used, the no. of turns per phase.

16

Set S

12

Seat No.			Set P
	-) (New) (CBCS) Exa Electrical Engin PECIAL PURPOSE	
•	Date: Thursday, 28- 10:00 AM To 12:00 F		Max. Marks: 50
Instru	book.		be solved in first 20 minutes in answer
	, C	the right indicate full ma	
Duratio	n: 20 Minutes	MCQ/Objective Type	Questions Marks: 10
		alternatives from the o	
	sentence.	alternatives nom the o	
	1) In a three-stack a) 15º c) 45º	< 12/8-pole VR motor, the b) d)	e rotor pole pitch is 30º 60º
	2) For a reluctanc	e motor, the maximum a	verage torque occurs when $\delta =$
	a) 45° c) 0°	b) d)	90° 180°
3		• •	h of 36° and a step angle of 9°,
	the number of i a) 4	ts phases must be b)	<u>.</u> 2
	c) 3	d)	6
2	a) any speed b) synchronou	greater than synchronou	beed
Ę		or may be considered as a	
	a) Dc to dc c) Dc to ac	b) d)	Ac to ac Digital-to-analogue
6	,	llowing is not an advanta	v
	a) Less maint c) No risk of e	,	
7	7) In BLDC motor a) SCRs c) FETs	driver module, we do no b) d)	t require Power transistors Transistors
8	a) Conventiorb) Induction nc) Permanent	f BLDC is exactly similar t nal DC motor notor t magnet synchronous mo erent construction	

d) Totally different construction

SL	R-F	M-4	26
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- Typical brushless motor doesn't have 9)
 - a) Commutator
 - c) Electronic controller
- Permanent magnet b)
- d) Fixed armature
- BLDC can be used instead _____. 10)
 - a) Synchronous motorc) Induction motor
- b) Normal brushed DC motor
- d) Air motor

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SPECIAL PURPOSE MACHINES

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2 2) Figures to the right indicate full marks.

Q.2 Answer any five question:-

- a) What are the applications of Synchronous Reluctance Motor? Explain with phasor diagram torque speed characteristics of Synchronous Reluctance Motor.
- **b)** Explain Principle of Micro stepping used for stepper motor.
- c) Give the Classification of Stepper motor. Explain with neat sketch operation of Single Stack Variable Reluctance Stepper Motor.
- d) Derive voltage and torque equation of Switched Reluctance Motor.
- e) Explain with neat sketch construction of permanent magnet brushless DC motor.
- f) Explain with neat sketch construction and operating principle of permanent magnet synchronous motor.



Max. Marks: 40

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SPECIAL PURPOSE MACHINES Day & Date: Thursday, 28-11-2019 Max. Marks: 50 Time: 10:00 AM To 12:00 PM Max. Marks: 50 Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book. 2) Figures to the right indicate full marks. MCQ/Objective Type Questions Duration: 20 Minutes Marks: 10 Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10 1) Which of the following is not an advantage of BLDC motor over conventional DC motor? a) Less maintenance b) Long life c) No risk of explosion d) Low cost 2) In BLDC motor driver module, we do not require
Day & Date: Thursday, 28-11-2019 Max. Marks: 50 Time: 10:00 AM To 12:00 PM Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book. 2) Figures to the right indicate full marks. MCQ/Objective Type Questions Duration: 20 Minutes Marks: 10 Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10 1) Which of the following is not an advantage of BLDC motor over conventional DC motor? a) Less maintenance a) Less maintenance b) Long life c) No risk of explosion d) Low cost 2) In BLDC motor driver module, we do not require
book. 2) Figures to the right indicate full marks. MCQ/Objective Type Questions Duration: 20 Minutes Marks: 10 Q.1 Choose the correct alternatives from the options and rewrite the sentence. 1) Which of the following is not an advantage of BLDC motor over conventional DC motor? a) Less maintenance b) Long life c) No risk of explosion d) Low cost 2) In BLDC motor driver module, we do not require
MCQ/Objective Type Questions Duration: 20 Minutes Marks: 10 Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10 1) Which of the following is not an advantage of BLDC motor over conventional DC motor? a) Less maintenance a) Less maintenance b) Long life c) No risk of explosion d) Low cost 2) In BLDC motor driver module, we do not require
Duration: 20 Minutes Marks: 10 Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10 1) Which of the following is not an advantage of BLDC motor over conventional DC motor? 10 a) Less maintenance b) Long life c) No risk of explosion d) Low cost 2) In BLDC motor driver module, we do not require
 sentence. 1) Which of the following is not an advantage of BLDC motor over conventional DC motor? a) Less maintenance b) Long life c) No risk of explosion d) Low cost 2) In BLDC motor driver module, we do not require
 Which of the following is not an advantage of BLDC motor over conventional DC motor? a) Less maintenance b) Long life c) No risk of explosion d) Low cost In BLDC motor driver module, we do not require
 conventional DC motor? a) Less maintenance b) Long life c) No risk of explosion d) Low cost 2) In BLDC motor driver module, we do not require
 a) Less maintenance b) Long life c) No risk of explosion d) Low cost 2) In BLDC motor driver module, we do not require
2) In BLDC motor driver module, we do not require
c) FETs d) Transistors
 3) Construction of BLDC is exactly similar to the a) Conventional DC motor b) Induction motor c) Permanent magnet synchronous motor d) Totally different construction
4) Typical brushless motor doesn't have
a) Commutator b) Permanent magnet c) Electronic controller d) Fixed armature
 5) BLDC can be used instead a) Synchronous motor b) Normal brushed DC motor c) Induction motor d) Air motor
6) In a three-stack 12/8-pole VR motor, the rotor pole pitch is
a) 15° b) 30° c) 45° d) 60°
7) For a reluctance motor, the maximum average torque occurs when $\delta =$
a) 45° b) 90°
c) 0° d) 180°
 If a hybrid stepper motor has a rotor pitch of 36° and a step angle of 9°, the number of its phases must be
a) 4 b) 2 c) 3 d) 6

c) 3 d) 6 SLR-FM-426

Seat No

SLR-FM-426 Set Q

- 9) Reluctance motor can produce torque at _____.
 - a) any speed less than synchronous speed
 - b) synchronous speed only
 - c) any speed greater than synchronous speed
 - d) any of the mentioned
- 10) A stepper motor may be considered as a _____ converter.
 - a) Dc to dc

- b) Ac to ac
- c) Dc to ac d) Digital-to-analogue

Max. Marks: 40

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

SPECIAL PURPOSE MACHINES Day & Date: Thursday, 28-11-2019

Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2 2) Figures to the right indicate full marks.

Q.2 Answer any five question:-

Seat

No.

- a) What are the applications of Synchronous Reluctance Motor? Explain with phasor diagram torque speed characteristics of Synchronous Reluctance Motor.
- **b)** Explain Principle of Micro stepping used for stepper motor.
- c) Give the Classification of Stepper motor. Explain with neat sketch operation of Single Stack Variable Reluctance Stepper Motor.
- d) Derive voltage and torque equation of Switched Reluctance Motor.
- e) Explain with neat sketch construction of permanent magnet brushless DC motor.
- f) Explain with neat sketch construction and operating principle of permanent magnet synchronous motor.



Seat					Set R		
No.				-			
T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering							
SPECIAL PURPOSE MACHINES							
Day & Date: Thursday, 28-11-2019 Max. Marks: 50 Time: 10:00 AM To 12:00 PM							
Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.							
2) Figures to the right indicate full marks.							
MCQ/Objective Type Questions Duration: 20 Minutes Marks: 10							
9	sentence.						
	1) Ty a)	•	ss motor doesn't hav or	/e b)	 Permanent magnet		
	,	Electronic o		d)	Fixed armature		
	,		sed instead				
	a) c)	Synchronor Induction m		b) d)	Normal brushed DC motor Air motor		
3	3) In a)		12/8-pole VR motor	, the r b)	rotor pole pitch is 30º		
	,	45 <u>°</u>		d)	60 <u>°</u>		
2	4) Fo	or a reluctance	e motor, the maximu	m ave	erage torque occurs when $\delta =$		
	a)			b)	90°		
	c)	0°		d)	180°		
		• • • •	per motor has a rotor is phases must be	-	of 36° and a step angle of 9°,		
	a)	4		b)	2		
	,	3		d)	6		
6	,		or can produce torqu less than synchronou				
		synchronou	• •	noue	speed		
	c) d)	· · ·	greater than synchro nentioned	nous	speed		
7			r may be considered	as a	converter.		
	a) c)	Dc to dc Dc to ac		b) d)	Ac to ac Digital-to-analogue		
8	,		lowing is not an adv	,	č		
·	conventional DC motor?						
	,	Less mainte No risk of e		b) d)	Long life Low cost		
	0)			<i></i> ,			

9) In BLDC motor driver module, we do not require _____.

b) Power transistors

SLR-FM-426

Set R

- c) FETs d) Transistors
- 10) Construction of BLDC is exactly similar to the _____.
 - a) Conventional DC motor
 - b) Induction motor

a) SCRs

- c) Permanent magnet synchronous motor
- d) Totally different construction

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SPECIAL PURPOSE MACHINES

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2 2) Figures to the right indicate full marks.

Q.2 Answer any five question:-

- a) What are the applications of Synchronous Reluctance Motor? Explain with phasor diagram torque speed characteristics of Synchronous Reluctance Motor.
- **b)** Explain Principle of Micro stepping used for stepper motor.
- c) Give the Classification of Stepper motor. Explain with neat sketch operation of Single Stack Variable Reluctance Stepper Motor.
- d) Derive voltage and torque equation of Switched Reluctance Motor.
- e) Explain with neat sketch construction of permanent magnet brushless DC motor.
- f) Explain with neat sketch construction and operating principle of permanent magnet synchronous motor.



Max. Marks: 40

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019								
Electrical Engineering SPECIAL PURPOSE MACHINES								
Day & Date: Thursday, 28-11-2019 Max. Marks: 50 Time: 10:00 AM To 12:00 PM Max. Marks: 50								
Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.								
2) Figures to the right indicate full marks.								
MCQ/Objective Type Questions								
Duration: 20 Minutes Marks: 10								
Q.1	Q.1 Choose the correct alternatives from the options and rewrite the 10 sentence.							
	1)	If a hybrid stepper motor has a rotor pitch of 36° and a step angle of 9°, the number of its phases must be a) 4 b) 2 c) 3 d) 6						
	2)	 Reluctance motor can produce torque at a) any speed less than synchronous speed b) synchronous speed only c) any speed greater than synchronous speed d) any of the mentioned 						
	3)	A stepper motor may be considered as a converter.a) Dc to dcb) Ac to acc) Dc to acd) Digital-to-analogue						
	4)	Which of the following is not an advantage of BLDC motor over conventional DC motor?a) Less maintenanceb) Long lifec) No risk of explosiond) Low cost						
	5)	In BLDC motor driver module, we do not require a) SCRs b) Power transistors c) FETs d) Transistors						
	6)	 Construction of BLDC is exactly similar to the a) Conventional DC motor b) Induction motor c) Permanent magnet synchronous motor d) Totally different construction 						
	7)	Typical brushless motor doesn't have a) Commutator b) Permanent magnet c) Electronic controller d) Fixed armature						
	8)	BLDC can be used insteada) Synchronous motorb) Normal brushed DC motorc) Induction motord) Air motor						

Seat No.

II) (New) (CBCS) Examination Nov/Dec-2019

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- 9) In a three-stack 12/8-pole VR motor, the rotor pole pitch is _____.
 - a) 15° b) 30°
 - c) 45° d) 60°
- 10) For a reluctance motor, the maximum average torque occurs when $\delta =$
 - a) 45° b) 90° c) 0° d) 180°

eat D. _____

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SPECIAL PURPOSE MACHINES

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. No.2 2) Figures to the right indicate full marks.

Q.2 Answer any five question:-

- a) What are the applications of Synchronous Reluctance Motor? Explain with phasor diagram torque speed characteristics of Synchronous Reluctance Motor.
- **b)** Explain Principle of Micro stepping used for stepper motor.
- c) Give the Classification of Stepper motor. Explain with neat sketch operation of Single Stack Variable Reluctance Stepper Motor.
- d) Derive voltage and torque equation of Switched Reluctance Motor.
- e) Explain with neat sketch construction of permanent magnet brushless DC motor.
- f) Explain with neat sketch construction and operating principle of permanent magnet synchronous motor.



Max. Marks: 40

Seat No.

Set

Max. Marks: 50

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL SAFETY**

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- 1) First aid is
 - a) Temporary and immediate care given to the victim
 - b) Permanent care given to victim
 - c) Both (a) & (b)
 - d) Neither (a) nor (B)
- 2) Which of these is most likely to be a result of handling an overloaded electrical socket? Asbestosis

b)

- a) Frostbite
- c) Asphyxiation d) Electric shock
- Which of these is most likely to cause an accident in a workplace? 3)
 - a) Administration Manual handling b)
 - c) Adequate lighting d) Excessive noise
- 4) Which of the following precautions is/are necessary in electrical work?
 - a) The equipment should be earthed properly
 - Cable should be completely insulated b)
 - Cable should have any joints c)
 - d) Both (a) & (b)

Handy fire extinguishers kept in chemical plants are containing _____. 5) Carbon dioxide

- Dry chemical powder a) b)
- c) Either (a) or (b) d)
- Dry pipe fire extinguisher contains _ 6)
 - a) N_2 c) CO_2
- 7) Fire can be defined as _____.
 - a) Release of light
 - Self propagating reaction of combustible material with O₂ from air b)
 - c) Release of energy
 - d) None of above
- 8) Fire is a combination of ____
 - a) Fuel, light and oxygen b)
 - c) Fuel, heat and carbon dioxide Fuel, light and nitrogen d)

- Foam
- H₂O b) d) None of the above

Fuel, heat and oxygen

Marks: 10

- Set P
- 9) In case of an accident, the victim should immediately be _____.
 - a) Asked to take rest
 - b) Enquired about the accident
 - c) Attended
 - d) Left to himself without treatment
- 10) The safe way of working is _____
 - a) An effective and right way of working
 - b) An ancient way of working
 - c) A way of handling the work in a hurry
 - d) A way of normal working

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL SAFETY

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. 2.

2) Figures to the right indicate full marks.

Q.2 Answer any five

- a) Explain the procedure of permit to do the work on electrical equipment.
- **b)** Explain the effect of electrical shock on human body.
- c) Write the objectives of safety management.
- d) Explain the safety precautions to be taken against electrical shock.
- e) Write the safety precautions to be taken during the operation and maintenance of electrical equipment.
- f) Explain the actions to be taken against in case of electrical fire



Max. Marks: 40



T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

ELECTRICAL SAFETY

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

2)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- Dry pipe fire extinguisher contains _ 1)
 - a) N_2
 - c) CO_2
 - Fire can be defined as _____.
 - a) Release of light
 - Self propagating reaction of combustible material with O₂ from air b)
 - c) Release of energy
 - d) None of above

3) Fire is a combination of

- a) Fuel, light and oxygen b) Fuel, heat and oxygen
- c) Fuel, heat and carbon dioxide Fuel, light and nitrogen d)
- 4) In case of an accident, the victim should immediately be .
 - a) Asked to take rest
 - b) Enquired about the accident
 - c) Attended
 - d) Left to himself without treatment
- The safe way of working is 5)
 - a) An effective and right way of working
 - b) An ancient way of working
 - c) A way of handling the work in a hurry
 - d) A way of normal working
- 6) First aid is _____
 - a) Temporary and immediate care given to the victim
 - b) Permanent care given to victim
 - c) Both (a) & (b)
 - d) Neither (a) nor (B)
- Which of these is most likely to be a result of handling an overloaded 7) electrical socket?
 - a) Frostbite

- b) Asbestosis
- d) Electric shock c) Asphyxiation
- 8) Which of these is most likely to cause an accident in a workplace?
 - Administration a) Adequate lighting C)
- b) Manual handling
- d) Excessive noise

Marks: 10

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Max. Marks: 50

b) H₂O

None of the above d)

Seat No.

9) Which of the following precautions is/are necessary in electrical work?

- a) The equipment should be earthed properly
- b) Cable should be completely insulated
- c) Cable should have any joints
- d) Both (a) & (b)

Handy fire extinguishers kept in chemical plants are containing _____. 10) a) Dry chemical powder

Carbon dioxide b)

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Set Q

- c) Either (a) or (b)
- d) Foam

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL SAFETY

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. 2.

2) Figures to the right indicate full marks.

Q.2 Answer any five

- a) Explain the procedure of permit to do the work on electrical equipment.
- **b)** Explain the effect of electrical shock on human body.
- c) Write the objectives of safety management.
- d) Explain the safety precautions to be taken against electrical shock.
- e) Write the safety precautions to be taken during the operation and maintenance of electrical equipment.
- f) Explain the actions to be taken against in case of electrical fire



Max. Marks: 40



Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL SAFETY**

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- In case of an accident, the victim should immediately be _____. 1)
 - a) Asked to take rest
 - b) Enquired about the accident
 - c) Attended
 - d) Left to himself without treatment
- 2) The safe way of working is _____
 - a) An effective and right way of working
 - b) An ancient way of working
 - c) A way of handling the work in a hurry
 - d) A way of normal working
- First aid is . 3)
 - a) Temporary and immediate care given to the victim
 - b) Permanent care given to victim
 - c) Both (a) & (b)
 - d) Neither (a) nor (B)
- 4) Which of these is most likely to be a result of handling an overloaded electrical socket?
 - a) Frostbite c) Asphyxiation

b) Asbestosis d) Electric shock

5) Which of these is most likely to cause an accident in a workplace?

- a) Administration b) Manual handling
- c) Adequate lighting d) Excessive noise
- 6) Which of the following precautions is/are necessary in electrical work?
 - a) The equipment should be earthed properly
 - b) Cable should be completely insulated
 - c) Cable should have any joints
 - d) Both (a) & (b)
- Handy fire extinguishers kept in chemical plants are containing _____. 7) a) Dry chemical powder
 - Carbon dioxide b)
 - Foam c) Either (a) or (b) d)
- Dry pipe fire extinguisher contains _ 8)
 - a) N_2
 - c) CO_2

- b) H₂O
- d) None of the above

Max. Marks: 50

R

SLR-FM-427 Set R

- Fire can be defined as _____. 9)
 - a) Release of light
 - b) Self propagating reaction of combustible material with O₂ from air
 - c) Release of energy
 - d) None of above
- Fire is a combination of _____. 10)
 - a) Fuel, light and oxygen
 - b) d)
 - c) Fuel, heat and carbon dioxide
- Fuel, heat and oxygen Fuel, light and nitrogen

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL SAFETY

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. 2.

2) Figures to the right indicate full marks.

Q.2 Answer any five

- a) Explain the procedure of permit to do the work on electrical equipment.
- **b)** Explain the effect of electrical shock on human body.
- c) Write the objectives of safety management.
- d) Explain the safety precautions to be taken against electrical shock.
- e) Write the safety precautions to be taken during the operation and maintenance of electrical equipment.
- f) Explain the actions to be taken against in case of electrical fire



Max. Marks: 40

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL SAFETY**

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

1)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- Which of these is most likely to cause an accident in a workplace?
- a) Administration
- b) Manual handling
- d) Excessive noise c) Adequate lighting

2) Which of the following precautions is/are necessary in electrical work?

- a) The equipment should be earthed properly
- b) Cable should be completely insulated
- c) Cable should have any joints
- d) Both (a) & (b)

3) Handy fire extinguishers kept in chemical plants are containing _____. Carbon dioxide b)

- a) Dry chemical powder
- c) Either (a) or (b) Foam d)
- Dry pipe fire extinguisher contains ____ 4)
 - a) N_2 c) CO_2

- b) H₂O
- None of the above d)
- 5) Fire can be defined as _____.
 - a) Release of light
 - Self propagating reaction of combustible material with O₂ from air b)
 - c) Release of energy
 - d) None of above

6) Fire is a combination of

- a) Fuel, light and oxygen b) Fuel, heat and oxygen
- c) Fuel, heat and carbon dioxide Fuel, light and nitrogen d)
- 7) In case of an accident, the victim should immediately be _____.
 - a) Asked to take rest
 - b) Enquired about the accident
 - c) Attended
 - d) Left to himself without treatment
- 8) The safe way of working is _____
 - a) An effective and right way of working
 - b) An ancient way of working
 - c) A way of handling the work in a hurry
 - d) A way of normal working

Max. Marks: 50

Marks: 10

- 9) First aid is _____.
 - a) Temporary and immediate care given to the victim
 - b) Permanent care given to victim
 - c) Both (a) & (b)
 - d) Neither (a) nor (B)
- 10) Which of these is most likely to be a result of handling an overloaded electrical socket?
 - a) Frostbite

b) Asbestosis

c) Asphyxiation

d) Electric shock

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Set S

Seat	
No.	

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL SAFETY

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Attempt any five questions from Q. 2.

2) Figures to the right indicate full marks.

Q.2 Answer any five

- a) Explain the procedure of permit to do the work on electrical equipment.
- **b)** Explain the effect of electrical shock on human body.
- c) Write the objectives of safety management.
- d) Explain the safety precautions to be taken against electrical shock.
- e) Write the safety precautions to be taken during the operation and maintenance of electrical equipment.
- f) Explain the actions to be taken against in case of electrical fire



Max. Marks: 40

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

1)

Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10
 - Which of the following is a main disadvantage of a solar PV system? b) **Operation cost**

d)

Life cycle cost

South facing

North and East facing

- a) Capital cost
- c) Maintenance cost
- 2) In India PV panel should be
 - a) North Facing b)
 - c) East facing d)
- 3) Which is not a part of Site feasibility study?
 - Population of nearest city Soil quality b) a)
 - Wind speed c) d) Location

4) In a residential roof-top PV system, which is not taken in to the consideration? Load & load flow analysis

- Nearest transmission grid b) a) c)
 - Roof area Back up Hours d)
- 5) In Solar PV system, what does PR stands for **Project Review**
 - **Project Report** a) b)
 - Performance ratio d) Performance review c)
- In a high rise building, LA is installed against ? 6)
 - a) Lightening b) Birds
 - c) Animals d) Both (a) and (b)
- Battery bank shouldn't be installed in a location? 7)
 - a) Near PV array Well ventilated room b)
 - Near Control Room d) At high temperature Area c)
- 8) If the orientation of PV module changes from horizontal to vertical, Tilt angle will ?
 - a) Change b) Remain same
 - Depends d) Can't say C)
 - Which is the key of efficiency in PV plant?
 - a) Well design

9)

- b) Proper Cleaning & maintenance
- c) Procurement
- d) All of the above

Max. Marks: 50

Set

Marks: 10

SLR-FM-428 Set P

- 10) MPPT Stands for _____?a) Maximum Power Point Temperatureb) Maximum Power Produce Temperature

 - c) Maximum Power Produce Temperatured) Minimum Power Produce Temperature.

Seat No.	t				Set	Ρ		
	T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION							
		ate: Thursday, 28-1 :00 AM To 12:00 P			Max. Marks	s: 40		
Instr	ucti	, .	ight indicate full mark four questions from Q					
Q.2	a)	•	g questions. concept of Solar Ener of Renewable Energy			10		
Q.3	a)		g questions. le name plate specific fecting output of PV m			10		
Q.4	a)			igurations of PV power tem.	system.	10		
Q.5	An a) b)		g questions. blved in PV system siz ypes of batteries used			10		
Q.6	a)	•	g questions. n process of solar pov ts types and operatior	•		10		

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- In a high rise building, LA is installed against _____? 1)
 - a) Lightening b) c) Animals d)
- Battery bank shouldn't be installed in a location? 2)
 - a) Near PV array
 - c) Near Control Room
- 3) If the orientation of PV module changes from horizontal to vertical, Tilt angle will ?
 - a) Change
 - c) Depends d)
- 4) Which is the key of efficiency in PV plant?
 - a) Well design
 - b) Proper Cleaning & maintenance
 - c) Procurement
 - d) All of the above
- MPPT Stands for _____? 5)
 - Maximum Power Point Temperature a)
 - Maximum Power Produce Temperature b)
 - Maximum Power Point Tracker c)
 - d) Minimum Power Produce Temperature.

Which of the following is a main disadvantage of a solar PV system? 6)

- a) Capital cost Operation cost b)
- c) Maintenance cost d)
- 7) In India PV panel should be ____
 - a) North Facing b) North and East facing
 - c) East facing South facing d)
- Which is not a part of Site feasibility study? 8)
 - a) Soil quality Population of nearest city b)
 - c) Wind speed d) Location
- In a residential roof-top PV system, which is not taken in to the consideration? 9) a) Nearest transmission grid
 - Load & load flow analysis b) Back up Hours d)
 - c) Roof area

SLR-FM-428 Set Q

Max. Marks: 50

Marks: 10

- **Birds**
- Both (a) and (b)
- Well ventilated room b)
- d) At high temperature Area
- b) Remain same
- Can't say

- Life cycle cost



- 10) In Solar PV system, what does PR stands for _____.
 a) Project Report b) Project Review
 c) Performance ratio d) Performance review

- Performance review

Seat No.	t					Set	Q	
	T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION							
		ate: Thursday, 28-1 :00 AM To 12:00 P			M	ax. Mark	s: 40	
Instr	ucti	, .	ight indicate full mar four questions from (
Q.2	a)	•	g questions. concept of Solar Energy of Renewable Energy	0.			10	
Q.3	An a) b)		g questions. le name plate specifi fecting output of PV i				10	
Q.4	a)		g questions. ne, Grid & Hybrid cor components of PV sy		V power syste	em.	10	
Q.5	An a) b)		g questions. blved in PV system s ypes of batteries use		vstem.		10	
Q.6	a)	•	g questions. n process of solar po ts types and operatio		vstem.		10	

Set

R

Seat No.

Duration: 20 Minutes

1)

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- Which is the key of efficiency in PV plant?
 - a) Well design
 - b) Proper Cleaning & maintenance
 - c) Procurement
 - d) All of the above
- MPPT Stands for 2) ?
 - Maximum Power Point Temperature a)
 - Maximum Power Produce Temperature b)
 - Maximum Power Point Tracker c)
 - d) Minimum Power Produce Temperature.
- Which of the following is a main disadvantage of a solar PV system? 3) **Operation cost**
 - a) Capital cost b)
 - c) Maintenance cost d)
- 4) In India PV panel should be ____ North Facing

a)

- b) North and East facing
- c) East facing South facing d)
- Which is not a part of Site feasibility study? 5)
 - a) Soil quality Population of nearest city b)
 - c) Wind speed d) Location
- 6) In a residential roof-top PV system, which is not taken in to the consideration?
 - a) Nearest transmission grid Load & load flow analysis b) Back up Hours
 - c) Roof area d)
- 7) In Solar PV system, what does PR stands for _
 - a) Project Report b) **Project Review** c) Performance ratio d) Performance review
- 8) In a high rise building, LA is installed against ?
 - a) Lightening b) Birds c) Animals d) Both (a) and (b)
- 9) Battery bank shouldn't be installed in a location?
 - Near PV array a) Near Control Room c)
- b) Well ventilated room
- d) At high temperature Area

- Max. Marks: 50

- Life cycle cost

SLR-FM-428



- If the orientation of PV module changes from horizontal to vertical, Tilt angle will _____? a) Change b) Remain same 10)

 - c) Depends

- d) Can't say

Seat No.	t					Set	R
	S	, , , , , , , , , , , , , , , , , , ,	(New) (CBCS) Ex Electrical Eng OLTAIC SYSTEM	ineering			
		ate: Thursday, 28-1 :00 AM To 12:00 P			Max	k. Marks	s: 40
Instr	ucti	, .	ight indicate full mark our questions from C				
Q.2	a)	-	g questions. concept of Solar Ene of Renewable Energ				10
Q.3	a)	•	g questions. e name plate specific fecting output of PV r				10
Q.4	a)	-	g questions. ne, Grid & Hybrid con components of PV sys	-	/ power systen	า.	10
Q.5	An a) b)	• •	g questions. blved in PV system si ypes of batteries use	-	stem.		10
Q.6	An a) b)	•	g questions. n process of solar po is types and operatio		stem.		10

No.				
	T.E. (Part – II)	(New) (CBCS)	Examinatio	on Nov/Dec-2019

Electrical Engineering

SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Seat

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- Which is not a part of Site feasibility study? 1)
 - a) Soil quality

Duration: 20 Minutes

- c) Wind speed

In a residential roof-top PV system, which is not taken in to the consideration? 2)

- a) Nearest transmission grid
- c) Roof area
- 3) In Solar PV system, what does PR stands for
 - **Project Report Project Review** b) a)
 - d) c) Performance ratio Performance review
- 4) In a high rise building, LA is installed against ?
 - a) Lightening b) Birds c) Animals d) Both (a) and (b)
- 5) Battery bank shouldn't be installed in a location?
 - a) Near PV array

b) Well ventilated room

At high temperature Area

- Near Control Room d) c)
- If the orientation of PV module changes from horizontal to vertical, Tilt 6) angle will ____?
 - a) Change c) Depends

- b) Remain same d) Can't sav
- 7) Which is the key of efficiency in PV plant?
 - a) Well design
 - b) Proper Cleaning & maintenance
 - c) Procurement
 - d) All of the above
- MPPT Stands for 8) ?
 - a) Maximum Power Point Temperature
 - Maximum Power Produce Temperature b)
 - Maximum Power Point Tracker c)
 - d) Minimum Power Produce Temperature.
- Which of the following is a main disadvantage of a solar PV system? 9)
 - Capital cost Operation cost a) b)
 - Life cycle cost Maintenance cost d) c)

Set

Max. Marks: 50

- Marks: 10
- b) Population of nearest city
 - Location
- d)
- b) Load & load flow analysis
 - d)
 - Back up Hours



- In India PV panel should be _____. a) North Facing c) East facing 10)

- North and East facing South facing b)
 - d)

Seat No.	t					Set	S	
	T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION							
		ate: Thursday, 28-1 :00 AM To 12:00 P			Μ	lax. Marks	s: 40	
Instr	ucti	, .	ight indicate full mar four questions from (
Q.2	a)	•	g questions. concept of Solar Energy of Renewable Energy				10	
Q.3	a)		g questions. le name plate specifi fecting output of PV				10	
Q.4	a)		g questions. ne, Grid & Hybrid coi components of PV sy		PV power syste	em.	10	
Q.5	An a) b)	• •	g questions. blved in PV system s ypes of batteries use	•	system.		10	
Q.6	a)	•	g questions. n process of solar po ts types and operatio		ystem.		10	

MCQ/Objective Type Questions Choose the correct alternatives from the options and rewrite the sentence. Which of the following is correct for proximity sensors? a) Inductive type b) Capacitive type All of the mentioned c) Ultrasonic wave type d) State model representation is possible using a) Physical variable b) Phase variables c) Canonical state variables d) All of the mentioned Which among the following plays a crucial role in determining the state of dynamic system? a) State variables b) State vector c) State space d) State scalar A Robot is a ____ b) None of the above d) The main objective of a process control is _____.

a) to control physical parameters

- b) to control mechanical parameters
- c) to control optical parameters
- d) to control electrical parameters

6) Automatic controllers operate on the difference between set point and measurement, which is called

- a) Offset b) Bias
- c) Error Feedback d)
- 7) Which among the following are the interconnected units of state diagram representation?
 - Adders a) Scalars b) All of the above Integrators d) c)
- A sensor is a device that converts 8)
 - Physical quantity into measurable signals a)
 - b) Physical guantity into mechanical signal
 - c) Electrical signal into physical quantity
 - d) Physical quantity into electric signal only

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering INSTRUMENTATION PROCESS CONTROL & ROBOTICS**

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to the right indicate full marks.

Duration: 20 Minutes

1)

2)

3)

4)

5)

Marks: 10

10

SLR-FM-429

Set

Max. Marks: 50

- Multi functional manipulator

a) Programmable

- c) Both (a) and b)

No.

Seat

Q.1



- The following drive is used for lighter class of Robot _____. 9)
 - a) Pneumatic drive
- Hydraulic drive b)

c) Electric drive

- d) All of the above
- Fast, self-regulating processes typically respond well to aggressive 10) control action _____.
 - a) Nonlinear

b) Derivative d)

c) Proportional

Reset

Set

Max. Marks: 40

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Answer any four from the following questions.

- a) Explain laws of robotics.
- b) Explain operation of PI control with neat sketch.
- c) Explain cascade control with block diagram.
- d) Explain proximity and distance measuring sensors with neat sketch.
- e) Explain advantages & dis-advantages of robot.

Q.3 Answer any two of the following questions.

- a) What is purpose of sensors? Explain internal and external sensors.
- **b)** What are the different methods available for tuning of PID controller? Explain relay feedback method in details.
- c) Explain feed forward control loop with neat sketch.

20

Set

Max. Marks: 50

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- Automatic controllers operate on the difference between set point and 1) measurement, which is called
 - a) Offset b) c) Error d)
- 2) Which among the following are the interconnected units of state diagram representation?
 - a) Scalars b)
 - d) c) Integrators
- 3) A sensor is a device that converts _
 - Physical quantity into measurable signals a)
 - b) Physical guantity into mechanical signal
 - Electrical signal into physical quantity C)
 - d) Physical quantity into electric signal only
- The following drive is used for lighter class of Robot _____ 4)
 - Pneumatic drive b) a) Electric drive c)
 - Hydraulic drive d) All of the above
- Fast, self-regulating processes typically respond well to aggressive 5) control action
 - a) Nonlinear
 - b) Derivative c) Proportional d) Reset

Which of the following is correct for proximity sensors? 6)

- a) Inductive type b) Capacitive type
- c) Ultrasonic wave type d) All of the mentioned
- 7) State model representation is possible using _
 - Physical variable b) Phase variables a) Canonical state variables c)
 - d) All of the mentioned
- Which among the following plays a crucial role in determining the state of 8) dynamic system?
 - a) State variables State vector b)
 - c) State space d) State scalar

Marks: 10

Bias

- Feedback
- Adders
- All of the above

SLR-FM-429 Set Q

- 9) A Robot is a _____.
 - a) Programmable

- b) Multi functional manipulator
- c) Both (a) and b)
- d) None of the above
- 10) The main objective of a process control is _____.
 - a) to control physical parameters
 - b) to control mechanical parameters
 - c) to control optical parameters
 - d) to control electrical parameters

Set

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Answer any four from the following questions. Q.2

- Explain laws of robotics. a)
- Explain operation of PI control with neat sketch. b)
- Explain cascade control with block diagram. C)
- d) Explain proximity and distance measuring sensors with neat sketch.
- Explain advantages & dis-advantages of robot. e)

Answer any two of the following questions. Q.3

- What is purpose of sensors? Explain internal and external sensors. a)
- b) What are the different methods available for tuning of PID controller? Explain relay feedback method in details.
- Explain feed forward control loop with neat sketch. C)

Max. Marks: 40

20

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- The following drive is used for lighter class of Robot _ 1)
 - Pneumatic drive a) Electric drive C)
- b)
- d)
- 2) Fast, self-regulating processes typically respond well to aggressive control action .
 - Nonlinear b) a)
 - Proportional d) Reset C)

Which of the following is correct for proximity sensors? 3)

- Inductive type b) a)
- Ultrasonic wave type d) C)
- 4) State model representation is possible using
 - Physical variable a)
 - Canonical state variables d) c)
- Which among the following plays a crucial role in determining the state of 5) dynamic system?
 - a) State variables b) State vector
 - State space d) c)

A Robot is a 6)

c)

- Programmable a) Both (a) and b)
- b) Multi functional manipulator
- None of the above d)
- 7) The main objective of a process control is .
 - to control physical parameters a)
 - b) to control mechanical parameters
 - c) to control optical parameters
 - d) to control electrical parameters
- Automatic controllers operate on the difference between set point and 8) measurement, which is called
 - Offset b) Bias a)
 - Error d) Feedback c)

Set

Max. Marks: 50

Marks: 10

- ... Hydraulic drive
- All of the above
- Derivative
- - Capacitive type

All of the mentioned

- Phase variables b)
- All of the mentioned

State scalar



- Which among the following are the interconnected units of state diagram 9) representation?
 - a) Scalars

b) Adders d)

.

c) Integrators

- All of the above
- A sensor is a device that converts ____ 10)
 - Physical quantity into measurable signals a)
 - b) Physical quantity into mechanical signal
 - c) Electrical signal into physical quantity
 - d) Physical quantity into electric signal only

Set R

Seat

No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering INSTRUMENTATION PROCESS CONTROL & ROBOTICS

		e: Thursday, 28-11-2019 00 AM To 12:00 PM	Max. Marks: 40
Instru	uctio	ns: 1) All questions are compulsory.2) Figures to the right indicate full marks.	
Q.2	Ans a) b) c) d) e)	wer any four from the following questions. Explain laws of robotics. Explain operation of PI control with neat sketch. Explain cascade control with block diagram. Explain proximity and distance measuring sensors with neat sket Explain advantages & dis-advantages of robot.	20 ch.
Q.3	Ans a) b)	wer any two of the following questions. What is purpose of sensors? Explain internal and external sensor What are the different methods available for tuning of PID control Explain relay feedback method in details.	

c) Explain feed forward control loop with neat sketch.

Set

Max. Marks: 50

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

- Which among the following plays a crucial role in determining the state of 1) dynamic system?
 - a) State variables
 - c) State space
- 2) A Robot is a
 - a) Programmable c) Both (a) and b)

- Multi functional manipulator
- d)

The main objective of a process control is _____. 3)

- a) to control physical parameters
- b) to control mechanical parameters
- c) to control optical parameters
- d) to control electrical parameters
- 4) Automatic controllers operate on the difference between set point and measurement, which is called ____ .
 - Offset b) Bias a)
 - c) d) Error Feedback

Which among the following are the interconnected units of state diagram 5) representation?

a) Scalars

c) Integrators

- b) Adders
- All of the above d)
- A sensor is a device that converts 6)
 - a) Physical quantity into measurable signals
 - b) Physical guantity into mechanical signal
 - Electrical signal into physical quantity c)
 - d) Physical quantity into electric signal only
- The following drive is used for lighter class of Robot _____. 7)
 - Pneumatic drive Hydraulic drive b) a)
 - c) Electric drive d) All of the above
- 8) Fast, self-regulating processes typically respond well to aggressive control action
 - a) Nonlinear b) Derivative Proportional c)
 - d) Reset

Marks: 10

- b) State vector
- d) State scalar
- b)
 - None of the above



- 9) Which of the following is correct for proximity sensors?
 - a) Inductive type

- b) Capacitive type
- c) Ultrasonic wave type
- d) All of the mentioned
- 10) State model representation is possible using _____.
 - a) Physical variable
- b) Phase variables
- c) Canonical state variables
- d) All of the mentioned

D.

Set

Max. Marks: 40

Seat No.

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Answer any four from the following questions.

- a) Explain laws of robotics.
- b) Explain operation of PI control with neat sketch.
- c) Explain cascade control with block diagram.
- d) Explain proximity and distance measuring sensors with neat sketch.
- e) Explain advantages & dis-advantages of robot.

Q.3 Answer any two of the following questions.

- a) What is purpose of sensors? Explain internal and external sensors.
- **b)** What are the different methods available for tuning of PID controller? Explain relay feedback method in details.
- c) Explain feed forward control loop with neat sketch.

20

	T E (Part – II) (Old	
No.		
Seat		

II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Missing data suitably assumed.

- 2) Non-programmable calculator is allowed.
- 3) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The cold rolled grain oriented steel has _____ in the direction of grain 1) orientation.
 - Minimum a)

c)

C)

C) Nil

- b) Maximum
- d) None of the above
- 2) The heated parts of an electrical machine dissipate heat into their surroundings by which of the following modes of heat dissipation?
 - a) Conduction
 - b) Convection Radiation d) All of the above
- Electrical machines having power outputs ranging from a few kW upto 3) approximately 250 kW may be classified as _
 - a) Small size machines
- b) Medium size machines d) Any of the above
- c) Large size machines
- The effect of harmonics in rotating machines can be minimized by _____. 4) b) skewing the poles
 - a) use of longer air gap
 - use of distributed winding c)
- 5) In dc machines by increasing the number of poles, all of the following reduce except .
 - weight of copper a) frequency of flux reversals C)
- b) weight of iron parts

d) all of the above

d) overall size of the machine

b) Cruciform core

- The stacking factor will be least for 6)
 - Square core a)
 - Three stepped core d) Four stepped core
- 7) In D.C. machines, ir order to prevent excessive distortion of field form by the armature reaction the field mmf must be made .
 - equal to that of armature mmf a)
 - less in comparison with the armature mmf b)
 - large in comparison with the armature mmf c)
 - none of the above d)
- For avoiding cogging in induction motor the difference between the 8) number of stator and rotor slots should not be _____.
 - a) Ρ
 - 5 P c)

- b) 3P
- d) any of the above



Marks: 14

Set

Set P

- The average value of specific electric loading of induction motors is in the range _____.
 - a) 5 to 50 ampere conductors/meter
 - b) 50 to 450 ampere conductors/meter
 - c) 500 to 4500 ampere conductors/meter
 - d) 5000 to 45000 ampere conductors/meter
- 10) In case of induction motors the ratio of length to pole pitch for minimum cost, is taken as _____.

a)	1.0	b)	1.5 to 2
c)	2 to 3	d)	3 to 5

- 11) The power factor of the induction motor will be _____ if the magnetizing current is _____.
 - a) low....low b) high.....high
 - c) high....low d) low....high
- 12) If an induction motor is designed with lesser air gap, then the motor will have _____.
 - a) better cooling

c)

- b) better overload capacity
- d) lower power factor
- 13) In case a synchronous motor starts but fails to develop torque, the probable cause could be _____.
 - a) open or short circuit

better power factor

- b) reverse field windingd) any of the above
- c) low excitation
- 14) Larger air gap length in synchronous machine will characterize as having.
 - a) higher stability limit
 - b) higher synchronizing power
 - c) inherently good voltage regulation
 - d) all of the above

Seat	
No.	

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to the right indicates full marks.
- 3) Missing data suitably assumed.
- 4) Non-programmable calculator is allowed.

Section – I

Q.2 Solve any four of the following questions.

- a) Derive an expression for armature diameter for dc machine.
- b) Derive an expression for volt per turn for transformer.
- c) What is design and explain the design factors of electrical machine.
- d) The diameter and length of the armature of a 1000 KW, 500V, 300rpm dc generator is 1.40m and 0.35m respectively. Calculate the mean emf per conductor, total flux and the number of conductors connected in series. Armature drop is 6.6 V at full load and flux density in the air gap is 1 web/m². Assume form factor Kf = 0.7.
- e) Explain the choice of specific loadings in case of DC machine.

Q.3 Attempt the following questions.

- a) With neat sketch derive an expression for design of square and two stepped core in transformer.
- b) A 250 KW, 460 v, 600rpm, 6-pole dc generator is built with an armature diameter of 72 cm and core length 27cm. The lap armature winding has 660 conductors. Using data obtained from this machine, determine preliminary dimensions for the armature core, number of armature conductors and commutator segments for a 350 Kw, 500V, 725 rpm, 60 pole dc generator. Assume a square pole face with the pole arc = 0.7 pole pitch.

OR

b) Determine the main dimensions of the core, the number of turns and the cross-section of the conductors for a 5 KVA, 11000/400 v, 50 Hz, single phase core type distribution transformer. The net conductor area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for a core, a flux density of 1 wb/m², a current density of 1.4 A/mm² and a window space factor 0.2. The height of window is 3 times width of window.

Max. Marks: 56

12

Section – II

Q.4 Solve any four of the following questions.

- Explain the choice of specific magnetic loading inn case of induction motor design.
- b) Explain the effect of dispersion co-efficient on overload capacity.
- c) Explain the different factors while calculating air gap length for synchronous machine.
- d) Find the main dimensions of a 100 MVA, 11KV, 50Hz, 40 pole salient pole generator assuming air gap flux density as 0.65 wb/m² and ampere conductors as 40000 per metre. The peripheral speed should not exceed 60 m/sec.
- e) A 15 HP 400V, 50 Hz, 1430 rpm, 3 phase three phase induction motor with an efficiency of 80% and pf 81% has inner diameter of stator 30 cm and length 12 cm. Estimate the diameter and length for a 50 HP, 406 V, 4 pole, 50 Hz induction motor to be designed for 84% efficiency and 85% pf assuming same specific loadings as the previous motor.

Q.5 Solve any two of the following questions.

- a) Derive expression for design of rotor bars and slots with end rings.
- b) Determine the dimensions of a 75000 KVA, 13.8 KV, 50 Hz, 62.5 rpm, 3 phase, star-connected alternator. Also, find the number of stator slots, conductors per slot, conductor area. The peripheral velocity should be about 40 m/sec. Assume, average gap density = 0.65 wb/m², ampere conductors per metre = 40000 and current density = 4 Amp/mm².
- c) Estimate the stator core dimensions, number of stator turns per phase and number of stator conductors for a 100 KW, 3300 V, 50 Hz, 12 pole star connected slip ring induction motor.
 Assume: air gap density = 0.4 wb/m², conductors per meter = 25000 A/m Efficiency = 0.9; power factor = 0.9 and winding factor = 0.96 Choose main dimensions to give best power factor.

16

12

SLR-FM-430 Set P

Set

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Missing data suitably assumed.

- 2) Non-programmable calculator is allowed.
- 3) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- For avoiding cogging in induction motor the difference between the 1) number of stator and rotor slots should not be .
 - Ρ a) b) 3P 5 P C) d) any of the above
- 2) The average value of specific electric loading of induction motors is in the range
 - 5 to 50 ampere conductors/meter a)
 - 50 to 450 ampere conductors/meter b)
 - c) 500 to 4500 ampere conductors/meter
 - 5000 to 45000 ampere conductors/meter d)
- 3) In case of induction motors the ratio of length to pole pitch for minimum cost, is taken as _____.
 - 1.0 a) b) 1.5 to 2 d) 3 to 5 c) 2 to 3
- The power factor of the induction motor will be _____ if the magnetizing 4) current is _____.
 - a) low....low b) high....high C)
 - high....low d) low....high
- If an induction motor is designed with lesser air gap, then the motor will 5) have ___
 - better cooling a)
 - better power factor d) lower power factor c)
- In case a synchronous motor starts but fails to develop torque, the 6) probable cause could be __
 - a) open or short circuit
- b) reverse field winding

b) better overload capacity

- d) any of the above
- Larger air gap length in synchronous machine will characterize as having. 7)
 - higher stability limit a)

low excitation

C)

- higher synchronizing power b)
- inherently good voltage regulation C)
- all of the above d)

SLR-FM-430

Marks: 14

Max. Marks: 70

				_		
					Set	Q
8)	orien	cold rolled grain oriented steel h tation.		-		
	,	Minimum Nil	b) d)	Maximum None of the above		
9)	surro a) (heated parts of an electrical man oundings by which of the followir Conduction Radiation	ng m b)	•		
10)	appro a)	rical machines having power ou oximately 250 kW may be class Small size machines Large size machines	ified b)	as Medium size machines)	
11)	a) (effect of harmonics in rotating m use of longer air gap use of distributed winding	b)	skewing the poles	<u> </u> .	
12)	reduc a) v	machines by increasing the nu- ce except weight of copper frequency of flux reversals	b)	weight of iron parts		
13)	The s	stacking factor will be least for _				

- The stacking factor will be least for ____

 - c) Three stepped core

a) Square core

b) Cruciform core d) Four stepped core

SLR-FM-430

- 14) In D.C. machines, ir order to prevent excessive distortion of field form by the armature reaction the field mmf must be made _____.
 - equal to that of armature mmf a)
 - less in comparison with the armature mmf b)
 - large in comparison with the armature mmf C)
 - none of the above d)

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Time: 10:00 AM 16 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to the right indicates full marks.
- 3) Missing data suitably assumed.
- 4) Non-programmable calculator is allowed.

Section – I

Q.2 Solve any four of the following questions.

- a) Derive an expression for armature diameter for dc machine.
- b) Derive an expression for volt per turn for transformer.
- c) What is design and explain the design factors of electrical machine.
- d) The diameter and length of the armature of a 1000 KW, 500V, 300rpm dc generator is 1.40m and 0.35m respectively. Calculate the mean emf per conductor, total flux and the number of conductors connected in series. Armature drop is 6.6 V at full load and flux density in the air gap is 1 web/m². Assume form factor Kf = 0.7.
- e) Explain the choice of specific loadings in case of DC machine.

Q.3 Attempt the following questions.

- a) With neat sketch derive an expression for design of square and two stepped core in transformer.
- b) A 250 KW, 460 v, 600rpm, 6-pole dc generator is built with an armature diameter of 72 cm and core length 27cm. The lap armature winding has 660 conductors. Using data obtained from this machine, determine preliminary dimensions for the armature core, number of armature conductors and commutator segments for a 350 Kw, 500V, 725 rpm, 60 pole dc generator. Assume a square pole face with the pole arc = 0.7 pole pitch.

OR

b) Determine the main dimensions of the core, the number of turns and the cross-section of the conductors for a 5 KVA, 11000/400 v, 50 Hz, single phase core type distribution transformer. The net conductor area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for a core, a flux density of 1 wb/m², a current density of 1.4 A/mm² and a window space factor 0.2. The height of window is 3 times width of window.

Max. Marks: 56

12

Section – II

Q.4 Solve any four of the following questions.

- Explain the choice of specific magnetic loading inn case of induction motor design.
- b) Explain the effect of dispersion co-efficient on overload capacity.
- c) Explain the different factors while calculating air gap length for synchronous machine.
- d) Find the main dimensions of a 100 MVA, 11KV, 50Hz, 40 pole salient pole generator assuming air gap flux density as 0.65 wb/m² and ampere conductors as 40000 per metre. The peripheral speed should not exceed 60 m/sec.
- e) A 15 HP 400V, 50 Hz, 1430 rpm, 3 phase three phase induction motor with an efficiency of 80% and pf 81% has inner diameter of stator 30 cm and length 12 cm. Estimate the diameter and length for a 50 HP, 406 V, 4 pole, 50 Hz induction motor to be designed for 84% efficiency and 85% pf assuming same specific loadings as the previous motor.

Q.5 Solve any two of the following questions.

- a) Derive expression for design of rotor bars and slots with end rings.
- b) Determine the dimensions of a 75000 KVA, 13.8 KV, 50 Hz, 62.5 rpm, 3 phase, star-connected alternator. Also, find the number of stator slots, conductors per slot, conductor area. The peripheral velocity should be about 40 m/sec. Assume, average gap density = 0.65 wb/m², ampere conductors per metre = 40000 and current density = 4 Amp/mm².
- c) Estimate the stator core dimensions, number of stator turns per phase and number of stator conductors for a 100 KW, 3300 V, 50 Hz, 12 pole star connected slip ring induction motor.
 Assume: air gap density = 0.4 wb/m², conductors per meter = 25000 A/m Efficiency = 0.9; power factor = 0.9 and winding factor = 0.96 Choose main dimensions to give best power factor.

16

12

SLR-FM-430 Set Q

Seat	
No.	

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Missing data suitably assumed.

- 2) Non-programmable calculator is allowed.
- 3) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

C)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In dc machines by increasing the number of poles, all of the following 1) reduce except .
 - weight of copper a)
- b) weight of iron parts
- d) overall size of the machine frequency of flux reversals
- 2) The stacking factor will be least for _____
 - a) Square core Three stepped core
- b) Cruciform core
- d) Four stepped core
- In D.C. machines, ir order to prevent excessive distortion of field form by 3) the armature reaction the field mmf must be made _____.
 - equal to that of armature mmf a)
 - b) less in comparison with the armature mmf
 - large in comparison with the armature mmf c)
 - none of the above d)
- For avoiding cogging in induction motor the difference between the 4) number of stator and rotor slots should not be _____.
 - a) P b) 3P
 - 5 P c) d) any of the above
- The average value of specific electric loading of induction motors is in the 5) range
 - a) 5 to 50 ampere conductors/meter
 - 50 to 450 ampere conductors/meter b)
 - 500 to 4500 ampere conductors/meter c)
 - 5000 to 45000 ampere conductors/meter d)
- In case of induction motors the ratio of length to pole pitch for minimum 6) cost, is taken as
 - a) 1.0 b) 1.5 to 2 c) 2 to 3 d) 3 to 5
- The power factor of the induction motor will be _____ if the magnetizing 7) current is _____.
 - a) low....low b) high.....high
 - high....low d) low....high c)



Max. Marks: 70

Marks: 14

- If an induction motor is designed with lesser air gap, then the motor will 8) have .
 - a) better cooling better power factor

C)

c)

c)

c)

C)

- b) better overload capacity
- d) lower power factor
- 9) In case a synchronous motor starts but fails to develop torque, the probable cause could be _____.
 - open or short circuit a)
- b) reverse field winding d) any of the above
- Larger air gap length in synchronous machine will characterize as having. 10)
 - a) higher stability limit

low excitation

- higher synchronizing power b)
- inherently good voltage regulation c)
- all of the above d)
- The cold rolled grain oriented steel has _____ in the direction of grain 11) orientation.
 - a) Minimum Nil

- b) Maximum
- d) None of the above
- 12) The heated parts of an electrical machine dissipate heat into their surroundings by which of the following modes of heat dissipation?
 - a) Conduction
 - Radiation d) All of the above
- 13) Electrical machines having power outputs ranging from a few kW upto approximately 250 kW may be classified as _____.
 - Small size machines a)
- b) Medium size machines
- Large size machines c)
- d) Any of the above
- 14) The effect of harmonics in rotating machines can be minimized by _____.
 - use of longer air gap a)
- b) skewing the poles d) all of the above
- use of distributed winding
- b) Convection

SLR-FM-430 Set

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to the right indicates full marks.
- 3) Missing data suitably assumed.
- 4) Non-programmable calculator is allowed.

Section – I

Q.2 Solve any four of the following questions.

- a) Derive an expression for armature diameter for dc machine.
- b) Derive an expression for volt per turn for transformer.
- c) What is design and explain the design factors of electrical machine.
- d) The diameter and length of the armature of a 1000 KW, 500V, 300rpm dc generator is 1.40m and 0.35m respectively. Calculate the mean emf per conductor, total flux and the number of conductors connected in series. Armature drop is 6.6 V at full load and flux density in the air gap is 1 web/m². Assume form factor Kf = 0.7.
- e) Explain the choice of specific loadings in case of DC machine.

Q.3 Attempt the following questions.

- a) With neat sketch derive an expression for design of square and two stepped core in transformer.
- A 250 KW, 460 v, 600rpm, 6-pole dc generator is built with an armature diameter of 72 cm and core length 27cm. The lap armature winding has 660 conductors. Using data obtained from this machine, determine preliminary dimensions for the armature core, number of armature conductors and commutator segments for a 350 Kw, 500V, 725 rpm, 60 pole dc generator. Assume a square pole face with the pole arc = 0.7 pole pitch.

OR

b) Determine the main dimensions of the core, the number of turns and the cross-section of the conductors for a 5 KVA, 11000/400 v, 50 Hz, single phase core type distribution transformer. The net conductor area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for a core, a flux density of 1 wb/m², a current density of 1.4 A/mm² and a window space factor 0.2. The height of window is 3 times width of window.

Max. Marks: 56

12

Section – II

Q.4 Solve any four of the following questions.

- Explain the choice of specific magnetic loading inn case of induction motor design.
- b) Explain the effect of dispersion co-efficient on overload capacity.
- c) Explain the different factors while calculating air gap length for synchronous machine.
- d) Find the main dimensions of a 100 MVA, 11KV, 50Hz, 40 pole salient pole generator assuming air gap flux density as 0.65 wb/m² and ampere conductors as 40000 per metre. The peripheral speed should not exceed 60 m/sec.
- e) A 15 HP 400V, 50 Hz, 1430 rpm, 3 phase three phase induction motor with an efficiency of 80% and pf 81% has inner diameter of stator 30 cm and length 12 cm. Estimate the diameter and length for a 50 HP, 406 V, 4 pole, 50 Hz induction motor to be designed for 84% efficiency and 85% pf assuming same specific loadings as the previous motor.

Q.5 Solve any two of the following questions.

- a) Derive expression for design of rotor bars and slots with end rings.
- b) Determine the dimensions of a 75000 KVA, 13.8 KV, 50 Hz, 62.5 rpm, 3 phase, star-connected alternator. Also, find the number of stator slots, conductors per slot, conductor area. The peripheral velocity should be about 40 m/sec. Assume, average gap density = 0.65 wb/m², ampere conductors per metre = 40000 and current density = 4 Amp/mm².
- c) Estimate the stator core dimensions, number of stator turns per phase and number of stator conductors for a 100 KW, 3300 V, 50 Hz, 12 pole star connected slip ring induction motor. Assume: air gap density = 0.4 wb/m², conductors per meter = 25000 A/m Efficiency = 0.9; power factor = 0.9 and winding factor = 0.96 Choose main dimensions to give best power factor.

12

Set R

16

SLR-FM-430

Seat	
No.	

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Missing data suitably assumed.

- 2) Non-programmable calculator is allowed.
- 3) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

 In case of induction motors the ratio of length to pole pitch for minimum cost, is taken as _____.

a)	•	 b)	1.5 to 2
c)	2 to 3	d)	3 to 5

- The power factor of the induction motor will be _____ if the magnetizing current is _____.
 - a) low....low b) high.....high
 - c) high....low d) low....high
- If an induction motor is designed with lesser air gap, then the motor will have _____.
 - a) better coolingc) better power factor
 - b) better overload capacityd) lower power factor
- In case a synchronous motor starts but fails to develop torque, the probable cause could be _____.
 - a) open or short circuit
- b) reverse field windingd) any of the above
- c) low excitation
- 5) Larger air gap length in synchronous machine will characterize as having.
 - a) higher stability limit
 - b) higher synchronizing power
 - c) inherently good voltage regulation
 - d) all of the above
- 6) The cold rolled grain oriented steel has _____ in the direction of grain orientation.
 - a) Minimum b) Maximum
 - c) Nil d) None of the above
- 7) The heated parts of an electrical machine dissipate heat into their surroundings by which of the following modes of heat dissipation?
 - a) Conductionb) Convectionc) Radiationd) All of the above



Max. Marks: 70

Marks: 14

				SLR-FM-43	60
				Set	S
8)	app a)	ctrical machines having power or proximately 250 kW may be class Small size machines Large size machines	ified b)	as Medium size machines	
9)		e effect of harmonics in rotating n use of longer air gap use of distributed winding		ines can be minimized by skewing the poles all of the above	
10)	red a)	lc machines by increasing the nu uce except weight of copper frequency of flux reversals	b)	weight of iron parts	
11)		e stacking factor will be least for _ Square core Three stepped core	b)	 Cruciform core Four stepped core	
12)		D.C. machines, ir order to preven armature reaction the field mmf equal to that of armature mmf less in comparison with the arm large in comparison with the arm none of the above	mus [.] natur	t be made	
13)		avoiding cogging in induction me nber of stator and rotor slots sho			

- c) 5 P d) any of the above
- 14) The average value of specific electric loading of induction motors is in the range _____.
 - a) 5 to 50 ampere conductors/meter
 - b) 50 to 450 ampere conductors/meter
 - c) 500 to 4500 ampere conductors/meter
 - d) 5000 to 45000 ampere conductors/meter

16

SLR-FM-430

Seat	
No.	

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to the right indicates full marks.
- 3) Missing data suitably assumed.
- 4) Non-programmable calculator is allowed.

Section – I

Q.2 Solve any four of the following questions.

- a) Derive an expression for armature diameter for dc machine.
- b) Derive an expression for volt per turn for transformer.
- c) What is design and explain the design factors of electrical machine.
- d) The diameter and length of the armature of a 1000 KW, 500V, 300rpm dc generator is 1.40m and 0.35m respectively. Calculate the mean emf per conductor, total flux and the number of conductors connected in series. Armature drop is 6.6 V at full load and flux density in the air gap is 1 web/m². Assume form factor Kf = 0.7.
- e) Explain the choice of specific loadings in case of DC machine.

Q.3 Attempt the following questions.

- a) With neat sketch derive an expression for design of square and two stepped core in transformer.
- b) A 250 KW, 460 v, 600rpm, 6-pole dc generator is built with an armature diameter of 72 cm and core length 27cm. The lap armature winding has 660 conductors. Using data obtained from this machine, determine preliminary dimensions for the armature core, number of armature conductors and commutator segments for a 350 Kw, 500V, 725 rpm, 60 pole dc generator. Assume a square pole face with the pole arc = 0.7 pole pitch.

OR

b) Determine the main dimensions of the core, the number of turns and the cross-section of the conductors for a 5 KVA, 11000/400 v, 50 Hz, single phase core type distribution transformer. The net conductor area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for a core, a flux density of 1 wb/m², a current density of 1.4 A/mm² and a window space factor 0.2. The height of window is 3 times width of window.

Section – II

Q.4 Solve any four of the following questions.

- a) Explain the choice of specific magnetic loading inn case of induction motor design.
- b) Explain the effect of dispersion co-efficient on overload capacity.
- c) Explain the different factors while calculating air gap length for synchronous machine.

Max. Marks: 56

12







12

- d) Find the main dimensions of a 100 MVA, 11KV, 50Hz, 40 pole salient pole generator assuming air gap flux density as 0.65 wb/m² and ampere conductors as 40000 per metre. The peripheral speed should not exceed 60 m/sec.
- e) A 15 HP 400V, 50 Hz, 1430 rpm, 3 phase three phase induction motor with an efficiency of 80% and pf 81% has inner diameter of stator 30 cm and length 12 cm. Estimate the diameter and length for a 50 HP, 406 V, 4 pole, 50 Hz induction motor to be designed for 84% efficiency and 85% pf assuming same specific loadings as the previous motor.

Q.5 Solve any two of the following questions.

- a) Derive expression for design of rotor bars and slots with end rings.
- b) Determine the dimensions of a 75000 KVA, 13.8 KV, 50 Hz, 62.5 rpm, 3 phase, star-connected alternator. Also, find the number of stator slots, conductors per slot, conductor area. The peripheral velocity should be about 40 m/sec. Assume, average gap density = 0.65 wb/m², ampere conductors per metre = 40000 and current density = 4 Amp/mm².
- c) Estimate the stator core dimensions, number of stator turns per phase and number of stator conductors for a 100 KW, 3300 V, 50 Hz, 12 pole star connected slip ring induction motor.
 Assume: air gap density = 0.4 wb/m², conductors per meter = 25000 A/m Efficiency = 0.9; power factor = 0.9 and winding factor = 0.96 Choose main dimensions to give best power factor.

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Choose the correct alternatives from the options and rewrite the sentence. 14 Q.1

- Usually a lag network for compensation consist of 1)
 - a) R element
 - **R&C** elements c)
- 2) Which of the following relation is correct?
 - $\alpha\beta = 0.1$ b) $\alpha\beta = 1$ a)
 - $\alpha/\beta = 1$ d) None of these C)
- 3) Lag-Lead compensator improves _____ response.
 - a) Steady state b) Transient c) Both a & b d) Dynamic
- Which of the following equation is correct in case of lead compensator? 4)
 - a) $\phi_m = \gamma_d + \gamma + \varepsilon$ b) $\phi_m = \gamma_d - \gamma + \varepsilon$
 - d) $\phi_m = \gamma_d \gamma \varepsilon$ C) $\phi_m = \gamma_d + \gamma - \varepsilon$
- 5) The transfer function approach is generally applied to the control systems which is
 - a) Time invariant b) time variant
 - c) both a and b d) none of these
- 6) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu y = Cx + Du$
 - $B(SI B)^{-1} + D$ b) C(SI - A)⁻¹+D a)
 - $D(SI A)^{-1} + +C$ d) A(SI - B)⁻¹++D c)

7) The state transition matrix for the system with initial state X(0) is _____.

- a) (sl A)⁻¹ b) (sl - A) Laplace inverse of (sl - A) ⁻¹ d) Laplace inverse of (sl - A) C)
- 8) The necessary and sufficient condition for full order state observer is that system must be _____.
 - Completely observable a)
 - Not observable C)
- b) Completely controllable d) Not controllable
- 9) The process of designing a closed loop control system is by _____
 - b) Lag Compensation

Pole placement a) Regulator c)

d) None of these

Marks: 14

SLR-FM-431

Max. Marks: 70



No.



b)

Seat

Duration: 30 Minutes

		SLR-FM-431
		Set P
10)	Which of the following is not a type of a a) Backlash c) Limit cycle	common nonlinearity? b) Saturation d) Dead Zone
11)	In nonlinear system when Eigen values equilibrium point is a) Saddle point	es are distinct and negative the b) Nodal Point
	c) Focus Point	d) None of these
12)	Non-linearities can be a) Incidental c) Linearized	b) Intentional d) Both a & b
13)	Which of the following is transfer funct	
	a) $\frac{1-e}{s}$	b) $\frac{e-1}{s}$
	c) $e^{-Ts} - 1$	d) $\frac{1-e^{-Ts}}{s}$
14)	Inherent characteristic of a digital cont	5
• •,	a) Analog	b) intermittent

c) either a or b d) sampled

Seat No.

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Attempt any four of the following question.

- a) Derive realization of lag compensator using Electrical Network.
- **b)** Explain design procedure for designing of lead compensator using frequency response method.
- c) Find the state transition matrix for the following system. $r_1 = 0$

$$\dot{x} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} z$$

- d) Explain effect of addition of poles and effect of addition of zeros on root locus.
- e) A linear time invariant system is characterized by the state variable model comment on controllability and observability of the system

$$\begin{bmatrix} \dot{X}1\\ \dot{X}2 \end{bmatrix} = \begin{bmatrix} -1 & 0\\ 0 & -2 \end{bmatrix} \begin{bmatrix} X1\\ X2 \end{bmatrix} + \begin{bmatrix} 0\\ 1 \end{bmatrix} u, y = \begin{bmatrix} 1 & 2 \end{bmatrix} \begin{bmatrix} X1\\ X2 \end{bmatrix}$$

f) Obtain state model for series RLC circuit considering output across Capacitor C

Q.3 Attempt any two of the following question.

- a) Unity feedback system has an open loop T. F. G(s)=K/s(s+1)(s+5). Design a suitable lead compensator to satisfy following specifications
 - 1) Kv≥50
 2) P.M.> 20°
- **b)** Design a lag-lead compensator for system with open loop transfer function $G(s) = \frac{K}{s(s+0.5)}$ to satisfy following specifications.
 - 1) Damping Ratio $\xi = 0.5$
 - 2) Wn=5 rad/sec
 - 3) Kv=80 sec⁻¹

c) A control system is described by the differential equation $\frac{d^3y(t)}{dt^3} = u(t)$. Where y(t) is the observed output and u(t) is the input. Describe the system in the state variable form and check the controllability and observability of the system.

Section – II

Q.4 Attempt any four of the following question.

- a) Explain any one method of determination of observer gain matrix Ke.
- **b)** Determine the kind of singularity for the following differential equation
- y + 3y + 2y = 0. Let the state variables be x1 = y, x2 = y
- **c)** Explain Isocline method in details.
- d) Derive the transfer function of zero order hold.
- e) Explain full order state observer in detail.
- f) Explain Mapping between S-plane to Z-plane



12

16

Q.5 Attempt any two of the following question.

a) A system Defined by $\dot{X} = AX + BU$, Where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix}, B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

The system uses the state feedback control u=-kx. The desired closed loop poles are at s=-2+j4, s=-2-j4 and s=-10. Determine state feedback gain matrix K by using direct substitution method.

- **b)** Explain stability of nonlinear control system and limit cycle phenomenon in details.
- c) Examine stability of following characteristic equation using jury test $P(z)=Z^4 1.2Z^3 + 0.07Z^2 + 0.3z .08 = 0$



T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Duration: 30 Minutes

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Choose the correct alternatives from the options and rewrite the sentence. Q.1

- The necessary and sufficient condition for full order state observer is that 1) system must be ____
 - Completely observable a)
 - Not observable C)
- 2) The process of designing a closed loop control system is by _____
 - Pole placement a)
 - C) Regulator d) None of these

3) Which of the following is not a type of common nonlinearity?

- a) Backlash b) Saturation
- Limit cycle d) Dead Zone C)
- 4) In nonlinear system when Eigen values are distinct and negative the equilibrium point is .
 - a) Saddle point
 - Focus Point c)
- Non-linearities can be _____. 5)
 - Incidental a) b) Intentional
 - Linearized d) Both a & b C)
- 6) Which of the following is transfer function of zero order hold _____.
 - 1 e b) *e*−1 a) S S $e^{-Ts} - 1$ C)
- 7) Inherent characteristic of a digital controller is that it accepts _____ data.
 - Analog b) intermittent a)
 - either a or b sampled C) d)
- 8) Usually a lag network for compensation consist of
 - R element b) R&L elements a) C)
 - R&C elements d) R, 1 & C elements
- 9) Which of the following relation is correct?
 - $\alpha\beta = 0.1$ a)
 - $\alpha/\beta = 1$ c) d) None of these

b) Nodal Point

d) None of these

b) Completely controllable

d) Not controllable

b) Lag Compensation

d) $\frac{1-e^{-Ts}}{s}$

b) $\alpha\beta = 1$

Max. Marks: 70

Set

SLR-FM-431



Marks: 14

10) Lag-Lead compensator improves _____ response.

- a) Steady state b) Transient
- Both a & b d) Dynamic C)
- 11) Which of the following equation is correct in case of lead compensator?
 - b) $\phi_m = \gamma_d \gamma + \varepsilon$ $\phi_m = \gamma_d + \gamma + \varepsilon$ a) C)
 - d) $\phi_m = \gamma_d \gamma \varepsilon$ $\phi_m = \gamma_d + \gamma - \varepsilon$
- The transfer function approach is generally applied to the control systems 12) which is _____
 - Time invariant a)

- b) time variant
- both a and b d) none of these C)
- 13) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu y = Cx + Du$
 - b) C(SI A)⁻¹+D a) B(SI - B)⁻¹+D
 - $D(SI A)^{-1} + +C$ d) A(SI - B)⁻¹++D c)
- The state transition matrix for the system with initial state X(0) is _____. 14)
 - (sI A) ⁻¹ a)

C)

- b) (sl A)
- Laplace inverse of (sl A) ⁻¹
- d) Laplace inverse of (sl A)

SLR-FM-431

Set C

Seat No.

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Attempt any four of the following question.

- a) Derive realization of lag compensator using Electrical Network.
- **b)** Explain design procedure for designing of lead compensator using frequency response method.
- c) Find the state transition matrix for the following system. $r_1 = 0$

$$\dot{x} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} z$$

- d) Explain effect of addition of poles and effect of addition of zeros on root locus.
- e) A linear time invariant system is characterized by the state variable model comment on controllability and observability of the system

$$\begin{bmatrix} \dot{X}1\\ \dot{X}2 \end{bmatrix} = \begin{bmatrix} -1 & 0\\ 0 & -2 \end{bmatrix} \begin{bmatrix} X1\\ X2 \end{bmatrix} + \begin{bmatrix} 0\\ 1 \end{bmatrix} u, y = \begin{bmatrix} 1 & 2 \end{bmatrix} \begin{bmatrix} X1\\ X2 \end{bmatrix}$$

f) Obtain state model for series RLC circuit considering output across Capacitor C

Q.3 Attempt any two of the following question.

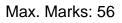
- a) Unity feedback system has an open loop T. F. G(s)=K/s(s+1)(s+5). Design a suitable lead compensator to satisfy following specifications
 - 1) Kv≥50
 2) P.M.> 20°
- **b)** Design a lag-lead compensator for system with open loop transfer function $G(s) = \frac{K}{s(s+0.5)}$ to satisfy following specifications.
 - 1) Damping Ratio $\xi = 0.5$
 - 2) Wn=5 rad/sec
 - 3) Kv=80 sec⁻¹

c) A control system is described by the differential equation $\frac{d^3y(t)}{dt^3} = u(t)$. Where y(t) is the observed output and u(t) is the input. Describe the system in the state variable form and check the controllability and observability of the system.

Section – II

Q.4 Attempt any four of the following question.

- a) Explain any one method of determination of observer gain matrix Ke.
- **b)** Determine the kind of singularity for the following differential equation
- y + 3y + 2y = 0. Let the state variables be x1 = y, x2 = y
- **c)** Explain Isocline method in details.
- d) Derive the transfer function of zero order hold.
- e) Explain full order state observer in detail.
- f) Explain Mapping between S-plane to Z-plane



12

16

Page **8** of **16**

Q.5 Attempt any two of the following question.

a) A system Defined by $\dot{X} = AX + BU$, Where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix}, B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

The system uses the state feedback control u=-kx. The desired closed loop poles are at s=-2+j4, s=-2-j4 and s=-10. Determine state feedback gain matrix K by using direct substitution method.

- **b)** Explain stability of nonlinear control system and limit cycle phenomenon in details.
- c) Examine stability of following characteristic equation using jury test $P(z)=Z^4 1.2Z^3 + 0.07Z^2 + 0.3z .08 = 0$

SLR-FM-431

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – II**

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

C)

Seat

No.

Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

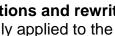
- The transfer function approach is generally applied to the control systems 1) which is
 - Time invariant a)
 - both a and b C)
- 2) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu y = Cx + Du$
 - B(SI B)⁻¹+D a) $D(SI - A)^{-1} + +C$
- b) $C(SI A)^{-1} + D$ d) A(SI - B)⁻¹++D
- The state transition matrix for the system with initial state X(0) is _____. 3) b) (sl - A)
 - (sI A) ⁻¹ a)
 - Laplace inverse of (sl A) ⁻¹ C)
- The necessary and sufficient condition for full order state observer is that 4) system must be _
 - Completely observable a)
 - Not observable c)
- b) Completely controllable d) Not controllable

d) Laplace inverse of (sl - A)

- The process of designing a closed loop control system is by 5)
 - Pole placement a)
 - b) Lag Compensation Regulator d) None of these
- 6) Which of the following is not a type of common nonlinearity?
 - Backlash b) Saturation a) Limit cycle
 - c) d) Dead Zone
- 7) In nonlinear system when Eigen values are distinct and negative the equilibrium point is _____. b) Nodal Point
 - a) Saddle point
 - Focus Point C)
- 8) Non-linearities can be _____.
 - a) Incidental
 - Linearized C)

- d) None of these
- b) Intentional
- d) Both a & b

- b) time variant
- d) none of these



SLR-FM-431



Max. Marks: 70

Marks: 14

		SLR-FM-431
		Set R
9)	Which of the following is transfer function of zero a) $\frac{1-e}{s}$ b) $\frac{e}{s}$ c) $\frac{e^{-Ts}-1}{s}$ d) $\frac{1}{s}$	$\frac{-1}{s}$
10)	, 3	that it accepts data. termittent ampled
11)	, , , ,	st of &L elements , 1 & C elements
12)	Which of the following relation is correct?a) $\alpha\beta = 0.1$ b) $\alpha\beta$ c) $\alpha/\beta = 1$ d) No	$\beta = 1$ one of these
13)		onse. ransient ynamic
14)		ase of lead compensator? $m_m = \gamma_d - \gamma + \varepsilon$ $m_m = \gamma_d - \gamma - \varepsilon$

Seat No.

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Attempt any four of the following question.

- a) Derive realization of lag compensator using Electrical Network.
- **b)** Explain design procedure for designing of lead compensator using frequency response method.
- c) Find the state transition matrix for the following system. $\begin{bmatrix} 1 & 0 \end{bmatrix}$

$$\dot{x} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} z$$

- d) Explain effect of addition of poles and effect of addition of zeros on root locus.
- e) A linear time invariant system is characterized by the state variable model comment on controllability and observability of the system

$$\begin{bmatrix} \dot{X}1\\ \dot{X}2 \end{bmatrix} = \begin{bmatrix} -1 & 0\\ 0 & -2 \end{bmatrix} \begin{bmatrix} X1\\ X2 \end{bmatrix} + \begin{bmatrix} 0\\ 1 \end{bmatrix} u, y = \begin{bmatrix} 1 & 2 \end{bmatrix} \begin{bmatrix} X1\\ X2 \end{bmatrix}$$

f) Obtain state model for series RLC circuit considering output across Capacitor C

Q.3 Attempt any two of the following question.

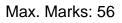
- a) Unity feedback system has an open loop T. F. G(s)=K/s(s+1)(s+5). Design a suitable lead compensator to satisfy following specifications
 - 1) Kv≥50
 2) P.M.> 20°
- **b)** Design a lag-lead compensator for system with open loop transfer function $G(s) = \frac{K}{s(s+0.5)}$ to satisfy following specifications.
 - 1) Damping Ratio $\xi = 0.5$
 - 2) Wn=5 rad/sec
 - 3) Kv=80 sec⁻¹

c) A control system is described by the differential equation $\frac{d^3y(t)}{dt^3} = u(t)$. Where y(t) is the observed output and u(t) is the input. Describe the system in the state variable form and check the controllability and observability of the system.

Section – II

Q.4 Attempt any four of the following question.

- a) Explain any one method of determination of observer gain matrix Ke.
- **b)** Determine the kind of singularity for the following differential equation
- y + 3y + 2y = 0. Let the state variables be $x1 = y, x2 = \dot{y}$
- c) Explain Isocline method in details.
- d) Derive the transfer function of zero order hold.
- e) Explain full order state observer in detail.
- f) Explain Mapping between S-plane to Z-plane



12

16

Page **12** of **16**

Q.5 Attempt any two of the following question.

a) A system Defined by $\dot{X} = AX + BU$, Where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix}, B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

The system uses the state feedback control u=-kx. The desired closed loop poles are at s=-2+j4, s=-2-j4 and s=-10. Determine state feedback gain matrix K by using direct substitution method.

- **b)** Explain stability of nonlinear control system and limit cycle phenomenon in details.
- c) Examine stability of following characteristic equation using jury test $P(z)=Z^4 1.2Z^3 + 0.07Z^2 + 0.3z .08 = 0$

12

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SLR-FM-431

Max. Marks: 70 Time: 10:00 AM To 01:00 PM book 2) Figures to the right indicate full marks. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 Choose the correct alternatives from the options and rewrite the sentence. Which of the following is not a type of common nonlinearity? 1) b) Saturation a) Backlash d) Dead Zone C) Limit cycle 2) In nonlinear system when Eigen values are distinct and negative the equilibrium point is _____. a) Saddle point b) Nodal Point Focus Point c) d) None of these 3) Non-linearities can be _____. Incidental a) b) Intentional Linearized d) Both a & b C) 4) Which of the following is transfer function of zero order hold _____. b) *e* − 1 1 – e a)

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Monday, 25-11-2019

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

CONTROL SYSTEM – II

S S

 $e^{-Ts} - 1$

C)

5) Inherent characteristic of a digital controller is that it accepts _____ data.

d) $1 - e^{-Ts}$

S

- Analog b) intermittent a)
- either a or b d) sampled c)

Usually a lag network for compensation consist of _____. 6)

- R element b) R&L elements a) R&C elements d) R, 1 & C elements c)
- 7) Which of the following relation is correct?
 - $\alpha\beta = 0.1$ b) $\alpha\beta = 1$ a)
 - $\alpha/\beta = 1$ d) None of these C)
- 8) Lag-Lead compensator improves _____ response.
 - a) Steady state b) Transient
 - Both a & b d) Dynamic c)

Which of the following equation is correct in case of lead compensator? 9)

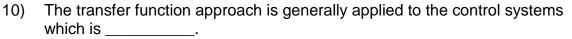
- b) $\phi_m = \gamma_d \gamma + \varepsilon$ a) $\phi_m = \gamma_d + \gamma + \varepsilon$
- c) $\phi_m = \gamma_d + \gamma - \varepsilon$ d) $\phi_m = \gamma_d - \gamma - \varepsilon$

Seat No.

Q.1

Set





a) Time invariant

C)

both a and b

- b) time variant
 d) none of these
- 11) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu y = Cx + Du$
 - a) B(SI B)⁻¹+D

- b) C(SI A)⁻¹+D
- c) $D(SI A)^{-1} + C$
- b) $C(SI A)^{-1}+D$ d) $A(SI - B)^{-1}++D$
- 12) The state transition matrix for the system with initial state X(0) is _____.
 - a) (sl A) ⁻¹
- b) (sl A)
- c) Laplace inverse of (sl A) ⁻¹
- d) Laplace inverse of (sI A)

SLR-FM-431

Set

- 13) The necessary and sufficient condition for full order state observer is that system must be _____.
 - a) Completely observable
- b) Completely controllable

c) Not observable

- d) Not controllable
- 14) The process of designing a closed loop control system is by _____
 - a) Pole placement

b) Lag Compensation

c) Regulator

d) None of these

Seat No.

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Attempt any four of the following question.

- a) Derive realization of lag compensator using Electrical Network.
- **b)** Explain design procedure for designing of lead compensator using frequency response method.
- c) Find the state transition matrix for the following system. r_1

$$\dot{x} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$$

- d) Explain effect of addition of poles and effect of addition of zeros on root locus.
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 $\begin{bmatrix} \dot{X}1\\ \dot{X}2 \end{bmatrix} = \begin{bmatrix} -1 & 0\\ 0 & -2 \end{bmatrix} \begin{bmatrix} X1\\ X2 \end{bmatrix} + \begin{bmatrix} 0\\ 1 \end{bmatrix} u, y = \begin{bmatrix} 1 & 2 \end{bmatrix} \begin{bmatrix} X1\\ X2 \end{bmatrix}$

f) Obtain state model for series RLC circuit considering output across Capacitor C

Q.3 Attempt any two of the following question.

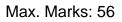
- a) Unity feedback system has an open loop T. F. G(s)=K/s(s+1)(s+5). Design a suitable lead compensator to satisfy following specifications
 - 1) Kv≥50 2) P.M.> 20°
- **b)** Design a lag-lead compensator for system with open loop transfer function $G(s) = \frac{K}{s(s+0.5)}$ to satisfy following specifications.
 - 1) Damping Ratio $\xi = 0.5$
 - 2) Wn=5 rad/sec
 - 3) Kv=80 sec⁻¹

c) A control system is described by the differential equation $\frac{d^3y(t)}{dt^3} = u(t)$. Where y(t) is the observed output and u(t) is the input. Describe the system in the state variable form and check the controllability and observability of the system.

Section – II

Q.4 Attempt any four of the following question.

- a) Explain any one method of determination of observer gain matrix Ke.
- **b)** Determine the kind of singularity for the following differential equation
- y + 3y + 2y = 0. Let the state variables be x1 = y, x2 = y
- **c)** Explain Isocline method in details.
- d) Derive the transfer function of zero order hold.
- e) Explain full order state observer in detail.
- f) Explain Mapping between S-plane to Z-plane



12

16

Q.5 Attempt any two of the following question.

a) A system Defined by $\dot{X} = AX + BU$, Where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix}, B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

The system uses the state feedback control u=-kx. The desired closed loop poles are at s=-2+j4, s=-2-j4 and s=-10. Determine state feedback gain matrix K by using direct substitution method.

- **b)** Explain stability of nonlinear control system and limit cycle phenomenon in details.
- c) Examine stability of following characteristic equation using jury test $P(z)=Z^4 1.2Z^3 + 0.07Z^2 + 0.3z .08 = 0$

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		e: Fri	day, 22-11-2 1 To 01:00 F	2019				. Marks	: 70
Instru	Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.2) Figures to the right indicate full marks.						wer		
		-	.) i iguioo to	-	ective Type				
Durati	on: 3	0 Mi	nutoe	MCQ/ODJ				Marks	. 11
				ontion				IVIAINE	
	1)	Wh	the correct at does Micr Clock Address bu	oprocessor)	ds upon Data bus width None of above		14
:	2)	out	instructions out port resp MOV, XCH IN, MOV	ectively are	Э.)	g an input port and writing an MOV, IN IN, OUT	1	
	3)		en 8051 mic Inputs Inputs and)	orts are configured as, Outputs Inputs or Outputs		
	4)		RL P1, #01h Complimer Complimer	nts P1	b) d)		Compliments P1.0 None		
Į	5)		ntify the inva MOV A,@F MOVC A,@	20			MOVX @DPTR,A MOV A,@R2		
	6)	LJN a) c)	1P is 2 4	byte instruc	ction. b) d)		3 1		
	7)		P1.0 Compleme Compleme	nts P1.0	b) d)		Complements P1 None		
8	8)	Wh a) c)	at changes a clear the R set the RS	/W bit)	ata to an LCD? high to low pulse on EN bit all of the mentioned		
9	9)	For a) c)	writing com set both of the		b))	t is reset none of the mentioned		
	10)	The a) c)	e memory wh PROM Both A and)	rogramed is called as EEPROM None		

Seat	
No.	



- 11) How many Timers are available in 8051 microcontroller?
 - a) Two 8-Bit

c)

- b) Two 16-Bit
- c) One 16-Bit
- d) One 8-Bit and One 16-Bit

SLR-FM-432

Set

- 12) If we push data on Stack in 8085 microprocessor then stack pointer _____.
 - a) Increases with every push b) I

Remains at same position

- b) Decreases with every pushd) None of above
- 13) Number of steps to rotate stepper motor for 360 degree at a step angle of 1.8 degree is _____.
 - a) 200 b) 1.8
 - c) 3 d) 1.1
- 14) Vector address for timer 0 interrupt is _____
 - a) 0003h b) 000Bh
 - c) 001Bh d) None

Page **3** of **16**

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Seat	
No.	

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Draw and explain flag register of 8085 microprocessor.
- **b)** Explain compare and jump (CJNE) instructions in 8051 microcontroller.
- c) Write an ALP to perform addition of R0 with the content at 20H Memory Location and store the result at memory location 30H.
- d) Explain features of 8085 microprocessor.
- e) Explain following pins of 8051 microcontroller
 - 1) EA
 - 2) PSEN
 - 3) ALE
 - 4) RESET

Q.3 Solve any two.

- a) Explain following instructions of 8085 microprocessor
 - 1) SHLD
 - 2) STA
 - 3) XCHG
- **b)** Describe various byte addressable instructions in 8051 microcontroller. Write an ALP to perform following logical operation $Y = R0R1 + R2 \overline{R3}$ using instructions of 8051 microcontroller.
- c) With neat diagram explain architecture of 8051 microcontroller.

Section – II

Q.4 Solve any four.

- a) Indicate which mode and timer is selected for the following.
 - 1) MOV TMOD,#03H
 - 2) MOV TMOD,#23H
 - 3) MOV TMOD,#00H
 - 4) MOV TMOD,#13H
- **b)** Draw the interfacing diagram of 8051 microcontroller with 4KB EEPROM also mention starting and ending addresses of interfaces memory.
- c) Draw and explain interfacing diagram of 8051 microcontroller with ADC 0809.
- d) Explain different types of semiconductor Memories.
- e) Draw and explain TCON register.

Max. Marks: 56

Set

12

16

SLR-FM-432 Set P

Q.5 Solve any two.

- a) Draw the interfacing of stepper motor with 8051 microcontroller. Write an ALP to rotate the stepper motor in clockwise direction, 90 degree apart with a step angle of 1.8 degree.
- **b)** Draw and explain TMOD SFR. Assuming XTAL=11.0592MHZ, write a program to generate square wave of 1KHZ frequency on pin P2.4 using timer 0 in mode 1.
- c) Explain TCON SFR. Interface LED to P2.6 pin of 8051 microcontroller. Write an ALP to turn ON and turn OFF LED after 2 sec delay.

Set

Max. Marks: 70

Seat	
No.	

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1

Marks: 14

14

- What changes are to be made to send data to an LCD? 1)
 - clear the R/W bit a) set the RS bit C)

Choose the correct option.

set

a)

b) high to low pulse on EN bit d) all of the mentioned

b) EEPROM

- 2) For writing commands on an LCD, RS bit is _____
 - b) Reset
 - d) none of the mentioned
- The memory which can be erased and programed is called as _____. 3)
 - a) PROM

c) both of the mentioned

c) Both A and B d) None

4) How many Timers are available in 8051 microcontroller?

- a) Two 8-Bit b) Two 16-Bit
- c) One 16-Bit d) One 8-Bit and One 16-Bit

If we push data on Stack in 8085 microprocessor then stack pointer 5) b) Decreases with every push

- a) Increases with every push
- Remains at same position C)
- d) None of above
- Number of steps to rotate stepper motor for 360 degree at a step angle 6) of1.8 degree is _____.
 - a) 200 b) 1.8
 - 3 d) 1.1 c)

7) Vector address for timer 0 interrupt is

- a) 0003h 000Bh b) 001Bh d) None
- C) What does Microprocessor speed depends upon _ 8)
 - a) Clock b) Data bus width
 - d) None of above c) Address bus width
- 9) The instructions that are used for reading an input port and writing an output port respectively are.
 - a) MOV, XCHG b) MOV, IN IN, MOV c)
 - d) IN, OUT
- 10) When 8051 microcontroller is reset all ports are configured as, _____.
 - a) Inputs Inputs and outputs c)
- b) Outputs
- d) Inputs or Outputs

- 11) XORL P1, #01h _____.
 - a) Compliments P1
 - c) Compliments P1.7
- 12) Identify the invalid Instruction.
 - a) MOV A,@R0
 - c) MOVC A,@A+DPTR
- 13) LJMP is _____ byte instruction.
 - a) 2
 - c) 4
- 14) CPL P1.0 _____.
 - a) Complements P1.0
 - c) Complements P1.7

b) Compliments P1.0

SLR-FM-432

Set Q

- d) None
- b) MOVX @DPTR,A
- d) MOV A,@R2
- b) 3
- d) 1
- b) Complements P1
- d) None

Set Q

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

Seat No.

- a) Draw and explain flag register of 8085 microprocessor.
- b) Explain compare and jump (CJNE) instructions in 8051 microcontroller.
- c) Write an ALP to perform addition of R0 with the content at 20H Memory Location and store the result at memory location 30H.
- d) Explain features of 8085 microprocessor.
- e) Explain following pins of 8051 microcontroller
 - 1) EA
 - 2) PSEN
 - 3) ALE
 - 4) RESET

Q.3 Solve any two.

- a) Explain following instructions of 8085 microprocessor
 - 1) SHLD
 - 2) STA
 - 3) XCHG
- **b)** Describe various byte addressable instructions in 8051 microcontroller. Write an ALP to perform following logical operation $Y = R0R1 + R2 \overline{R3}$ using instructions of 8051 microcontroller.
- c) With neat diagram explain architecture of 8051 microcontroller.

Section – II

Q.4 Solve any four.

- a) Indicate which mode and timer is selected for the following.
 - 1) MOV TMOD,#03H
 - 2) MOV TMOD,#23H
 - 3) MOV TMOD,#00H
 - 4) MOV TMOD,#13H
- **b)** Draw the interfacing diagram of 8051 microcontroller with 4KB EEPROM also mention starting and ending addresses of interfaces memory.
- c) Draw and explain interfacing diagram of 8051 microcontroller with ADC 0809.
- d) Explain different types of semiconductor Memories.
- e) Draw and explain TCON register.

Max. Marks: 56

16

12

SLR-FM-432 Set Q

Q.5 Solve any two.

- a) Draw the interfacing of stepper motor with 8051 microcontroller. Write an ALP to rotate the stepper motor in clockwise direction, 90 degree apart with a step angle of 1.8 degree.
- **b)** Draw and explain TMOD SFR. Assuming XTAL=11.0592MHZ, write a program to generate square wave of 1KHZ frequency on pin P2.4 using timer 0 in mode 1.
- c) Explain TCON SFR. Interface LED to P2.6 pin of 8051 microcontroller. Write an ALP to turn ON and turn OFF LED after 2 sec delay.

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

2)

Q.1 Choose the correct option.

- Identify the invalid Instruction. 1)
 - a) MOV A,@R0 MOVC A,@A+DPTR c)
 - LJMP is _____ byte instruction. b) 3 a) 2 d) 1
 - c) 4
- 3) CPL P1.0

a)

a)

- a) Complements P1.0
- c) Complements P1.7 d) None

4) What changes are to be made to send data to an LCD?

clear the R/W bit a) c) set the RS bit

c) both of the mentioned

- b) high to low pulse on EN bit
- d) all of the mentioned

Complements P1

b) MOVX @DPTR,A

d) MOV A,@R2

For writing commands on an LCD, RS bit is 5) a) set

b) Reset

b)

- d) none of the mentioned
- 6) The memory which can be erased and programed is called as _____.
 - a) PROM b) EEPROM
 - d) None Both A and B C)
- How many Timers are available in 8051 microcontroller? 7)
 - Two 8-Bit b) Two 16-Bit
 - One 16-Bit d) One 8-Bit and One 16-Bit c)
- If we push data on Stack in 8085 microprocessor then stack pointer _____. 8) Increases with every push
 - b) Decreases with every push d) None of above
 - Remains at same position C)
- 9) Number of steps to rotate stepper motor for 360 degree at a step angle of1.8 degree is _____.
 - a) 200 b) 1.8
 - c) 3 d) 1.1

Vector address for timer 0 interrupt is 10)

- b) 000Bh a) 0003h 001Bh c)
 - d) None

Max. Marks: 70

Set

Marks: 14

11) What does Microprocessor speed depends upon _____.

a) Clock

b) Data bus width

SLR-FM-432

Set R

- c) Address bus width
- d) None of above
- 12) The instructions that are used for reading an input port and writing an output port respectively are.
 - a) MOV, XCHG
- b) MOV, IN
- d) IN, OUT
- 13) When 8051 microcontroller is reset all ports are configured as, _____.
 - a) Inputs

C)

- b) Outputs
- c) Inputs and outputs
- d) Inputs or Outputs

14) XORL P1, #01h ____

IN, MOV

- a) Compliments P1
- c) Compliments P1.7
- b) Compliments P1.0
- d) None

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

Seat

No.

- a) Draw and explain flag register of 8085 microprocessor.
- b) Explain compare and jump (CJNE) instructions in 8051 microcontroller.
- c) Write an ALP to perform addition of R0 with the content at 20H Memory Location and store the result at memory location 30H.
- d) Explain features of 8085 microprocessor.
- e) Explain following pins of 8051 microcontroller
 - 1) EA
 - 2) PSEN
 - 3) ALE
 - 4) RESET

Q.3 Solve any two.

- a) Explain following instructions of 8085 microprocessor
 - 1) SHLD
 - 2) STA
 - 3) XCHG
- **b)** Describe various byte addressable instructions in 8051 microcontroller. Write an ALP to perform following logical operation $Y = R0R1 + R2 \overline{R3}$ using instructions of 8051 microcontroller.
- c) With neat diagram explain architecture of 8051 microcontroller.

Section – II

Q.4 Solve any four.

- a) Indicate which mode and timer is selected for the following.
 - 1) MOV TMOD,#03H
 - 2) MOV TMOD,#23H
 - 3) MOV TMOD,#00H
 - 4) MOV TMOD,#13H
- **b)** Draw the interfacing diagram of 8051 microcontroller with 4KB EEPROM also mention starting and ending addresses of interfaces memory.
- c) Draw and explain interfacing diagram of 8051 microcontroller with ADC 0809.
- d) Explain different types of semiconductor Memories.
- e) Draw and explain TCON register.



Max. Marks: 56

16

12

Set R

Q.5 Solve any two.

- a) Draw the interfacing of stepper motor with 8051 microcontroller. Write an ALP to rotate the stepper motor in clockwise direction, 90 degree apart with a step angle of 1.8 degree.
- **b)** Draw and explain TMOD SFR. Assuming XTAL=11.0592MHZ, write a program to generate square wave of 1KHZ frequency on pin P2.4 using timer 0 in mode 1.
- c) Explain TCON SFR. Interface LED to P2.6 pin of 8051 microcontroller. Write an ALP to turn ON and turn OFF LED after 2 sec delay.
- 12

Set

Max. Marks: 70

Seat	
No.	

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

14

Q.1 Choose the correct option.

The memory which can be erased and programed is called as _____. 1) b) EEPROM

- a) PROM
- Both A and B d) None c)
- 2) How many Timers are available in 8051 microcontroller?
 - a) Two 8-Bit b) Two 16-Bit
 - c) One 16-Bit d) One 8-Bit and One 16-Bit

If we push data on Stack in 8085 microprocessor then stack pointer _____. 3)

a) Increases with every push b) Decreases with every push

- c) Remains at same position d) None of above
- 4) Number of steps to rotate stepper motor for 360 degree at a step angle of1.8 degree is _____.
 - 200 b) 1.8 a)
 - C) 3 d) 1.1
- Vector address for timer 0 interrupt is 5)
 - a) 0003h b) 000Bh c)
 - 001Bh d) None
- What does Microprocessor speed depends upon _____ 6) a) Clock
 - b) Data bus width

b) Outputs

d)

- Address bus width d) None of above
- 7) The instructions that are used for reading an input port and writing an output port respectively are.
 - a) MOV, XCHG b) MOV, IN
 - IN, MOV d) IN, OUT c)
- When 8051 microcontroller is reset all ports are configured as, _____. 8)
 - Inputs a)
 - Inputs and outputs C)
- 9) XORL P1, #01h ___

C)

- a) Compliments P1
- Compliments P1.7 c)
- b) Compliments P1.0 d) None
- 10) Identify the invalid Instruction.
 - MOV A,@R0 a)
 - MOVC A,@A+DPTR C)
- b) MOVX @DPTR,A

Inputs or Outputs

d) MOV A,@R2

11) LJMP is _____ byte instruction.

- b) 3 d) 1 a) 2 c) 4
- 12) CPL P1.0 _____.
 - a) Complements P1.0
 - c) Complements P1.7
- b) Complements P1
- d) None
- What changes are to be made to send data to an LCD? 13) a) clear the R/W bit
 - b) high to low pulse on EN bit

SLR-FM-432

Set S

- c) set the RS bit
- d) all of the mentioned
- For writing commands on an LCD, RS bit is _____. 14)
 - a) set both of the mentioned

C)

- b) Reset
- d) none of the mentioned

Page 14 of 16

Set S

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

Seat No.

- a) Draw and explain flag register of 8085 microprocessor.
- b) Explain compare and jump (CJNE) instructions in 8051 microcontroller.
- c) Write an ALP to perform addition of R0 with the content at 20H Memory Location and store the result at memory location 30H.
- d) Explain features of 8085 microprocessor.
- e) Explain following pins of 8051 microcontroller
 - 1) EA
 - 2) PSEN
 - 3) ALE
 - 4) RESET

Q.3 Solve any two.

- a) Explain following instructions of 8085 microprocessor
 - 1) SHLD
 - 2) STA
 - 3) XCHG
- **b)** Describe various byte addressable instructions in 8051 microcontroller. Write an ALP to perform following logical operation $Y = R0R1 + R2 \overline{R3}$ using instructions of 8051 microcontroller.
- c) With neat diagram explain architecture of 8051 microcontroller.

Section – II

Q.4 Solve any four.

- a) Indicate which mode and timer is selected for the following.
 - 1) MOV TMOD,#03H
 - 2) MOV TMOD,#23H
 - 3) MOV TMOD,#00H
 - 4) MOV TMOD,#13H
- **b)** Draw the interfacing diagram of 8051 microcontroller with 4KB EEPROM also mention starting and ending addresses of interfaces memory.
- c) Draw and explain interfacing diagram of 8051 microcontroller with ADC 0809.
- d) Explain different types of semiconductor Memories.
- e) Draw and explain TCON register.

Max. Marks: 56

12

16

SLR-FM-432 Set S

Q.5 Solve any two.

- a) Draw the interfacing of stepper motor with 8051 microcontroller. Write an ALP to rotate the stepper motor in clockwise direction, 90 degree apart with a step angle of 1.8 degree.
- **b)** Draw and explain TMOD SFR. Assuming XTAL=11.0592MHZ, write a program to generate square wave of 1KHZ frequency on pin P2.4 using timer 0 in mode 1.
- c) Explain TCON SFR. Interface LED to P2.6 pin of 8051 microcontroller. Write an ALP to turn ON and turn OFF LED after 2 sec delay.

Seat No.

> T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figure to right indicate full marks.

Assume the suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1	Choose the correct alternatives from the options and rewrite the sentence.			14	
	1)	Silicon controlled rectifier is	-		
		a) Unidirectional	b)	Bidirectional	

- Unidirectional & bidirectional None c) d)
- 2) The thyristor turn-off requires that the anode current _____.
 - falls below the holding current a)
 - falls below the latching current b)
 - rises above the holding current c)
 - d) rises above the latching current

3) A single-phase half wave circuit has Vs = 230 V with a R load of 100 Ω . Find the average load current at $\alpha = 30^{\circ}$.

a)	1.45 A	b)	0.57 A
C)	0.96 A	d)	2.3 A

4) In case of a single-phase half-wave circuit with RL load, with firing angle α and extinction angle β , the conduction angle γ can be written as _____.

a)	$\gamma = \beta + \alpha$	b)	$\gamma = \beta - \alpha$
c)	$\gamma = \beta / \alpha$	d)	$\gamma = \alpha \ / \ \beta$

- In a single-phase half-wave circuit with RL load and a freewheeling diode, 5) the freewheeling period is _____.
 - b) a) 0 to π α to $\pi + \alpha$ c) π / 2 to $2\pi - \alpha$ π to $2\pi + \alpha$ d)
- 6) Find the output voltage for a step-up chopper when it is operated at a duty cycle of 50 % and Vs = 240 V.
 - a) 240 V b) 120 V 560 V 480 V C) d)
- 7) The values of duty cycle (α) lies between
 - $0 > \alpha > -1$ $0 < \alpha < 1$ b) a)
 - c) $0 <= \alpha <= 1$ d) $1 < \alpha < 100$
- For a step-down chopper, find the rms value of output voltage. Let α be 8) the duty cycle and Vs be the input voltage _____.

a)	$\alpha \times Vs$	b)	Vs/α
c)	$\sqrt{\alpha} \times Vs$	d)	<i>Vs</i> / 2

Set

Max. Marks: 70

Marks: 14



- A single phase half-wave controlled rectifier has 400 sin314t as the input 9) voltage and R as the load. For a firing angle of 60°, the average output voltage is
 - $200/\pi$ b) $300 / \pi$ a)
 - 100 / π c) d) $400 / \pi$

Which circuit gives inherent freewheeling action? 10)

- Half wave converter a)
- Full wave converter b) C) Semi converter d) None of these
- 11) A type D chopper is a _____
 - two quadrant type-B chopper a)
 - two quadrant type-C chopper C)
- b) two quadrant type-A chopper
- none of the mentioned d)

power transmission

- 12) The AC voltage controllers are used in applications.
 - power generation electric heating b)
 - a) d) C) conveyor belt motion
- If k is the duty cycles of the controller, then the rms value of the output 13) voltage in case of a integral cycle control circuit will be? Consider the input to be sinusoidal with peak value Vm & rms value Vs.
 - $Vs \times k$ a) b) Vs/k
 - d) C) $Vs \times \sqrt{k}$ Vs
- The GTO can be turned off _____. 14)
 - By a positive gate pulse a)
 - By a negative gate pulse b)
 - By a negative anode-cathode voltage C)
 - By removing the gate pulse d)

16

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Seat No.

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to right indicate full marks.
- 3) Assume the suitable data if necessary.

Section I

Q.2 Attempt any four of the following questions.

- a) Draw the circuit of two transistor analogy of SCR & regenerative current process to conduct SCR?
- b) What is the necessity of firing circuit? Explain RC firing circuit?
- c) Draw & explain V-I characteristics of enhancement n-channel MOSFET?
- d) A single phase full wave controlled converter is operated from a 120V, 50Hz supply. Load resistance $R = 10\Omega$. If the average voltage is 30% of Maximum possible average output voltage, determine :
 - i) Firing angle
 - ii) rms & average output current
- e) Draw & explain three phase half controlled rectifier with RL load, and freewheeling diode connected across the load?

Q.3 Attempt any two of the following questions.

- a) Draw & explain Characteristics of DIAC & TRIAC?
- b) Draw the static V-I characteristics of SCR. Explain effect of gate current on anode current?
- c) Two quadrant operation of single phase full controlled bridge rectifier connected to 230V, 50Hz is feeding a load R= 10ohm in series with inductance having firing angle is 60°. Determine :
 - i) Average load voltage
 - ii) RMS load voltage
 - iii) Output Ac power
 - iv) Output dc power
 - v) Form factor
 - vi) ripple factor

Section –II

Q.4 Attempt any four of the following questions.

- a) Draw & explain step up chopper?
- **b)** Draw single phase full bridge inverter circuit, gate pulses, output voltage waveforms and explain the operation of circuit?
- c) Write the comparison between CSI and VSI.
- d) Explain the On off type AC controller?
- e) A single phase ,Phase angle control type ac voltage controller has resistive load of $R = 10\Omega$ & input voltage is 120V,60Hz the delay angle of thyristor T1 is $\alpha = \pi / 2$, determine:
 - i) Rms value of output voltage
 - ii) The input power factor
 - iii) The average input current

Max. Marks: 56

Set

12

Set P

Q.5 Attempt any two of the following questions.

- a) What is the DC to Dc converter? Describe the classification of DC to dc Converter? Explain buck-boost chopper with their applications?
- **b)** Draw a neat diagram & explain the 180 degree conduction mode of 3phase inverter and derive the line to line voltage and phase voltage expression?
- c) A chopper has supply Voltage is 250V & output voltage is 400V. If the total time of chopper (T) is 100 μ sec determine
 - i) Pulse width of output voltage
 - ii) Find the Output voltage, if pulse width is reduced to ½ th for constant frequency?

Set T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

- 2) Figure to right indicate full marks.
- Assume the suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

5)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- For a step-down chopper, find the rms value of output voltage. Let α be 1) the duty cycle and Vs be the input voltage ____
 - $\alpha \times Vs$ Vs / a a) b) Vs / 2 c) $\sqrt{\alpha} \times Vs$ d)
- 2) A single phase half-wave controlled rectifier has 400 sin314t as the input voltage and R as the load. For a firing angle of 60°, the average output voltage is
 - $200/\pi$ 300 / π a) b)
 - c) $100 / \pi$ d) $400 / \pi$

Which circuit gives inherent freewheeling action? 3)

- Half wave converter b) Full wave converter a) None of these
- c) Semi converter d)
- 4) A type D chopper is a ____
 - two quadrant type-B chopper a)
 - two quadrant type-C chopper c)
 - The AC voltage controllers are used in applications.
 - power generation a)
 - electric heating b) conveyor belt motion c) d) power transmission
- 6) If k is the duty cycles of the controller, then the rms value of the output voltage in case of a integral cycle control circuit will be? Consider the input to be sinusoidal with peak value Vm & rms value Vs.

b)

d)

- a) $Vs \times k$ Vs/k b)
- c) $V_S \times \sqrt{k}$ d) Vs
- The GTO can be turned off 7)
 - By a positive gate pulse a)
 - b) By a negative gate pulse
 - By a negative anode-cathode voltage c)
 - By removing the gate pulse d)
- Silicon controlled rectifier is _____. 8)
 - Unidirectional a)
 - Unidirectional & bidirectional c) d)
- **Bidirectional** b)
- None

Max. Marks: 70

Marks: 14

Q

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Seat No.



two quadrant type-A chopper

none of the mentioned

9) The thyristor turn-off requires that the anode current . falls below the holding current a) falls below the latching current b) rises above the holding current C) rises above the latching current d) 10) A single-phase half wave circuit has Vs = 230 V with a R load of 100 Ω . Find the average load current at $\alpha = 30^{\circ}$. 1.45 A 0.57 A a) b) 0.96 A 2.3 A c) d) In case of a single-phase half-wave circuit with RL load, with firing angle α 11) and extinction angle β , the conduction angle γ can be written as _____. $\gamma = \beta - \alpha$ a) $\gamma = \beta + \alpha$ b) C) $\gamma = \beta / \alpha$ d) $\gamma = \alpha / \beta$ In a single-phase half-wave circuit with RL load and a freewheeling diode, 12) the freewheeling period is _____. a) 0 to π b) α to $\pi + \alpha$ d) C) π to $2\pi + \alpha$ $\pi/2$ to $2\pi-\alpha$ Find the output voltage for a step-up chopper when it is operated at a duty 13) cycle of 50 % and Vs = 240 V. a) 240 V b) 120 V 560 V C) d) 480 V 14) The values of duty cycle (α) lies between ____

a) $0 < \alpha < 1$ b) $0 > \alpha > -1$ c) $0 <= \alpha <= 1$ d) $1 < \alpha < 100$ **SLR-FM-433**

Set Q

Seat No.

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to right indicate full marks.
- 3) Assume the suitable data if necessary.

Section I

Q.2 Attempt any four of the following questions.

- a) Draw the circuit of two transistor analogy of SCR & regenerative current process to conduct SCR?
- b) What is the necessity of firing circuit? Explain RC firing circuit?
- c) Draw & explain V-I characteristics of enhancement n-channel MOSFET?
- **d**) A single phase full wave controlled converter is operated from a 120V, 50Hz supply. Load resistance $R = 10\Omega$. If the average voltage is 30% of Maximum possible average output voltage, determine :
 - i) Firing angle
 - ii) rms & average output current
- e) Draw & explain three phase half controlled rectifier with RL load, and freewheeling diode connected across the load?

Q.3 Attempt any two of the following questions.

- a) Draw & explain Characteristics of DIAC & TRIAC?
- b) Draw the static V-I characteristics of SCR. Explain effect of gate current on anode current?
- c) Two quadrant operation of single phase full controlled bridge rectifier connected to 230V, 50Hz is feeding a load R= 10ohm in series with inductance having firing angle is 60°. Determine :
 - i) Average load voltage
 - ii) RMS load voltage
 - iii) Output Ac power
 - iv) Output dc power
 - v) Form factor
 - vi) ripple factor

Section –II

Q.4 Attempt any four of the following questions.

- a) Draw & explain step up chopper?
- **b)** Draw single phase full bridge inverter circuit, gate pulses, output voltage waveforms and explain the operation of circuit?
- c) Write the comparison between CSI and VSI.
- d) Explain the On off type AC controller?
- e) A single phase ,Phase angle control type ac voltage controller has resistive load of $R = 10\Omega$ & input voltage is 120V,60Hz the delay angle of thyristor T1 is $\alpha = \pi / 2$, determine:
 - i) Rms value of output voltage
 - ii) The input power factor
 - iii) The average input current

Max. Marks: 56

Set

Q

16

12

Q.5 Attempt any two of the following questions.

- a) What is the DC to Dc converter? Describe the classification of DC to dc Converter? Explain buck-boost chopper with their applications?
- **b)** Draw a neat diagram & explain the 180 degree conduction mode of 3phase inverter and derive the line to line voltage and phase voltage expression?
- c) A chopper has supply Voltage is 250V & output voltage is 400V. If the total time of chopper (T) is 100 μsec determine
 - i) Pulse width of output voltage
 - ii) Find the Output voltage, if pulse width is reduced to ½ th for constant frequency?



SLR-FM-433 Set Q

Set T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

- 2) Figure to right indicate full marks.
- Assume the suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

a)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In a single-phase half-wave circuit with RL load and a freewheeling diode, 1) the freewheeling period is _____.
 - a) 0 to π b) α to $\pi + \alpha$ c) π to $2\pi + \alpha$ d) $\pi/2$ to $2\pi-\alpha$
- 2) Find the output voltage for a step-up chopper when it is operated at a duty cycle of 50 % and Vs = 240 V.

a)	240 V	b)	120 V
c)	560 V	d)	480 V

3) The values of duty cycle (α) lies between _____.

a)	$0 < \alpha < 1$	b)	$0 > \alpha > -1$
c)	$0 <= \alpha <= 1$	d)	$1 < \alpha < 100$

4) For a step-down chopper, find the rms value of output voltage. Let α be the duty cycle and Vs be the input voltage _____.

a)	$\alpha \times Vs$	b)	Vs/α
c)	$\sqrt{\alpha} \times Vs$	d)	<i>Vs</i> / 2

- A single phase half-wave controlled rectifier has 400 sin314t as the input 5) voltage and R as the load. For a firing angle of 60°, the average output voltage is
 - a) $200/\pi$ b) 300 / π C) $100 / \pi$ d) $400 / \pi$

Which circuit gives inherent freewheeling action? 6)

- Half wave converter Full wave converter b) a)
- Semi converter d) None of these C)
- 7) A type D chopper is a _____. two quadrant type-B chopper two quadrant type-A chopper a) b) two quadrant type-C chopper none of the mentioned C) d)
- The AC voltage controllers are used in _____ applications. 8)
 - power generation electric heating b)
 - conveyor belt motion power transmission C) d)

Seat No.

SLR-FM-433

R

Marks: 14

Max. Marks: 70

9) If k is the duty cycles of the controller, then the rms value of the output voltage in case of a integral cycle control circuit will be? Consider the input to be sinusoidal with peak value Vm & rms value Vs.

- a) $Vs \times k$ b) Vs/k Vs
- c) $Vs \times \sqrt{k}$ d)
- The GTO can be turned off _____. 10)
 - By a positive gate pulse a)
 - By a negative gate pulse b)
 - By a negative anode-cathode voltage C)
 - By removing the gate pulse d)
- 11) Silicon controlled rectifier is
 - Unidirectional a)
 - C) Unidirectional & bidirectional d)
- 12) The thyristor turn-off requires that the anode current .
 - falls below the holding current a)
 - falls below the latching current b)
 - rises above the holding current C)
 - d) rises above the latching current
- 13) A single-phase half wave circuit has Vs = 230 V with a R load of 100 Ω . Find the average load current at $\alpha = 30^{\circ}$.
 - 0.57 A a) 1.45 A b)
 - 0.96 A d) 2.3 A c)
- 14) In case of a single-phase half-wave circuit with RL load, with firing angle α and extinction angle β , the conduction angle γ can be written as _____.
 - a) $\gamma = \beta + \alpha$ b) $\gamma = \beta - \alpha$ d)
 - C) $\gamma = \beta / \alpha$
- $\gamma = \alpha / \beta$

Bidirectional

None

b)

SLR-FM-433

Set | R

Set

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Seat

No.

Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to right indicate full marks.
- 3) Assume the suitable data if necessary.

Section I

Q.2 Attempt any four of the following questions.

- a) Draw the circuit of two transistor analogy of SCR & regenerative current process to conduct SCR?
- **b)** What is the necessity of firing circuit? Explain RC firing circuit?
- c) Draw & explain V-I characteristics of enhancement n-channel MOSFET?
- d) A single phase full wave controlled converter is operated from a 120V, 50Hz supply. Load resistance $R = 10\Omega$. If the average voltage is 30% of Maximum possible average output voltage, determine :
 - i) Firing angle
 - ii) rms & average output current
- e) Draw & explain three phase half controlled rectifier with RL load, and freewheeling diode connected across the load?

Q.3 Attempt any two of the following questions.

- a) Draw & explain Characteristics of DIAC & TRIAC?
- b) Draw the static V-I characteristics of SCR. Explain effect of gate current on anode current?
- c) Two quadrant operation of single phase full controlled bridge rectifier connected to 230V, 50Hz is feeding a load R= 10ohm in series with inductance having firing angle is 60°. Determine :
 - i) Average load voltage
 - ii) RMS load voltage
 - iii) Output Ac power
 - iv) Output dc power
 - v) Form factor
 - vi) ripple factor

Section –II

Q.4 Attempt any four of the following questions.

- a) Draw & explain step up chopper?
- **b)** Draw single phase full bridge inverter circuit, gate pulses, output voltage waveforms and explain the operation of circuit?
- c) Write the comparison between CSI and VSI.
- d) Explain the On off type AC controller?
- e) A single phase ,Phase angle control type ac voltage controller has resistive load of $R = 10\Omega$ & input voltage is 120V,60Hz the delay angle of thyristor T1 is $\alpha = \pi / 2$, determine:
 - i) Rms value of output voltage
 - ii) The input power factor
 - iii) The average input current

Max. Marks: 56

R

16

SLR-FM-433



Q.5 Attempt any two of the following questions.

- a) What is the DC to Dc converter? Describe the classification of DC to dc Converter? Explain buck-boost chopper with their applications?
- **b)** Draw a neat diagram & explain the 180 degree conduction mode of 3phase inverter and derive the line to line voltage and phase voltage expression?
- c) A chopper has supply Voltage is 250V & output voltage is 400V. If the total time of chopper (T) is 100 μsec determine
 - i) Pulse width of output voltage
 - ii) Find the Output voltage, if pulse width is reduced to ½ th for constant frequency?



SLR-FM-433 Set R

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

- 2) Figure to right indicate full marks.
- Assume the suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

3)

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

b)

d)

b)

- Which circuit gives inherent freewheeling action? 1)
 - Half wave converter a)
 - C) Semi converter
- 2) A type D chopper is a _____.
 - two quadrant type-B chopper a)
 - two quadrant type-C chopper C)
 - d) The AC voltage controllers are used in _____
 - _ applications. electric heating b)

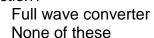
Bidirectional

None

- power generation a)
- conveyor belt motion c) d)
- If k is the duty cycles of the controller, then the rms value of the output 4) voltage in case of a integral cycle control circuit will be? Consider the input to be sinusoidal with peak value Vm & rms value Vs.
 - a) $Vs \times k$ b) Vs/k
 - d) c) $Vs \times \sqrt{k}$ Vs
- The GTO can be turned off _____. 5)
 - By a positive gate pulse a)
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 - c) By a negative anode-cathode voltage
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- 6) Silicon controlled rectifier is
 - Unidirectional a)
 - b) Unidirectional & bidirectional C) d)
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 - falls below the holding current a)
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 - rises above the latching current d)
- 8) A single-phase half wave circuit has Vs = 230 V with a R load of 100 Ω . Find the average load current at $\alpha = 30^{\circ}$.
 - a) 1.45 A 0.57 A b) 2.3 A
 - 0.96 A C) d)

power transmission

two quadrant type-A chopper



none of the mentioned

Set

Max. Marks: 70

Marks: 14

	Set S
9)	In case of a single-phase half-wave circuit with RL load, with firing angle α and extinction angle β , the conduction angle γ can be written as a) $\gamma = \beta + \alpha$ b) $\gamma = \beta - \alpha$ c) $\gamma = \beta / \alpha$ d) $\gamma = \alpha / \beta$
10)	In a single-phase half-wave circuit with RL load and a freewheeling diode, the freewheeling period is a) $0 to \pi$ b) $\alpha to \pi + \alpha$ c) $\pi to 2\pi + \alpha$ d) $\pi / 2 to 2\pi - \alpha$
11)	Find the output voltage for a step-up chopper when it is operated at a dutycycle of 50 % and Vs = 240 V.a) 240 Vb) 120 Vc) 560 Vd) 480 V
12)	The values of duty cycle (α) lies between a) $0 < \alpha < 1$ b) $0 > \alpha > -1$ c) $0 <= \alpha <= 1$ d) $1 < \alpha < 100$
13)	For a step-down chopper, find the rms value of output voltage. Let α be the duty cycle and Vs be the input voltage a) $\alpha \times Vs$ b) Vs / α c) $\sqrt{\alpha \times Vs}$ d) $Vs / 2$
14)	A single phase half-wave controlled rectifier has 400 sin314t as the input voltage and R as the load. For a firing angle of 60°, the average output

voltage is _____.

a)	200 / π	b)	300 / π
C)	$100 / \pi$	d)	400 / π

SLR-FM-433

S S A Supervised S

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019

Time: 10:00 AM To 01:00 PM

Seat

No.

Instructions: 1) All questions are compulsory.

- 2) Figure to right indicate full marks.
- 3) Assume the suitable data if necessary.

Section I

Q.2 Attempt any four of the following questions.

- a) Draw the circuit of two transistor analogy of SCR & regenerative current process to conduct SCR?
- **b)** What is the necessity of firing circuit? Explain RC firing circuit?
- c) Draw & explain V-I characteristics of enhancement n-channel MOSFET?
- d) A single phase full wave controlled converter is operated from a 120V, 50Hz supply. Load resistance $R = 10\Omega$. If the average voltage is 30% of Maximum possible average output voltage, determine :
 - i) Firing angle
 - ii) rms & average output current
- e) Draw & explain three phase half controlled rectifier with RL load, and freewheeling diode connected across the load?

Q.3 Attempt any two of the following questions.

- a) Draw & explain Characteristics of DIAC & TRIAC?
- b) Draw the static V-I characteristics of SCR. Explain effect of gate current on anode current?
- c) Two quadrant operation of single phase full controlled bridge rectifier connected to 230V, 50Hz is feeding a load R= 10ohm in series with inductance having firing angle is 60°. Determine :
 - i) Average load voltage
 - ii) RMS load voltage
 - iii) Output Ac power
 - iv) Output dc power
 - v) Form factor
 - vi) ripple factor

Section –II

Q.4 Attempt any four of the following questions.

- a) Draw & explain step up chopper?
- **b)** Draw single phase full bridge inverter circuit, gate pulses, output voltage waveforms and explain the operation of circuit?
- c) Write the comparison between CSI and VSI.
- d) Explain the On off type AC controller?
- e) A single phase ,Phase angle control type ac voltage controller has resistive load of $R = 10\Omega$ & input voltage is 120V,60Hz the delay angle of thyristor T1 is $\alpha = \pi / 2$, determine:
 - i) Rms value of output voltage
 - ii) The input power factor
 - iii) The average input current

Max. Marks: 56

12

16

16



SLR-FM-433

Q.5 Attempt any two of the following questions.

- a) What is the DC to Dc converter? Describe the classification of DC to dc Converter? Explain buck-boost chopper with their applications?
- **b)** Draw a neat diagram & explain the 180 degree conduction mode of 3phase inverter and derive the line to line voltage and phase voltage expression?
- c) A chopper has supply Voltage is 250V & output voltage is 400V. If the total time of chopper (T) is 100 μsec determine
 - i) Pulse width of output voltage
 - ii) Find the Output voltage, if pulse width is reduced to ½ th for constant frequency?



SLR-FM-433 Set S

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** SIGNALS & SYSTEMS Max. Marks: 70 **Instructions:** 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Day & Date: Tuesday, 26-11-2019

book.

Time: 10:00 AM To 01:00 PM

Seat

No.

Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

- Evaluate the integrals $\int_{-\infty}^{\infty} e^{-\alpha t} \partial(t-10) dt$ 1)
 - $e^{-10\alpha}$ a) $e^{-100\alpha}$ b)
 - $e^{-1000\alpha}$ c) $e^{-\alpha}$ d)
- 2) Resistor and Capacitor is _____ and _____ respectively.
 - a) System with Memory, Memory less
 - b) System with Memory, system with Memory
 - c) Memory less, Memory less
 - d) Memory less, system with Memory
- 3) signal is one whose occurrence is always random Α_
 - a) Deterministic b) Non-deterministic
 - c) Regular d) None of above

4)	The impulse response of $y(t) = x$	x(t-t ₀) is
	a) $h(t) = \delta(t + t)$	b) $h(t) = \delta(t \cdot t)$

- a) $h(t) = \delta(t + t_0)$ $h(t) = \delta(t \div t_0)$ b) c) $h(t) = \delta(t - t_0)$ d) None of these
- In DT-LTI system, Impulse response can be computed by simply taking 5) the first difference of _____ Response.
 - parabola b)
- Fourier transform exists for f(t) if, ____ 6) b) $\int_{-\infty}^{\infty} |f(t)| dt < \infty$ d) $\int_{-\infty}^{\infty} |f(t)| dt > \infty$ a) $\int_{-\infty}^{\infty} |f(t)| dt < 0$ c) $\int_{-\infty}^{\infty} |f(t)| dt > 0$

7) The Fourier transform of non-periodic signal $m(t) = e^{-a|t|}$ is .

- a) $2a/(a^2 + \omega^2)$ $2\omega/(a^2+\omega^2)$ b) c) $a/(a^2 + \omega^2)$ $\omega/(a^2 + \omega^2)$ d)
- In DTFT, $X(e^{i\omega})$ is periodic in ' ω ' with period ' 2π ' satisfying which of the 8) following condition _____.
 - $X = [e^{j(\omega + 2k\pi)}]$ a) $X = [e^{j(\omega + 2k)}]$ b) c) $X = [e^{j(\omega + \pi k)}]$ $\mathbf{X} = [\mathbf{e}^{\mathbf{j}(\omega + \mathbf{k})}]$ d)
- If $x(n) = (0.6)^n u(n) + (0.4)^n u(n)$ then, ROC of X(Z) is _____ 9) a) |Z| > 0.4b) 0.4 < |Z| < 0.6c) |Z| > 0.6d) Any of above

- d) step
- a) ramp
- c) impulse

SLR-FM-434



Marks: 14

10)	In DTFT Properties, Parsevals theo a) Energy Density Spectrum c) Current Density Spectrum	b)	
11)	In DFT, the magnitude of twiddle factor a) 0 c) 1	· e ^{-j2} b) d)	^{π/N} is ∞ Cant say
12)	ROC can not contain any a) Zero c) Either a or b	b) d)	Pole Both a & b
13)	If $X(Z) = Z{x(n)}$ then $\{a^nx(n)\}$ is a) X(az) c) X(a ⁿ z)		$X(a^{-1}z)$ $X(a^{-n}z)$
14)	Z{u(n)} is; a) $1/(Z-1)$ c) Z/(Z+1)	,	1/(Z + 1) Z/(Z - 1)

Set P

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

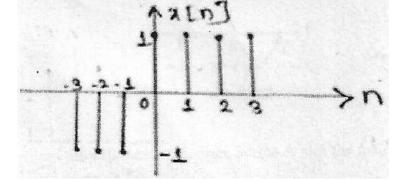
Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

a) Find even and odd part of DT sequence x(n)



b) Check whether given signal is energy signal or power signal.

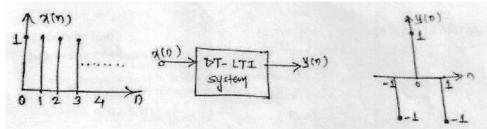
$$x(t) = (1 + e^{-5t}).u(t)$$

c) Determine whether the following systems are causal or not.

1)
$$y(n) = x(n) + \frac{1}{x(n-1)}$$

2)
$$y(t) = x[t-2] + x[2-t]$$

d) Find the impulse response and sketch it, for following DT-LTI system.



e) Derive time differentiation property of Fourier Transform.

Q.3 Solve any two.

- a) Sketch the following signals
 - 1) x(4-n)
 - 2) x(2n+1)
 - 3) x(n)u(2 − n)
 - 4) $x(n-1)\delta(n-3)$

12

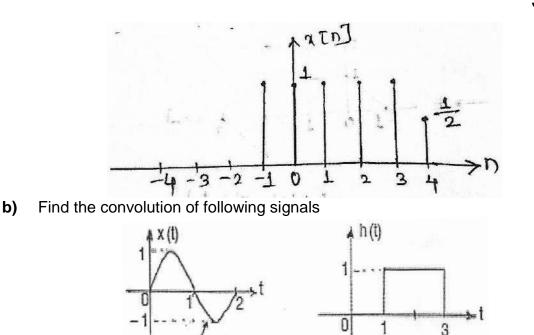


Max. Marks: 56

SLR-FM-434

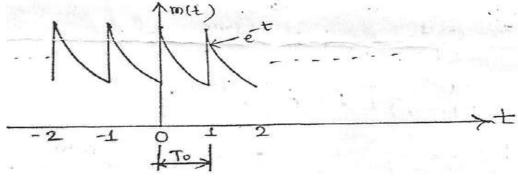


Set P



c) Find the exponential Fourier Series & plot the magnitude & phase spectrum for the periodic signal m(t) given in fig.

sinnt



Section – II

Q.4 Solve any four.

- a) Determine Z transform, ROC & pole zero locations for $x(n) = (2/3)^n u(n) + (n) + (-1/2)^n u(n)$.
- **b)** Derive **Multiplication by 'n'** property of Z Transform.
- c) Find Z transform & ROC of causal sequence. X(n)={2, -1, 3, 2, 0, 1}
- d) Derive Parsevals theorem property of DTFT.
- Find 4 point IDFT of the following X(K) = { 1, 1-j2, -1, 1+j2 }

Q.5 Solve any two.

- a) Find 8 point DFT of following sequence.
 - x(n) = {1, 2, 1, 2}
- b) Determine the sequence x[n] associated with Z transform given using "Partial Fraction Expansion [P.F.E.]" method X [Z] = 10Z/(Z-1) (Z-2); Right sided sequence
- c) Compute 8 point DFT of sequence using DIT FFT algorithm.

 $\mathbf{x}(\mathbf{n}) = \{0.5, 0, 0.5, 0, 0.5, 0, 0.5, 0\}$

Set

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** SIGNALS & SYSTEMS

Dav & Date: Tuesdav. 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In DTFT, $X(e^{i\omega})$ is periodic in ' ω ' with period ' 2π ' satisfying which of the 1) following condition .
- $\mathbf{X} = [\mathbf{e}^{\mathbf{j}(\omega + 2\mathbf{k}\pi)}]$ a) $X = [e^{j(\omega+2k)}]$ b) c) $X = \left[e^{j(\omega + \pi k)} \right]$ d) $\mathbf{X} = [\mathbf{e}^{\mathbf{j}(\omega + \mathbf{k})}]$ If $x(n) = (0.6)^n u(n) + (0.4)^n u(n)$ then, ROC of X(Z) is _____ 2) a) |Z| > 0.40.4 < |Z| < 0.6b) Any of above c) |Z| > 0.6d) 3) In DTFT Properties, Parsevals theorem is also called as . a) Energy Density Spectrum **Power Density Spectrum** b) c) Current Density Spectrum d) None 4) In DFT, the magnitude of twiddle factor $|e^{-j2\pi/N}|$ is _____. a) 0 b) ∞ c) 1 d) Cant say 5) ROC can not contain any _____. b) Pole a) Zero Both a & b c) Either a or b d) 6) If $X(Z) = Z\{x(n)\}$ then $\{a^n x(n)\}$ is _ $X(a^{-1}z)$ b) a) X(az) c) $X(a^n z)$ d) $X(a^{-n}z)$ 7) $Z\{u(n)\}$ is; _____. a) 1/(Z-1)b) 1/(Z+1)c) Z/(Z+1)d) Z/(Z-1)Evaluate the integrals $\int_{-\infty}^{\infty}e^{-\alpha t}\,\partial\,(t-10)dt$ 8) $e^{-10\alpha}$ a) $e^{-100\alpha}$ b) $e^{-1000\alpha}$ c) $e^{-\alpha}$ d)

Max. Marks: 70

Marks: 14

		Set Q
9)	 Resistor and Capacitor is and _ a) System with Memory, Memory less b) System with Memory, system with c) Memory less, Memory less d) Memory less, system with Memory 	ss n Memory
10)	,	nce is always random b) Non-deterministic d) None of above
11)	a) $h(t) = \delta(t + t_0)$	is b) $h(t) = \delta(t \div t_0)$ d) None of these
12)	c) impulse c	e. b) parabola d) step
13)	Fourier transform exists for f(t) if,a) $\int_{-\infty}^{\infty} f(t) dt < 0$ bc) $\int_{-\infty}^{\infty} f(t) dt > 0$ c	$ \int_{-\infty}^{\infty} f(t) dt < \infty $ $ d) \qquad \int_{-\infty}^{\infty} f(t) dt > \infty $
14)		c signal m(t)= $e^{-a t }$ is b) $2\omega/(a^2 + \omega^2)$

c) $a/(a^2 + \omega^2)$

d) $\omega/(a^2 + \omega^2)$

SLR-FM-434

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

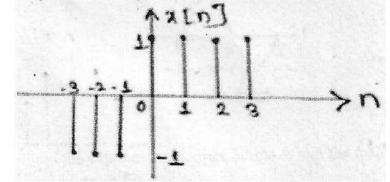
Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

a) Find even and odd part of DT sequence x(n)



b) Check whether given signal is energy signal or power signal.

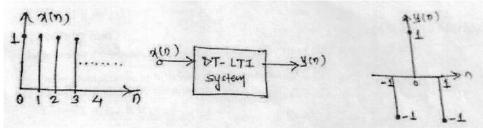
$$x(t) = (1 + e^{-5t}).u(t)$$

c) Determine whether the following systems are causal or not.

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$$y(n) = x(n) + \frac{1}{x(n-1)}$$

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$$y(t) = x[t-2] + x[2-t]$$

d) Find the impulse response and sketch it, for following DT-LTI system.



e) Derive time differentiation property of Fourier Transform.

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- a) Sketch the following signals
 - 1) x(4 n)
 - 2) x(2n + 1)
 - 3) x(n)u(2-n)
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12



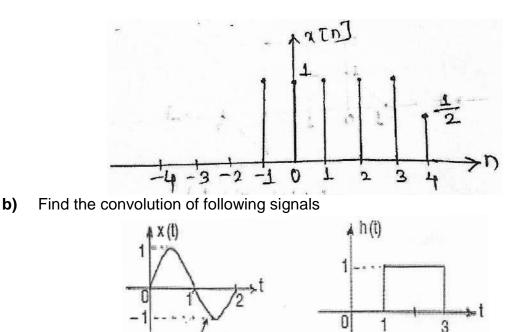
Set

Max. Marks: 56



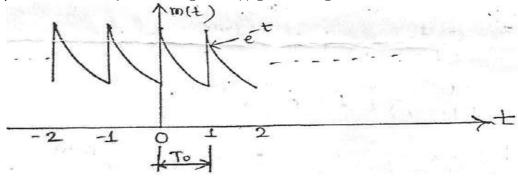


Set Q



c) Find the exponential Fourier Series & plot the magnitude & phase spectrum for the periodic signal m(t) given in fig.

sinnt



Section – II

Q.4 Solve any four.

- a) Determine Z transform, ROC & pole zero locations for $x(n) = (2/3)^n u(n) + (n) + (-1/2)^n u(n)$.
- **b)** Derive **Multiplication by 'n'** property of Z Transform.
- c) Find Z transform & ROC of causal sequence. X(n)={2, -1, 3, 2, 0, 1}
- d) Derive Parsevals theorem property of DTFT.
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- b) Determine the sequence x[n] associated with Z transform given using "Partial Fraction Expansion [P.F.E.]" method X [Z] = 10Z/(Z-1) (Z-2); Right sided sequence
- c) Compute 8 point DFT of sequence using DIT FFT algorithm.

 $\mathbf{x}(\mathbf{n}) = \{0.5, 0, 0.5, 0, 0.5, 0, 0.5, 0\}$

c)́	$a/(a^2+\omega^2)$	d)́	$\omega/(a^2 + \omega^2)$	
	DTFT, X($e^{i\omega}$) is periodic in ' ω ' with owing condition	n peri	od ' 2π ' satisfying which of the	
a)	$X = [e^{j(\omega+2k)}]$ $X = [e^{j(\omega+\pi k)}]$	b) d)	$X = [e^{j(\omega + 2k\pi)}]$ $X = [e^{j(\omega + k)}]$	
	$(n) = (0.6)^n u(n) + (0.4)^n u(n)$ then			
	Z > 0.4 Z > 0.6		0.4 < Z < 0.6 Any of above	
a)		b)	Power Density Spectrum	
	Current Density Spectrum DFT, the magnitude of twiddle factor	,		
a) c)	0	b)	Cant say	
	C can not contain any	b)	Polo	
a) c)	Zero Either a or b	b) d)	Pole Both a & b	
	$(Z) = Z{x(n)}$ then $\{a^nx(n)\}$ is			
	X(az) X(a ⁿ z)	-	$X(a^{-1}z)$ X(a ⁻ⁿ z)	
-	.(n)} is;			
	1/(Z-1) Z/(Z+1)		1/(Z+1) Z/(Z-1)	
0,		ч)		Pa

Duration: 30 Minutes

2)

9)

10)

Marks: 14 Q.1 Choose the correct alternatives from the options and rewrite the sentence.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering SIGNALS & SYSTEMS**

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

MCQ/Objective Type Questions

In DT-LTI system, Impulse response can be computed by simply taking 1) the first difference of _____ Response.

- a) ramp b)
- parabola c) impulse d) step

2) Figures to the right indicate full marks. 3) Assume suitable data if necessary.

- Fourier transform exists for f(t) if, ____
 - $\int_{-\infty}^{\infty} |f(t)| dt < \infty$ $\int_{-\infty}^{\infty} |f(t)| dt > \infty$ b) a) $\int_{-\infty}^{\infty} |f(t)| dt < 0$
 - c) $\int_{-\infty}^{\infty} |f(t)| dt > 0$ d)

The Fourier transform of non- periodic signal $m(t) = e^{-a|t|}$ is _____. 3)

- $2\omega/(a^2+\omega^2)$ a) $2a/(a^2 + \omega^2)$ b)
- 4)
- 5)
- 6)
- 7)
- 8)

SLR-FM-434

Set

Max. Marks: 70

14

Seat No.

Day & Date: Tuesday, 26-11-2019

book.

Time: 10:00 AM To 01:00 PM

Evaluate the integrals $\int_{-\infty}^{\infty}e^{-\alpha t}\,\partial\,(t-10)dt$ 11)

- a) $e^{-100\alpha}$ $e^{-10\alpha}$ b)
- $e^{-1000\,\alpha}$ c) $e^{-\alpha}$ d)
- Resistor and Capacitor is _____ and _____ respectively. 12)
 - a) System with Memory, Memory less
 - b) System with Memory, system with Memory
 - c) Memory less, Memory less
 - d) Memory less, system with Memory

13) A _____ signal is one whose occurrence is always random

- a) Deterministic Non-deterministic b)
- c) Regular d) None of above
- 14) The impulse response of $y(t) = x(t-t_0)$ is _
 - a) $h(t) = \delta(t + t_0)$ c) $h(t) = \delta(t - t_0)$
- $h(t) = \delta(t \div t_0)$ b) None of these

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d)

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

Seat

No.

a) Find even and odd part of DT sequence x(n)



Ó

b) Check whether given signal is energy signal or power signal.

$$x(t) = (1 + e^{-5t}).u(t)$$

1

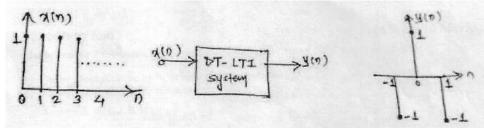
 $\mathbf{2}$

c) Determine whether the following systems are causal or not.

1)
$$y(n) = x(n) + \frac{1}{x(n-1)}$$

2)
$$y(t) = x[t-2] + x[2-t]$$

d) Find the impulse response and sketch it, for following DT-LTI system.



e) Derive time differentiation property of Fourier Transform.

Q.3 Solve any two.

- a) Sketch the following signals
 - 1) x(4 n)
 - 2) x(2n+1)
 - 3) x(n)u(2-n)
 - 4) $x(n-1)\delta(n-3)$

12

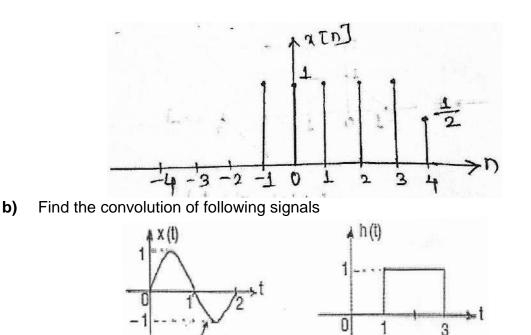


Max. Marks: 56

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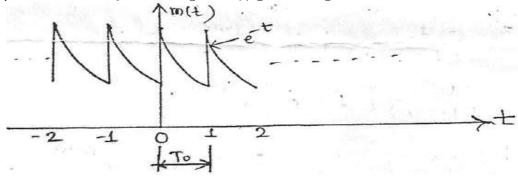


Set R



c) Find the exponential Fourier Series & plot the magnitude & phase spectrum for the periodic signal m(t) given in fig.

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Section – II

Q.4 Solve any four.

- a) Determine Z transform, ROC & pole zero locations for $x(n) = (2/3)^n u(n) + (n) + (-1/2)^n u(n)$.
- **b)** Derive **Multiplication by 'n'** property of Z Transform.
- c) Find Z transform & ROC of causal sequence. X(n)={2, -1, 3, 2, 0, 1}
- d) Derive Parsevals theorem property of DTFT.
- Find 4 point IDFT of the following X(K) = { 1, 1-j2, -1, 1+j2 }

Q.5 Solve any two.

- a) Find 8 point DFT of following sequence.
 - x(n) = {1, 2, 1, 2}
- b) Determine the sequence x[n] associated with Z transform given using "Partial Fraction Expansion [P.F.E.]" method X [Z] = 10Z/(Z-1) (Z-2); Right sided sequence
- c) Compute 8 point DFT of sequence using DIT FFT algorithm.

 $\mathbf{x}(\mathbf{n}) = \{0.5, 0, 0.5, 0, 0.5, 0, 0.5, 0\}$

Set

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In DTFT Properties, Parsevals theorem is also called as 1) Power Density Spectrum a) Energy Density Spectrum b)
- c) Current Density Spectrum d) None In DFT, the magnitude of twiddle factor $|e^{-j2\pi/N}|$ is 2) a) 0 b) ∞ c) 1 d) Cant say 3) ROC can not contain any a) Zero b) Pole c) Either a or b d) Both a & b If $X(Z) = Z{x(n)}$ then ${a^nx(n)}$ is _ 4) b) $X(a^{-1}z)$ a) X(az) c) $X(a^n z)$ d) $X(a^{-n}z)$ 5) Z{u(n)} is; _____ a) 1/(Z-1)b) 1/(Z + 1)c) Z/(Z+1)Z/(Z - 1)d) Evaluate the integrals $\int_{-\infty}^{\infty}e^{-\alpha t}\,\partial\,(t-10)dt$ 6) a) $e^{-100\alpha}$ $e^{-10\alpha}$ b) $e^{-1000 \alpha}$ c) $e^{-\alpha}$ d) Resistor and Capacitor is and respectively. 7) System with Memory, Memory less a) b) System with Memory, system with Memory

 - c) Memory less, Memory less
 - d) Memory less, system with Memory
- 8) _____ signal is one whose occurrence is always random Α___
 - a) Deterministic Non-deterministic b)
 - c) Regular d) None of above

9) The impulse response of $y(t) = x(t-t_0)$ is _

 $h(t) = \delta(t + t_0)$ $h(t) = \delta(t \div t_0)$ b) a) None of these c) $h(t) = \delta(t - t_0)$ d)

Max. Marks: 70

Marks: 14

In DT-LTI system, Impulse response can be computed by simply taking 10) the first difference of _____ Response. a) Ramp Parabola b) c) Impulse d) Step Fourier transform exists for f(t) if, _____. 11) $\int_{-\infty}^{\infty} |f(t)| dt < \infty$ $\int_{-\infty}^{\infty} |f(t)| dt > \infty$ a) $\int_{-\infty}^{\infty} |f(t)| dt < 0$ $\int_{-\infty}^{\infty} |f(t)| dt > 0$ d) C) The Fourier transform of non- periodic signal $m(t) = e^{-a|t|}$ is _____. 12) $2\omega/(a^2+\omega^2)$ a) $2a/(a^2 + \omega^2)$ b) c) $a/(a^2 + \omega^2)$ $\omega/(a^2 + \omega^2)$ d) In DTFT, $X(e^{i\omega})$ is periodic in ' ω ' with period ' 2π ' satisfying which of the 13)

- following condition _____.
 - $X = [e^{j(\omega + 2k\pi)}]$ a) $X = [e^{j(\omega + 2k)}]$ b) c) $X = \left[e^{j(\omega + \pi k)}\right]$ $X = [e^{j(\omega+k)}]$ d)
- If $x(n) = (0.6)^n u(n) + (0.4)^n u(n)$ then, ROC of X(Z) is _____. 14)

a)
$$|Z| > 0.4$$

0.4 < |Z| < 0.6b)

SLR-FM-434

Set S

c) |Z| > 0.6

d) Any of above

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 Time: 10:00 AM To 01:00 PM

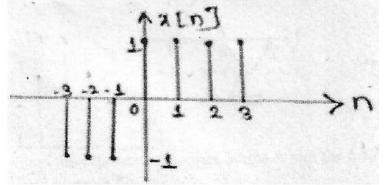
Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four.

a) Find even and odd part of DT sequence x(n)



b) Check whether given signal is energy signal or power signal.

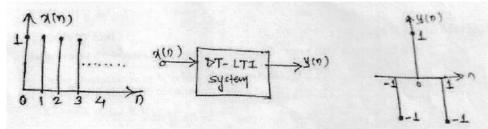
$$x(t) = (1 + e^{-5t}).u(t)$$

c) Determine whether the following systems are causal or not.

1)
$$y(n) = x(n) + \frac{1}{x(n-1)}$$

2)
$$y(t) = x[t-2] + x[2-t]$$

d) Find the impulse response and sketch it, for following DT-LTI system.



e) Derive time differentiation property of Fourier Transform.

Q.3 Solve any two.

- a) Sketch the following signals
 - 1) x(4 n)
 - 2) x(2n+1)
 - 3) x(n)u(2-n)
 - 4) $x(n-1)\delta(n-3)$

12

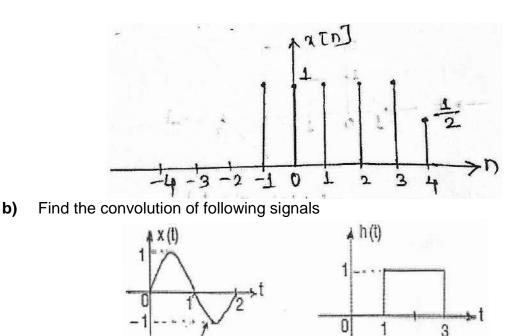
Max. Marks: 56

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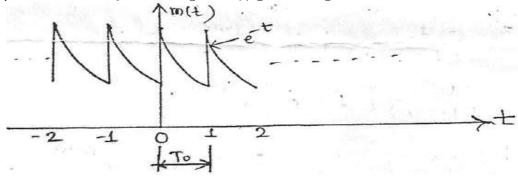


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c) Find the exponential Fourier Series & plot the magnitude & phase spectrum for the periodic signal m(t) given in fig.

sinnt





Q.4 Solve any four.

- a) Determine Z transform, ROC & pole zero locations for $x(n) = (2/3)^n u(n) + (n) + (-1/2)^n u(n)$.
- **b)** Derive **Multiplication by 'n'** property of Z Transform.
- c) Find Z transform & ROC of causal sequence. X(n)={2, -1, 3, 2, 0, 1}
- d) Derive Parsevals theorem property of DTFT.
- Find 4 point IDFT of the following X(K) = { 1, 1-j2, -1, 1+j2 }

Q.5 Solve any two.

- a) Find 8 point DFT of following sequence.
 - x(n) = {1, 2, 1, 2}
- b) Determine the sequence x[n] associated with Z transform given using "Partial Fraction Expansion [P.F.E.]" method X [Z] = 10Z/(Z-1) (Z-2); Right sided sequence
- c) Compute 8 point DFT of sequence using DIT FFT algorithm.

 $\mathbf{x}(\mathbf{n}) = \{0.5, 0, 0.5, 0, 0.5, 0, 0.5, 0\}$

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Sea No.	t	Set P
	l	T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering
		SAFETY ENGINEERING AND DISASTER MANAGEMENT
		e: Thursday, 28-11-2019 Max. Marks: 50 00 AM To 12:00 PM
Instr	uctio	ns: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.
		2) Figures to the right indicate full marks.
Dura	tion: 2	MCQ/Objective Type Questions 20 Minutes Marks: 10
Q.1	-	ose the correct alternatives from the options and rewrite the sentence. 10
	1)	A disaster management cycle comprises of
		a) Mitigation b) Preparedness c) Recovery d) All of the above
	2)	Risk is that loss will occur as the result of an adverse event.
	_,	a) Effect b) Event
		c) Probability d) Possibility
	3)	Recovery in disaster management refers to a) Temporary Housing Facility b) Medical aid
		c) Grants d) All of the above
	4)	An emergency is a situation generated by the real or imminent occurance of event that requires immediate
		a) response b) attention
	5)	c) action d) Act A committee was formed for disaster management plans in under
	5)	the chairmanship of Mr. J. C. Pant.
		a) August 1999 b) Feb 2002
	\mathbf{c}	c) Sept 1949 d) Jan 2002
	6)	Weather and climate related disasters are a) Flood
		c) Cyclone d) All of the above
	7)	Which is not the disaster related to geological conditions?
		 a) Landscape and mud flows b) Avalanche c) Heat wave d) Coastal erosion
	8)	Which does not include environmental disaster?
	-,	a) Decertification b) Cloud burst
		c) Dam Bursts d) Mine fires
	9)	The geological disasters are a) Earthquakes b) Volcanic activity
		c) Dam bursts d) All of the above

d) All of the above c) Dam bursts



- Which are the 'Safety' equipments while working in industry?a) Helmetsb) Safety belts 10)

- c) Machine guards
- d) All of the above

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Solve any four of the following.

- a) What are the unsafe acts while working in industry?
- b) Explain the "need for safety".
- c) What are the requirements of safety specialist?
- **d)** What are highlights of National policy on disaster management approved in 2009?
- e) What are equipments for electrical safety while working in industries? Explain its importance.
- f) Brief corrective actions for prevention of industrial accidents.

Q.3 Solve any two of the following.

- a) Explain types of accidents and preventive measures in industries.
- b) Describe causes of electrical accidents and safety rules for electrical accidents.
- c) Explain different types of environmental disasters.

Set P

Max. Marks: 40

20

We a) c)	_	rs are b) d)	Drought All of the above
a)	ich is not the disaster related to g Landscape and mud flows Heat wave	-	ical conditions? Avalanche Coastal erosion
a)	ich does not include environment Decertification Dam Bursts	al dis b) d)	aster? Cloud burst Mine fires
a)	e geological disasters are Earthquakes Dam bursts	b) d)	Volcanic activity All of the above
a)	ich are the 'Safety' equipments w Helmets Machine guards	'nile v b) d)	vorking in industry? Safety belts All of the above
a)	isaster management cycle comp Mitigation Recovery		of Preparedness All of the above
a)	k is that loss will occur as Effect Probability	b)	sult of an adverse event. Event Possibility
	covery in disaster management re Temporary Housing Facility Grants		o Medical aid All of the above
	emergency is a situation generat event that requires immediate response action	ed by b) d)	the real or imminent occurance attention Act

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Electrical Engineering SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019

Time: 10:00 AM To 12:00 PM

Duration: 20 Minutes

1)

2)

9)

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.

Marks: 10

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T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019

10

Max. Marks: 50

3)

4)

- 5)

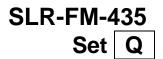
6)

7)

- 8)

Seat No.





- A committee was formed for disaster management plans in _____ under the chairmanship of Mr. J. C. Pant. 10)
 - a) August 1999c) Sept 1949 b) Feb 2002

d) Jan 2002

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Solve any four of the following.

- a) What are the unsafe acts while working in industry?
- b) Explain the "need for safety".
- c) What are the requirements of safety specialist?
- **d)** What are highlights of National policy on disaster management approved in 2009?
- e) What are equipments for electrical safety while working in industries? Explain its importance.
- f) Brief corrective actions for prevention of industrial accidents.

Q.3 Solve any two of the following.

- a) Explain types of accidents and preventive measures in industries.
- b) Describe causes of electrical accidents and safety rules for electrical accidents.
- c) Explain different types of environmental disasters.

Max. Marks: 40

20



Re	covery in disaster management re	efers	to
a)	Temporary Housing Facility	b)	Medical aid
c)	Grants	d)	All of the above
Án	emergency is a situation generate event that requires immediate response action	éd by	
the	committee was formed for disaste chairmanship of Mr. J. C. Pant.		
	August 1999	b)	Feb 2002
C)	Sept 1949	d)	Jan 2002
We	ather and climate related disaste	rs are	
a)	Flood	b)	Drought
c)	Cyclone	d)	All of the above
,		,	
	lich is not the disaster related to g		•
a)	Landscape and mud flows	b)	Avalanche
C)	Heat wave	d)	Coastal erosion

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Choose the correct alternatives from the options and rewrite the sentence.

b)

Duration: 20 Minutes

1)

9)

Q.1

Marks: 10

10

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Max. Marks: 50

b) Volcanic activity All of the above d)

Safetv belts

2) Which are the 'Safety' equipments while working in industry?

Helmets a)

The geological disasters are ____

a) Earthquakes

c) Dam bursts

Machine guards d) All of the above c)

A disaster management cycle comprises of 3)

- Mitigation Preparedness a) b)
- Recovery d) All of the above c)
- Risk is _____ that loss will occur as the result of an adverse event. 4)
 - Effect Event a) b) Probability d) Possibility C)
- 5) Re
 - a)
 - c)
- 6) Ar of
 - a) c)

7) А the

- a)
- c)

W 8)

- a)
- c) W



- 10) Which does not include environmental disaster?
 - a) Decertification

b) Cloud burst d)

c) Dam Bursts

Mine fires

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) All questions are compulsorv.

2) Figures to the right indicate full marks.

Q.2 Solve any four of the following.

- What are the unsafe acts while working in industry? a)
- Explain the "need for safety". b)
- C) What are the requirements of safety specialist?
- What are highlights of National policy on disaster management approved d) in 2009?
- What are equipments for electrical safety while working in industries? e) Explain its importance.
- Brief corrective actions for prevention of industrial accidents. **f**)

Q.3 Solve any two of the following.

- Explain types of accidents and preventive measures in industries. a)
- Describe causes of electrical accidents and safety rules for electrical b) accidents.
- Explain different types of environmental disasters. c)

Max. Marks: 40

20

20

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	•	T.E. (P	Part – II) (Old) (CGPA) E		
		SAFET	Electrical En Y ENGINEERING AND		
	& Date	: Thursd	lay, 28-11-2019		Max. Marks: 50
			12:00 PM		
Instr	uctio	bo	ook.		be solved in first 20 minutes in answer
		2) Fig	gures to the right indicate full	mark	<s.< td=""></s.<>
Dure	tion. O		MCQ/Objective Ty	ype (
		0 Minute			Marks: 10
Q.1	1)		ry in disaster management r		tions and rewrite the sentence. 10
	- /		nporary Housing Facility		Medical aid All of the above
	2)				y the real or imminent occurance
			t that requires immediate	 b)	attention
		c) acti		d)	Act
	3)	A comm	nittee was formed for disaste	r mar	nagement plans in under
			irmanship of Mr. J. C. Pant.	ل م)	Fab 2002
		c) Sep	gust 1999 ot 1949	b) d)	Feb 2002 Jan 2002
	4)		r and climate related disaste	ers are	e
		a) Floo		b)	Drought
	E)	, ,	clone	d) roolo	All of the above
	5)		s not the disaster related to g Idscape and mud flows	b)	Avalanche
			at wave	d)	Coastal erosion
	6)		loes not include environmen		
		,	certification n Bursts	b) d)	Cloud burst Mine fires
	7)	,	blogical disasters are	u)	
	7)		thquakes	b)	Volcanic activity
		,	n bursts	d)	All of the above
	8)		are the 'Safety' equipments v		• •
		,	mets	b)	Safety belts
	0)	,	chine guards	d)	All of the above
	9)		ter management cycle comp gation	b)	of Preparedness
			covery	d)	All of the above

Page **10** of **12**

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Seat

No.



- 10) Risk is _____ that loss will occur as the result of an adverse event.
 - a) Effect
 - c) Probability

- b) Event
- d) Possibility

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Q.2 Solve any four of the following.

- a) What are the unsafe acts while working in industry?
- **b)** Explain the "need for safety".
- c) What are the requirements of safety specialist?
- **d)** What are highlights of National policy on disaster management approved in 2009?
- e) What are equipments for electrical safety while working in industries? Explain its importance.
- f) Brief corrective actions for prevention of industrial accidents.

Q.3 Solve any two of the following.

- a) Explain types of accidents and preventive measures in industries.
- b) Describe causes of electrical accidents and safety rules for electrical accidents.
- c) Explain different types of environmental disasters.

Set S

Max. Marks: 40

20

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

INTELLECTUAL PROPERTY RIGHTS Day & Date: Thursday, 28-11-2019

Time: 10:00 AM To 12:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 20 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 20 Minutes

TRUE OR FALSE (Attempt All) Q.1

- Certification mark can be licensed. a)
- Trademark can be domain name. b)
- Domain name is used in real world. c)
- d) Geographical Indication is public good.
- Geographical Indication is community right. e)
- Company can register collective mark. **f)**
- Trademark can be used in virtual world. g)
- WTO administer domain name. h)
- ICANN head guarter is in Geneva. i)
- j) Certification is used along with trademark.

Max. Marks: 50

Marks: 10

10

Set



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Set

SLR-FM-436

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** INTELLECTUAL PROPERTY RIGHTS

Day & Date: Thursday, 28-11-2019 Max. Marks: 40 Time: 10:00 AM To 12:00 PM Instructions: 1) All question are compulsory. 2) Figures to the right indicate full marks. Q.2 Attempt any Four Explain measures to control piracy. a) Explain software copyright. b) Explain law on semiconductor layout design. C) Explain patent on biotechnology. d) What is expected from patentee as an obligation to the state? e) What are the types of designs not registrable under act? **f**)

Q.3 Attempt any Two

Seat

No.

- Discuss the importance of Law on Industrial designs. a)
- What is Intellectual property? How it is useful for Engineers? b)
- Explain commercial exploitation and infringement. c)

20

Seat No.

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering VALUE ENGINEERING

Day & Date: Thursday, 28-11-2019 Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Solve any five questions.

Q.1 Solve any five.

- a) Define Value Engineering and brief the advantages of Value Engineering.
- **b)** Brief the selection procedure for value engineering projects.
- c) Explain in detail value in Indian Scenario.
- d) What are the different phases in Job Plans?
- e) How value engineering is useful in maintenance and repair activities? Explain in details.
- f) Write note on Value analysis for value engineering.
- g) Explain different techniques employed in value engineering.



Max. Marks: 50

No.			
	B.E. (Part – I) (New) (C

r) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - A four quadrant operation requires _____. 1)
 - Two full converters in series a)
 - Two full converters connected in parallel b)
 - Two full converter connected in back to back C)
 - Two semi converters connected in back to back d)
 - 2) Which of the following motors is preferred when quick speed reversal is the main consideration?
 - Squirrel cage induction motor b) Wound rotor induction motor a)
 - Synchronous motor d) DC motor C)
 - Which duty cycle is preferred if the load requires a constant power for 3) short period of time and rest for sufficient longer duration?
 - a) Short Time duty
 - Intermittent duty b)
 - Intermittent duty with starting c)
 - Intermittent duty with starting and braking d)
 - 4) For high frequency choppers the device that is preferred is _____.
 - Thyristor b) TRIAC a)
 - Transistor GTO c) d)

An elevator drive is required to operate in ____ 5)

- One quadrant only b) Two quadrants a) Three quadrants c)
 - d) Four quadrants
- 6) Full-converter can be used in DC motor for regenerative braking in _____.
 - Constant Operation b) Variable Operation a)
 - Inversion Operation d) Opposite Operation
- 7) Which of the following method is employed when regenerative braking is necessary?
 - a) DC Chopper Inverter Rectifier

c)

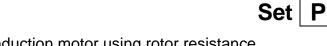
c)

C)

- b) Variable Resistor d) Motor-generator
- 8) Stator voltage control for speed control of induction motors is suitable for
 - Fan and pump drives a) Running it as generator
- b) Drive of a crane
- d) Constant load drive

Max. Marks: 70

Marks: 14



- 9) During the starting of a slip ring induction motor using rotor resistance starter, the insertion of resistance in the rotor circuit causes: _____.
 - a) Stator current to increase and torque to decrease
 - b) Stator current to decrease and torque to increase
 - c) Stators current to increase and power factor to decrease
 - d) Power factor to decrease and torque to increase
- 10) The operating speed of a synchronous motor can be changed to new fixed value by _____.
 - a) Changing the load
- b) Changing the supply voltage
- c) Changing frequency d) Using brakes
- 11) In a 3-phase voltage source inverter used for speed control of induction motor, antiparallel diodes are used across each switching device. The main purpose of diodes is to _____.
 - a) Protect the switching devices against overvoltage
 - b) Provide the path for freewheeling current
 - c) Allow the motor to return energy during regeneration
 - d) Help in switching off the devices
- 12) Speed control by variation of field flux results in _
 - Constant power drive b) Constant torque drive
 - c) Variable power drive
- d) None of the above
- 13) Reluctance motor is a ____

a)

- a) Variable torque motor
- b) Low torque variable speed motor
- c) Self starting type synchronous motor
- d) Low noise, slow speed motor
- 14) With a stator having 8 teeth and a rotor having 6 teeth, what step angle will an application be able to achieve?
 - a) 15° b) 51°
 - c) 20° d) 105°

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019

Time : 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to the right indicates full marks.
- 3) Assume the suitable data wherever necessary.

Section – I

Q.2 Solve any four

- With neat sketch explain closed loop control of multimotor drive. a)
- b) Explain regenerative braking in separately excited dc motor also draw speed torque characteristics.
- A 230 V, 1200 rpm and 15 A separately excited dc motor has an armature c) resistance of 1.2Ω . The motor is operated in dynamic braking with chopper control. The braking resistance has value of 20Ω .
 - Calculate duty ratio of chopper for motor speed of 1000rpm & braking 1) torque equal to 1.5 times rated motor torque.
 - 2) What will be motor speed for duty ratio of 0.5 & motor torgue equal to its rated torque.
- d) A 200 V, 875 rpm, 150 A, separately excited dc motor has an armature resistance of 0.06Ω It is fed from a single phase fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction calculate.
 - Firing angle for the rated torgue and 750 rpm. 1)
 - Firing angle for the rated torgue and (-500) rpm. 2)
- Explain the chopper fed DC separately excited motor in motoring mode. e)

Q.3 Solve Any Two

- With neat sketch & waveform explain single phase fully controlled rectifier a) fed separately excited D.C. motor drive. And derive the expression for critical value of speed which separates continuous conduction at discontinuous conduction for a given firing angle α .
- A 220V, 960 rpm, 12.8 A separately excited dc motor has armature circuit b) resistance & inductance of 2 Ω & 150 mH respectively. Motor is controlled by single phase half controlled rectifier with source voltage of 230 V, 50 Hz. Identify modes of operation & Calculate.
 - Motor torque for $\alpha = 60^{\circ}$ & Speed = 600 rpm 1)
 - Motor Speed for $\alpha = 60^{\circ}$ & Torque = 20 N-m 2)
- A 220 V, 1500 rpm, 50 A separately excited dc motor has armature circuit c) resistance of 0.5 Ω , is fed from 3 phase fully controlled rectifier. Available ac source has line voltage of 440 V, 50Hz. A star -delta connected transformer is used to feed the armature so that motor terminal voltage equals to rated voltage when converter firing angel is zero.
 - Calculate transformer turns ratio 1)
 - Determine the value of firing angle when 2)
 - Motor is running at 1200 rpm & rated torgue i)
 - When motor is running at (-800) rpm & twice the rated torque ii)

Max. Marks: 56

12

16

Set

Seat No.



Set

Section – II

Q.4 Solve any four

- a) Explain stator voltage control of an induction motor with speed torque characteristics.
- b) A 440 V, 50 Hz, 6 pole star connected wound rotor motor has following parameters referred to stator.

 $R_s = 0.5$ ohm, $R_r' = 0.4$ ohm. $X_s = X_r' = 1.2$ ohm, $X_m = 50 \Omega$.

Stator to rotor turns ratio is 3.5 motor is controlled by static rotor resistance control. External resistance is chosen such that the breakdown torque is produced at standstill for a duty ratio of zero. Calculate the value of external resistance.

c) A star connected squirrel cage induction motor has following rating & parameters:

400V, 50 Hz, 4 Pole, 1370 rpm $R_s = 2 \Omega$, $R_r' = 3 \Omega$, $X_s = X_r' = 3.5 \Omega$, Motor is controlled by a voltage source inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz. Calculate approximate values of the following for inverter fed induction motor drive.

- 1) Speed for a frequency of 30Hz & 80% of full load torque
- 2) Frequency for speed of 1000 rpm & full load torque
- d) Explain the speed torque & power angle characteristics of cylindrical rotor wound field synchronous motor.
- e) Explain drive circuit for stepper motor with neat sketch.

Q.5 Solve any Two

- a) With neat sketch explain VSI feed induction motor drive also draw block diagram for closed loop control.
- b) A 400 V star connected, 3 phase, 6 pole and 50Hz induction motor has following parameter referred to stator

 $Rs = Rr' = 1\Omega$, $Xs = Xr' = 2\Omega$

It is braked by plugging from its initial full load speed of 950 rpm. Stator to rotor turns Ratio is 2.3.

- 1) Calculate the initial braking current & torque as a ratio of their full load values.
- 2) What resistance must be inserted in rotor circuit to reduce the maximum braking current to 1.5 times full load current? What will be initial braking torque now?
- c) A 500 KW, 3 phase, 3.3 kV, 50 Hz, (0.8 lagging) power factor, 4 pole star connected synchronous motor has following parameters:
 - $X_s=~15\,\Omega$, $Rs=0\,\Omega$. Rated field current is 10A.Calculate.
 - 1) Armature current and power factor at half the rated torque & rated field current.
 - 2) Field current to get unity power factor at the rated torque
 - 3) Torque for unity power factor operation at field current of 12.5 A

16

Set

Max. Marks: 70

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering INDUSTRIAL DRIVES CONTROL**

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- Assume the suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Stator voltage control for speed control of induction motors is suitable 1)
 - for
 - Fan and pump drives a) Running it as generator
- d) Constant load drive
- 2) During the starting of a slip ring induction motor using rotor resistance starter, the insertion of resistance in the rotor circuit causes:
 - Stator current to increase and torque to decrease a)
 - Stator current to decrease and torque to increase b)
 - Stators current to increase and power factor to decrease c)
 - d) Power factor to decrease and torgue to increase
- 3) The operating speed of a synchronous motor can be changed to new fixed value by
 - Changing the load a)
- b) Changing the supply voltage
- c) Changing frequency d) Using brakes
- 4) In a 3-phase voltage source inverter used for speed control of induction motor, antiparallel diodes are used across each switching device. The main purpose of diodes is to
 - Protect the switching devices against overvoltage a)
 - Provide the path for freewheeling current b)
 - Allow the motor to return energy during regeneration c)
 - Help in switching off the devices d)
- 5) Speed control by variation of field flux results in _____
 - Constant power drive a)
- b) Constant torque drive d) None of the above
- Variable power drive c)
- Reluctance motor is a

6)

- Variable torque motor a)
- Low torgue variable speed motor b)
- Self starting type synchronous motor c)
- d) Low noise, slow speed motor

Seat No.

Marks: 14

- b) Drive of a crane

Set Q

- 7) With a stator having 8 teeth and a rotor having 6 teeth, what step angle will an application be able to achieve?
 - a) 15° b) 51°
 - c) 20° d) 105°
- 8) A four quadrant operation requires _____.
 - a) Two full converters in series
 - b) Two full converters connected in parallel
 - c) Two full converter connected in back to back
 - d) Two semi converters connected in back to back
- 9) Which of the following motors is preferred when quick speed reversal is the main consideration?
 - a) Squirrel cage induction motor b) Wound rotor induction motor
 - c) Synchronous motor d) DC motor
- 10) Which duty cycle is preferred if the load requires a constant power for short period of time and rest for sufficient longer duration?
 - a) Short Time duty
 - b) Intermittent duty

a)

c)

- c) Intermittent duty with starting
- d) Intermittent duty with starting and braking
- 11) For high frequency choppers the device that is preferred is _____.
 - Thyristor b) TRIAC
 - c) Transistor d) GTO

12) An elevator drive is required to operate in _____

- a) One quadrant only
- b) Two quadrants
- c) Three quadrants
- d) Four quadrants
- 13) Full-converter can be used in DC motor for regenerative braking in _____.
 - a) Constant Operation
- b) Variable Operation
- Inversion Operation d) Opposite Operation
- 14) Which of the following method is employed when regenerative braking is necessary?
 - a) DC Chopper
 - c) Inverter Rectifier
- b) Variable Resistor
- d) Motor-generator

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019

Time : 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to the right indicates full marks.
- 3) Assume the suitable data wherever necessary.

Section – I

Q.2 Solve any four

- a) With neat sketch explain closed loop control of multimotor drive.
- b) Explain regenerative braking in separately excited dc motor also draw speed torque characteristics.
- c) A 230 V, 1200 rpm and 15 A separately excited dc motor has an armature resistance of 1.2Ω . The motor is operated in dynamic braking with chopper control. The braking resistance has value of 20Ω .
 - 1) Calculate duty ratio of chopper for motor speed of 1000rpm & braking torque equal to 1.5 times rated motor torque.
 - 2) What will be motor speed for duty ratio of 0.5 & motor torque equal to its rated torque.
- A 200 V, 875 rpm, 150 A, separately excited dc motor has an armature resistance of 0.06Ω It is fed from a single phase fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction calculate.
 - 1) Firing angle for the rated torque and 750 rpm.
 - 2) Firing angle for the rated torque and (-500) rpm.
- e) Explain the chopper fed DC separately excited motor in motoring mode.

Q.3 Solve Any Two

- a) With neat sketch & waveform explain single phase fully controlled rectifier fed separately excited D.C. motor drive. And derive the expression for critical value of speed which separates continuous conduction at discontinuous conduction for a given firing angle *α*.
- b) A 220V, 960 rpm, 12.8 A separately excited dc motor has armature circuit resistance & inductance of 2 Ω & 150 mH respectively. Motor is controlled by single phase half controlled rectifier with source voltage of 230 V, 50 Hz. Identify modes of operation & Calculate.
 - 1) Motor torque for $\alpha = 60^{\circ}$ & Speed = 600 rpm
 - 2) Motor Speed for $\alpha = 60^{\circ}$ & Torque = 20 N-m
- c) A 220 V, 1500 rpm, 50 A separately excited dc motor has armature circuit resistance of 0.5 Ω , is fed from 3 phase fully controlled rectifier. Available ac source has line voltage of 440 V, 50Hz. A star –delta connected transformer is used to feed the armature so that motor terminal voltage equals to rated voltage when converter firing angel is zero.
 - 1) Calculate transformer turns ratio
 - 2) Determine the value of firing angle when
 - i) Motor is running at 1200 rpm & rated torque
 - ii) When motor is running at (-800) rpm & twice the rated torque

Max. Marks: 56

12

SLR-FM-438



Seat No.

Set Q

Section – II

Q.4 Solve any four

- a) Explain stator voltage control of an induction motor with speed torque characteristics.
- b) A 440 V, 50 Hz, 6 pole star connected wound rotor motor has following parameters referred to stator.

 $R_s = 0.5$ ohm, $R_r' = 0.4$ ohm. $X_s = X_r' = 1.2$ ohm, $X_m = 50 \Omega$.

Stator to rotor turns ratio is 3.5 motor is controlled by static rotor resistance control. External resistance is chosen such that the breakdown torque is produced at standstill for a duty ratio of zero. Calculate the value of external resistance.

c) A star connected squirrel cage induction motor has following rating & parameters:

400V, 50 Hz, 4 Pole, 1370 rpm $R_s = 2 \Omega$, $R_r' = 3 \Omega$, $X_s = X_r' = 3.5 \Omega$, Motor is controlled by a voltage source inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz. Calculate approximate values of the following for inverter fed induction motor drive.

- 1) Speed for a frequency of 30Hz & 80% of full load torque
- 2) Frequency for speed of 1000 rpm & full load torque
- d) Explain the speed torque & power angle characteristics of cylindrical rotor wound field synchronous motor.
- e) Explain drive circuit for stepper motor with neat sketch.

Q.5 Solve any Two

- a) With neat sketch explain VSI feed induction motor drive also draw block diagram for closed loop control.
- b) A 400 V star connected, 3 phase, 6 pole and 50Hz induction motor has following parameter referred to stator

 $Rs = Rr' = 1\Omega$, $Xs = Xr' = 2\Omega$

It is braked by plugging from its initial full load speed of 950 rpm. Stator to rotor turns Ratio is 2.3.

- 1) Calculate the initial braking current & torque as a ratio of their full load values.
- 2) What resistance must be inserted in rotor circuit to reduce the maximum braking current to 1.5 times full load current? What will be initial braking torque now?
- c) A 500 KW, 3 phase, 3.3 kV, 50 Hz, (0.8 lagging) power factor, 4 pole star connected synchronous motor has following parameters:
 - $X_s=~15\,\Omega$, $Rs=0\,\Omega$. Rated field current is 10A.Calculate.
 - 1) Armature current and power factor at half the rated torque & rated field current.
 - 2) Field current to get unity power factor at the rated torque
 - 3) Torque for unity power factor operation at field current of 12.5 A

16

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

C)

Seat No.

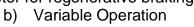
Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- An elevator drive is required to operate in 1)
 - One quadrant only a)
 - Three quadrants C)
- Full-converter can be used in DC motor for regenerative braking in _____. 2)
 - Constant Operation a) Inversion Operation
- d) Opposite Operation
- Which of the following method is employed when regenerative braking is 3) necessary?
 - DC Chopper a) Inverter Rectifier c)
- Variable Resistor b) d) Motor-generator

b) Two quadrants

d) Four quadrants

- Stator voltage control for speed control of induction motors is suitable 4) for
 - a) Fan and pump drives Running it as generator
- b) Drive of a crane d) Constant load drive
- 5) During the starting of a slip ring induction motor using rotor resistance starter, the insertion of resistance in the rotor circuit causes:
 - Stator current to increase and torque to decrease a)
 - Stator current to decrease and torque to increase b)
 - Stators current to increase and power factor to decrease c)
 - Power factor to decrease and torque to increase d)
- 6) The operating speed of a synchronous motor can be changed to new fixed value by
 - Changing the load b) Changing the supply voltage a)
 - c) Changing frequency d) Using brakes
- In a 3-phase voltage source inverter used for speed control of induction 7) motor, antiparallel diodes are used across each switching device. The main purpose of diodes is to
 - Protect the switching devices against overvoltage a)
 - Provide the path for freewheeling current b)
 - Allow the motor to return energy during regeneration C)
 - Help in switching off the devices d)





Max. Marks: 70

SLR-FM-438

Marks: 14

Set R

- 8) Speed control by variation of field flux results in _____.
 - a) Constant power drive
 - c) Variable power drive
- b) Constant torque drive
- d) None of the above
- 9) Reluctance motor is a _____.
 - a) Variable torque motor
 - b) Low torque variable speed motor
 - c) Self starting type synchronous motor
 - d) Low noise, slow speed motor
- 10) With a stator having 8 teeth and a rotor having 6 teeth, what step angle will an application be able to achieve?
 - a) 15° b) 51°
 - c) 20° d) 105°
- 11) A four quadrant operation requires _____.
 - a) Two full converters in series
 - b) Two full converters connected in parallel
 - c) Two full converter connected in back to back
 - d) Two semi converters connected in back to back
- 12) Which of the following motors is preferred when quick speed reversal is the main consideration?
 - a) Squirrel cage induction motor
 - b) Wound rotor induction motor
 - c) Synchronous motor
- d) DC motor

b) TRIAC

- 13) Which duty cycle is preferred if the load requires a constant power for short period of time and rest for sufficient longer duration?
 - a) Short Time duty
 - b) Intermittent duty
 - c) Intermittent duty with starting
 - d) Intermittent duty with starting and braking
- 14) For high frequency choppers the device that is preferred is _____.
 - a) Thyristor
 - c) Transistor d) GTO

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019

Time : 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to the right indicates full marks.
- 3) Assume the suitable data wherever necessary.

Section – I

Q.2 Solve any four

- a) With neat sketch explain closed loop control of multimotor drive.
- b) Explain regenerative braking in separately excited dc motor also draw speed torque characteristics.
- c) A 230 V, 1200 rpm and 15 A separately excited dc motor has an armature resistance of 1.2Ω . The motor is operated in dynamic braking with chopper control. The braking resistance has value of 20Ω .
 - 1) Calculate duty ratio of chopper for motor speed of 1000rpm & braking torque equal to 1.5 times rated motor torque.
 - 2) What will be motor speed for duty ratio of 0.5 & motor torque equal to its rated torque.
- d) A 200 V, 875 rpm, 150 A, separately excited dc motor has an armature resistance of 0.06Ω It is fed from a single phase fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction calculate.
 - 1) Firing angle for the rated torque and 750 rpm.
 - 2) Firing angle for the rated torque and (-500) rpm.
- e) Explain the chopper fed DC separately excited motor in motoring mode.

Q.3 Solve Any Two

- a) With neat sketch & waveform explain single phase fully controlled rectifier fed separately excited D.C. motor drive. And derive the expression for critical value of speed which separates continuous conduction at discontinuous conduction for a given firing angle *α*.
- b) A 220V, 960 rpm, 12.8 A separately excited dc motor has armature circuit resistance & inductance of 2 Ω & 150 mH respectively. Motor is controlled by single phase half controlled rectifier with source voltage of 230 V, 50 Hz. Identify modes of operation & Calculate.
 - 1) Motor torque for $\alpha = 60^{\circ}$ & Speed = 600 rpm
 - 2) Motor Speed for $\alpha = 60^{\circ}$ & Torque = 20 N-m
- c) A 220 V, 1500 rpm, 50 A separately excited dc motor has armature circuit resistance of 0.5 Ω , is fed from 3 phase fully controlled rectifier. Available ac source has line voltage of 440 V, 50Hz. A star –delta connected transformer is used to feed the armature so that motor terminal voltage equals to rated voltage when converter firing angel is zero.
 - 1) Calculate transformer turns ratio
 - 2) Determine the value of firing angle when
 - i) Motor is running at 1200 rpm & rated torque
 - ii) When motor is running at (-800) rpm & twice the rated torque

Max. Marks: 56

16

12

Set |

Seat		
No.		
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SLR-FM-438

Set

Section – II

Q.4 Solve any four

- a) Explain stator voltage control of an induction motor with speed torque characteristics.
- b) A 440 V, 50 Hz, 6 pole star connected wound rotor motor has following parameters referred to stator.

 $R_s = 0.5 \text{ ohm}, R_r' = 0.4 \text{ ohm}, X_s = X_r' = 1.2 \text{ ohm}, X_m = 50 \Omega.$

Stator to rotor turns ratio is 3.5 motor is controlled by static rotor resistance control. External resistance is chosen such that the breakdown torque is produced at standstill for a duty ratio of zero. Calculate the value of external resistance.

c) A star connected squirrel cage induction motor has following rating & parameters:

400V, 50 Hz, 4 Pole, 1370 rpm $R_s = 2 \Omega$, $R_r' = 3 \Omega$, $X_s = X_r' = 3.5 \Omega$, Motor is controlled by a voltage source inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz. Calculate approximate values of the following for inverter fed induction motor drive.

- 1) Speed for a frequency of 30Hz & 80% of full load torque
- 2) Frequency for speed of 1000 rpm & full load torque
- d) Explain the speed torque & power angle characteristics of cylindrical rotor wound field synchronous motor.
- e) Explain drive circuit for stepper motor with neat sketch.

Q.5 Solve any Two

- a) With neat sketch explain VSI feed induction motor drive also draw block diagram for closed loop control.
- b) A 400 V star connected, 3 phase, 6 pole and 50Hz induction motor has following parameter referred to stator

 $Rs = Rr' = 1\Omega$, $Xs = Xr' = 2\Omega$

It is braked by plugging from its initial full load speed of 950 rpm. Stator to rotor turns Ratio is 2.3.

- 1) Calculate the initial braking current & torque as a ratio of their full load values.
- 2) What resistance must be inserted in rotor circuit to reduce the maximum braking current to 1.5 times full load current? What will be initial braking torque now?
- c) A 500 KW, 3 phase, 3.3 kV, 50 Hz, (0.8 lagging) power factor, 4 pole star connected synchronous motor has following parameters:
 - $X_s=~15\,\Omega$, $Rs=0\,\Omega$. Rated field current is 10A.Calculate.
 - 1) Armature current and power factor at half the rated torque & rated field current.
 - 2) Field current to get unity power factor at the rated torque
 - 3) Torque for unity power factor operation at field current of 12.5 A

16

Set S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The operating speed of a synchronous motor can be changed to new fixed value by _____.
 - a) Changing the load
 - c) Changing frequency
- d) Using brakes

b) Changing the supply voltage

- In a 3-phase voltage source inverter used for speed control of induction motor, antiparallel diodes are used across each switching device. The main purpose of diodes is to _____.
 - a) Protect the switching devices against overvoltage
 - b) Provide the path for freewheeling current
 - c) Allow the motor to return energy during regeneration
 - d) Help in switching off the devices
- 3) Speed control by variation of field flux results in _____
 - a) Constant power drive
- b) Constant torque drived) None of the above
- c) Variable power drive
- 4) Reluctance motor is a _____
 - a) Variable torque motor
 - b) Low torque variable speed motor
 - c) Self starting type synchronous motor
 - d) Low noise, slow speed motor
- 5) With a stator having 8 teeth and a rotor having 6 teeth, what step angle will an application be able to achieve?
 - a) 15° b) 51°
 - c) 20° d) 105°
- 6) A four quadrant operation requires _____
 - a) Two full converters in series
 - b) Two full converters connected in parallel
 - c) Two full converter connected in back to back
 - d) Two semi converters connected in back to back
- 7) Which of the following motors is preferred when quick speed reversal is the main consideration?
 - a) Squirrel cage induction motorc) Synchronous motor
- b) Wound rotor induction motor
- d) DC motor

Max. Marks: 70

Marks: 14

- 8) Which duty cycle is preferred if the load requires a constant power for short period of time and rest for sufficient longer duration?
 - a) Short Time duty
 - b) Intermittent duty
 - c) Intermittent duty with starting
 - d) Intermittent duty with starting and braking
- 9) For high frequency choppers the device that is preferred is _____.
 - a) Thyristor b) TRIAC
 - c) Transistor d) GTO
- 10) An elevator drive is required to operate in ____
 - a) One quadrant only
 - b) Two quadrants
 - c) Three quadrants d) Four quadrants
- 11) Full-converter can be used in DC motor for regenerative braking in _____.
 - a) Constant Operation

Inversion Operation

- b) Variable Operationd) Opposite Operation
- 12) Which of the following method is employed when regenerative braking is necessary?
 - a) DC Chopper

c)

c)

- b) Variable Resistor
- Inverter Rectifier d) Motor-generator
- 13) Stator voltage control for speed control of induction motors is suitable for _____.
 - a) Fan and pump drives
- b) Drive of a crane
- c) Running it as generator
- d) Constant load drive
- 14) During the starting of a slip ring induction motor using rotor resistance starter, the insertion of resistance in the rotor circuit causes: _____.
 - a) Stator current to increase and torque to decrease
 - b) Stator current to decrease and torque to increase
 - c) Stators current to increase and power factor to decrease
 - d) Power factor to decrease and torque to increase

Seat No.

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019

Time : 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figure to the right indicates full marks.
- 3) Assume the suitable data wherever necessary.

Section – I

Q.2 Solve any four

- a) With neat sketch explain closed loop control of multimotor drive.
- b) Explain regenerative braking in separately excited dc motor also draw speed torque characteristics.
- c) A 230 V, 1200 rpm and 15 A separately excited dc motor has an armature resistance of 1.2Ω . The motor is operated in dynamic braking with chopper control. The braking resistance has value of 20Ω .
 - 1) Calculate duty ratio of chopper for motor speed of 1000rpm & braking torque equal to 1.5 times rated motor torque.
 - 2) What will be motor speed for duty ratio of 0.5 & motor torque equal to its rated torque.
- d) A 200 V, 875 rpm, 150 A, separately excited dc motor has an armature resistance of 0.06Ω It is fed from a single phase fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction calculate.
 - 1) Firing angle for the rated torque and 750 rpm.
 - 2) Firing angle for the rated torque and (-500) rpm.
- e) Explain the chopper fed DC separately excited motor in motoring mode.

Q.3 Solve Any Two

- a) With neat sketch & waveform explain single phase fully controlled rectifier fed separately excited D.C. motor drive. And derive the expression for critical value of speed which separates continuous conduction at discontinuous conduction for a given firing angle α .
- b) A 220V, 960 rpm, 12.8 A separately excited dc motor has armature circuit resistance & inductance of 2 Ω & 150 mH respectively. Motor is controlled by single phase half controlled rectifier with source voltage of 230 V, 50 Hz. Identify modes of operation & Calculate.
 - 1) Motor torque for $\alpha = 60^{\circ}$ & Speed = 600 rpm
 - 2) Motor Speed for $\alpha = 60^{\circ}$ & Torque = 20 N-m
- c) A 220 V, 1500 rpm, 50 A separately excited dc motor has armature circuit resistance of 0.5 Ω , is fed from 3 phase fully controlled rectifier. Available ac source has line voltage of 440 V, 50Hz. A star –delta connected transformer is used to feed the armature so that motor terminal voltage equals to rated voltage when converter firing angel is zero.
 - 1) Calculate transformer turns ratio
 - 2) Determine the value of firing angle when
 - i) Motor is running at 1200 rpm & rated torque
 - ii) When motor is running at (-800) rpm & twice the rated torque

12

16

Max. Marks: 56

Set

Section – II

Q.4 Solve any four

- a) Explain stator voltage control of an induction motor with speed torque characteristics.
- b) A 440 V, 50 Hz, 6 pole star connected wound rotor motor has following parameters referred to stator.

 $R_s = 0.5$ ohm, $R_r' = 0.4$ ohm. $X_s = X_r' = 1.2$ ohm, $X_m = 50 \Omega$.

Stator to rotor turns ratio is 3.5 motor is controlled by static rotor resistance control. External resistance is chosen such that the breakdown torque is produced at standstill for a duty ratio of zero. Calculate the value of external resistance.

c) A star connected squirrel cage induction motor has following rating & parameters:

400V, 50 Hz, 4 Pole, 1370 rpm $R_s = 2 \Omega$, $R_r' = 3 \Omega$, $X_s = X_r' = 3.5 \Omega$, Motor is controlled by a voltage source inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz. Calculate approximate values of the following for inverter fed induction motor drive.

- 1) Speed for a frequency of 30Hz & 80% of full load torque
- 2) Frequency for speed of 1000 rpm & full load torque
- d) Explain the speed torque & power angle characteristics of cylindrical rotor wound field synchronous motor.
- e) Explain drive circuit for stepper motor with neat sketch.

Q.5 Solve any Two

- a) With neat sketch explain VSI feed induction motor drive also draw block diagram for closed loop control.
- b) A 400 V star connected, 3 phase, 6 pole and 50Hz induction motor has following parameter referred to stator

 $Rs = Rr' = 1\Omega$, $Xs = Xr' = 2\Omega$

It is braked by plugging from its initial full load speed of 950 rpm. Stator to rotor turns Ratio is 2.3.

- 1) Calculate the initial braking current & torque as a ratio of their full load values.
- 2) What resistance must be inserted in rotor circuit to reduce the maximum braking current to 1.5 times full load current? What will be initial braking torque now?
- c) A 500 KW, 3 phase, 3.3 kV, 50 Hz, (0.8 lagging) power factor, 4 pole star connected synchronous motor has following parameters:
 - $X_s = 15 \Omega$, $Rs = 0 \Omega$. Rated field current is 10A.Calculate.
 - 1) Armature current and power factor at half the rated torque & rated field current.
 - 2) Field current to get unity power factor at the rated torque
 - 3) Torque for unity power factor operation at field current of 12.5 A

12

16

SLR-FM-438

Set S

Seat No.		Set P					
B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION							
		e: Tuesday, 10-12-2019 Max. Marks: 70 80 PM To 05:30 PM					
Instru	ctio	 ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minute in answer book. 2) Figures to the right indicate full marks 					
		 Figures to the right indicate full marks. MCQ/Objective Type Questions 					
Durati	on: ?	30 Minutes Marks: 14					
Q.1	-	oose the correct alternatives from the options and rewrite the 14					
	ser	ntence.					
	1)	 If the fault occurs near the impedance relay, the V/I ratio will be a) Constant for all distances b) Lower than that of if fault occurs away from the relay c) Higher than that of if fault occurs away from the relay d) None of the above 					
	2)	The relay with inverse time characteristic will operate withina) 1.5 secb) 5 to 10 secc) 5 to 20 secd) 20 to 30 sec					
	3)	The actuating quantity for the relays may bea) Magnitudeb) Frequencyc) Phase angled) Any of the above					
	 4) Burden of a protective relay is the power a) Required to operate the circuit breaker b) Absorbed by the circuit of relay c) Developed by the relay circuit d) None of the above 						
	5)	Up to what voltage can the liquid type HRC fuses be used? a) 33 kV b) 132 kV c) 66 V d) 220 kV					
	6)	Admittance relay isa) Non-directional relayb) Directional relayc) Differential relayd) All of the above					
	7)	 Which circuit breaker is preferred to be installed in extra high voltage AC system? a) Bulk oil type circuit breaker b) Air blast circuit breaker c) SF6 circuit breaker d) Vacuum circuit breaker 					
	8)	Discrimination between main and back up protection is provided by the use of relays which are					
		a) Factb) Sensitivec) Slowd) None of the above					

- Set P
- 9) If the strands of the fusing wire are twisted, what happens to the fusing current?
 - a) Increases
 - b) Reduces
 - c) No change/ remains same
 - d) Depends on the value of current, increases or decreases
- 10) The arc resistance depends on which among the following factors?
 - a) Cross section of the arc b) Length of the arc
 - c) Degree of ionization d) All of the above
- 11) Protective relays are devices that detect abnormal conditions in circuits by measuring _____.
 - a) Current during abnormal condition
 - b) Voltage during abnormal condition
 - c) Constantly the electrical quantities which differ during normal & abnormal condition
 - d) None of the above
- 12) For ground fault, which of the relay is preferred?
 - a) Plain impedance relay b) Directional relay
 - c) Reactance relay d) Overcurrent relay
- 13) Up to what voltage a cartridge type of fuse can be used?
 - a) 400 V b) 11 KV
 - c) 20 KV d) 33 KV
- 14) Protective relays can be designed to respond to _____.
 - a) Light intensity, impedance
 - b) Temperature, resistance, reactance
 - c) Voltage and current
 - d) All of these

12

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve any Four.

Seat

No.

- a) Explain the electromechanical impedance relay for protection of line.
- **b)** Define the following terms related to relay.
 - 1) Plug setting Multiplier
 - 2) Time setting multiplier
- c) Explain percentage differential relay with neat diagram.
- d) Explain with neat diagram the overcurrent protective scheme for radial and ring main feeder.
- e) What are desirable qualities of protective scheme?
- f) Determine the time of operation of an IDMT relay rating 5A and having setting of 125% and TSM=0.5. The relay is connected through C.T of 400/5A. The fault current is 4000A. The operating time for PSM of 8 is 3.2 Second.

Q.3 Solve any Two.

- a) Describe microprocessor based reactance relay with block diagram and flow chart to realize its characteristics.
- **b)** Explain construction and operation of electromechanical directional power relay.
- c) Explain MHO relay for distance protection. Draw its characteristics on R-X diagram.

Section – II

Q.4 Solve any Four.

- a) With neat sketch explain methods of arc extinction.
- **b)** Explain metal oxide arrestor with neat diagram.
- c) Draw & describe construction and operation of vacuum circuit breaker.
- d) With neat sketch explain the phenomenon of current chopping in circuit breaker.
- e) Explain differential protection of generator with neat diagram.
- f) A three phase transformer having line voltage ratio of 0.4KV/11KV is connected in star-delta and the protective transformer on 400v side have current ratio of 500/5. What must be ratio of protective transformer on the 11KV side?

Q.5 Solve any Two.

- a) With neat diagram explain percentage differential protection scheme of delta- star connected transformer indicate all three phases.
- **b)** What is restriking voltage? Derive an expression of RV & RRRV in terms of system voltage, inductance and capacitance.
- c) Explain the different protection schemes of industrial motors.

12

Max. Marks: 56

Set



16

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minute in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Choose the correct alternatives from the options and rewrite the sentence.

Duration: 30 Minutes

- 1) Discrimination between main and back up protection is provided by the
 - use of relays which are _____.
 - a) Fact

c)

c)

a)

- Slow d) None of the above
- 2) If the strands of the fusing wire are twisted, what happens to the fusing current?
 - a) Increases
 - b) Reduces
 - No change/ remains same c)
 - Depends on the value of current, increases or decreases d)
- 3) The arc resistance depends on which among the following factors?
 - a) Cross section of the arc Degree of ionization
 - b) Length of the arc d) All of the above

b) Sensitive

- Protective relays are devices that detect abnormal conditions in circuits by 4) measuring
 - a) Current during abnormal condition
 - Voltage during abnormal condition b)
 - Constantly the electrical quantities which differ during normal & c) abnormal condition
 - None of the above d)
- 5) For ground fault, which of the relay is preferred?
 - Plain impedance relay b) Directional relay
 - C) Reactance relay d) Overcurrent relay
- Up to what voltage a cartridge type of fuse can be used? 6)
 - a) 400 V b) 11 KV
 - d) 33 KV 20 KV c)
- 7) Protective relays can be designed to respond to .
 - Light intensity, impedance a)
 - Temperature, resistance, reactance b)
 - Voltage and current c)
 - d) All of these

Max. Marks: 70

SLR-FM-439



Seat No.

Q.

1

Marks: 14

Set Q 8) If the fault occurs near the impedance relay, the V/I ratio will be . Constant for all distances a) Lower than that of if fault occurs away from the relay b) Higher than that of if fault occurs away from the relay c) None of the above d) 9) The relay with inverse time characteristic will operate within _____. b) 5 to 10 sec 1.5 sec a) 5 to 20 sec d) 20 to 30 sec c) The actuating quantity for the relays may be _____. 10) Magnitude b) Frequency a) Phase angle d) Any of the above C) 11) Burden of a protective relay is the power _____ Required to operate the circuit breaker a) Absorbed by the circuit of relay b) Developed by the relay circuit c) None of the above d) 12) Up to what voltage can the liquid type HRC fuses be used? 33 kV b) 132 kV a) 66 V d) 220 kV C) 13) Admittance relay is _____. Non-directional relay b) Directional relay a) c) Differential relay d) All of the above 14) Which circuit breaker is preferred to be installed in extra high voltage AC system? a) Bulk oil type circuit breaker

- SF6 circuit breaker c)
- b) Air blast circuit breaker

SLR-FM-439

d) Vacuum circuit breaker

12

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve any Four.

- a) Explain the electromechanical impedance relay for protection of line.
- **b)** Define the following terms related to relay.
 - 1) Plug setting Multiplier
 - 2) Time setting multiplier
- c) Explain percentage differential relay with neat diagram.
- d) Explain with neat diagram the overcurrent protective scheme for radial and ring main feeder.
- e) What are desirable qualities of protective scheme?
- f) Determine the time of operation of an IDMT relay rating 5A and having setting of 125% and TSM=0.5. The relay is connected through C.T of 400/5A. The fault current is 4000A. The operating time for PSM of 8 is 3.2 Second.

Q.3 Solve any Two.

- a) Describe microprocessor based reactance relay with block diagram and flow chart to realize its characteristics.
- **b)** Explain construction and operation of electromechanical directional power relay.
- c) Explain MHO relay for distance protection. Draw its characteristics on R-X diagram.

Section – II

Q.4 Solve any Four.

- a) With neat sketch explain methods of arc extinction.
- **b)** Explain metal oxide arrestor with neat diagram.
- c) Draw & describe construction and operation of vacuum circuit breaker.
- d) With neat sketch explain the phenomenon of current chopping in circuit breaker.
- e) Explain differential protection of generator with neat diagram.
- f) A three phase transformer having line voltage ratio of 0.4KV/11KV is connected in star-delta and the protective transformer on 400v side have current ratio of 500/5. What must be ratio of protective transformer on the 11KV side?

Q.5 Solve any Two.

- a) With neat diagram explain percentage differential protection scheme of delta- star connected transformer indicate all three phases.
- **b)** What is restriking voltage? Derive an expression of RV & RRRV in terms of system voltage, inductance and capacitance.
- c) Explain the different protection schemes of industrial motors.

12

Max. Marks: 56

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Set

Seat No.

16

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minute in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q. 1

- 1) Up to what voltage can the liquid type HRC fuses be used?
 - 33 kV a) b) 132 kV
 - 66 V c)
- 2) Admittance relay is
 - Non-directional relay a)
 - Differential relay d) All of the above c)
- 3) Which circuit breaker is preferred to be installed in extra high voltage AC system?
 - a) Bulk oil type circuit breaker
- b) Air blast circuit breaker d) Vacuum circuit breaker
- SF6 circuit breaker c)
- Discrimination between main and back up protection is provided by the 4) use of relays which are _____.
 - a) Fact C) Slow

b) Sensitive

d) 220 kV

b) Directional relay

- d) None of the above
- 5) If the strands of the fusing wire are twisted, what happens to the fusing current?
 - a) Increases
 - b) Reduces
 - No change/ remains same c)
 - Depends on the value of current, increases or decreases d)
- 6) The arc resistance depends on which among the following factors?
 - Cross section of the arc b) Length of the arc a)
 - Degree of ionization d) All of the above C)
- 7) Protective relays are devices that detect abnormal conditions in circuits by measuring
 - Current during abnormal condition a)
 - b) Voltage during abnormal condition
 - Constantly the electrical quantities which differ during normal & C) abnormal condition
 - None of the above d)
- For ground fault, which of the relay is preferred? 8)
 - Plain impedance relay a) Reactance relay c)
- b) Directional relay
- d) Overcurrent relav

Max. Marks: 70

Marks: 14 Choose the correct alternatives from the options and rewrite the sentence. 14

Set

- Set R
- 9) Up to what voltage a cartridge type of fuse can be used?
 - b) 11 KV
 - 400 V a) 20 KV d) 33 KV C)
- 10) Protective relays can be designed to respond to _____.
 - Light intensity, impedance a)
 - Temperature, resistance, reactance b)
 - Voltage and current c)
 - All of these d)

If the fault occurs near the impedance relay, the V/I ratio will be _____. 11)

- Constant for all distances a)
- Lower than that of if fault occurs away from the relay b)
- Higher than that of if fault occurs away from the relay c)
- d) None of the above

The relay with inverse time characteristic will operate within _____. 12)

- 1.5 sec b) 5 to 10 sec a)
- 5 to 20 sec d) 20 to 30 sec c)

13) The actuating quantity for the relays may be _____

Magnitude a)

- b) Frequency
- d) Any of the above c) Phase angle
- Burden of a protective relay is the power ____ 14)
 - Required to operate the circuit breaker a)
 - Absorbed by the circuit of relay b)
 - Developed by the relay circuit c)
 - None of the above d)

12

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve any Four.

- a) Explain the electromechanical impedance relay for protection of line.
- **b)** Define the following terms related to relay.
 - 1) Plug setting Multiplier
 - 2) Time setting multiplier
- c) Explain percentage differential relay with neat diagram.
- d) Explain with neat diagram the overcurrent protective scheme for radial and ring main feeder.
- e) What are desirable qualities of protective scheme?
- f) Determine the time of operation of an IDMT relay rating 5A and having setting of 125% and TSM=0.5. The relay is connected through C.T of 400/5A. The fault current is 4000A. The operating time for PSM of 8 is 3.2 Second.

Q.3 Solve any Two.

- a) Describe microprocessor based reactance relay with block diagram and flow chart to realize its characteristics.
- **b)** Explain construction and operation of electromechanical directional power relay.
- c) Explain MHO relay for distance protection. Draw its characteristics on R-X diagram.

Section – II

Q.4 Solve any Four.

- a) With neat sketch explain methods of arc extinction.
- **b)** Explain metal oxide arrestor with neat diagram.
- c) Draw & describe construction and operation of vacuum circuit breaker.
- d) With neat sketch explain the phenomenon of current chopping in circuit breaker.
- e) Explain differential protection of generator with neat diagram.
- f) A three phase transformer having line voltage ratio of 0.4KV/11KV is connected in star-delta and the protective transformer on 400v side have current ratio of 500/5. What must be ratio of protective transformer on the 11KV side?

Q.5 Solve any Two.

- a) With neat diagram explain percentage differential protection scheme of delta- star connected transformer indicate all three phases.
- **b)** What is restriking voltage? Derive an expression of RV & RRRV in terms of system voltage, inductance and capacitance.
- c) Explain the different protection schemes of industrial motors.

12

SLR-FM-439

Set

Max. Marks: 56

16

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minute in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Choose the correct alternatives from the options and rewrite the sentence.

Duration: 30 Minutes

a)

Q.

1

- 1) The arc resistance depends on which among the following factors?
 - b) Length of the arc Degree of ionization d) All of the above C)
 - 2) Protective relays are devices that detect abnormal conditions in circuits by measuring
 - Current during abnormal condition a)

Cross section of the arc

- Voltage during abnormal condition b)
- Constantly the electrical guantities which differ during normal & c) abnormal condition
- None of the above d)
- 3) For ground fault, which of the relay is preferred?
 - a) Plain impedance relay b) Directional relay
 - Reactance relay d) Overcurrent relay c)
- Up to what voltage a cartridge type of fuse can be used? 4)
 - 400 V b) 11 KV a)
 - d) 33 KV 20 KV C)
- Protective relays can be designed to respond to _____. 5)
 - Light intensity, impedance a)
 - Temperature, resistance, reactance b)
 - Voltage and current c)
 - All of these d)

a)

- 6) If the fault occurs near the impedance relay, the V/I ratio will be .
 - Constant for all distances a)
 - Lower than that of if fault occurs away from the relay b)
 - C) Higher than that of if fault occurs away from the relay
 - None of the above d)
- 7) The relay with inverse time characteristic will operate within .
 - 1.5 sec b) 5 to 10 sec
 - 5 to 20 sec c) d) 20 to 30 sec

Seat No.





Max. Marks: 70

SLR-FM-439

Marks: 14

- Set S
- 8) The actuating quantity for the relays may be .
 - Magnitude a)

- b) Frequency
- c) Phase angle d) Any of the above
- 9) Burden of a protective relay is the power ____
 - Required to operate the circuit breaker a)
 - Absorbed by the circuit of relay b)
 - Developed by the relay circuit c)
 - None of the above d)
- Up to what voltage can the liquid type HRC fuses be used? 10)
 - 33 kV b) 132 kV a)
 - 66 V C) d) 220 kV
- Admittance relay is _____. 11) Non-directional relay

a)

c)

- b) Directional relay
- Differential relay d) All of the above
- Which circuit breaker is preferred to be installed in extra high voltage AC 12) svstem?
 - a) Bulk oil type circuit breaker
- b) Air blast circuit breaker d) Vacuum circuit breaker
- SF6 circuit breaker c) 13) Discrimination between main and back up protection is provided by the

use of relays which are _____.

- a) Fact b) Sensitive
- c) Slow d) None of the above
- If the strands of the fusing wire are twisted, what happens to the fusing 14) current?
 - a) Increases
 - b) Reduces
 - No change/ remains same c)
 - Depends on the value of current, increases or decreases d)

Seat No.

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019

Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve any Four.

- a) Explain the electromechanical impedance relay for protection of line.
- **b)** Define the following terms related to relay.
 - 1) Plug setting Multiplier
 - 2) Time setting multiplier
- c) Explain percentage differential relay with neat diagram.
- d) Explain with neat diagram the overcurrent protective scheme for radial and ring main feeder.
- e) What are desirable qualities of protective scheme?
- f) Determine the time of operation of an IDMT relay rating 5A and having setting of 125% and TSM=0.5. The relay is connected through C.T of 400/5A. The fault current is 4000A. The operating time for PSM of 8 is 3.2 Second.

Q.3 Solve any Two.

- a) Describe microprocessor based reactance relay with block diagram and flow chart to realize its characteristics.
- **b)** Explain construction and operation of electromechanical directional power relay.
- c) Explain MHO relay for distance protection. Draw its characteristics on R-X diagram.

Section – II

Q.4 Solve any Four.

- a) With neat sketch explain methods of arc extinction.
- **b)** Explain metal oxide arrestor with neat diagram.
- c) Draw & describe construction and operation of vacuum circuit breaker.
- d) With neat sketch explain the phenomenon of current chopping in circuit breaker.
- e) Explain differential protection of generator with neat diagram.
- f) A three phase transformer having line voltage ratio of 0.4KV/11KV is connected in star-delta and the protective transformer on 400v side have current ratio of 500/5. What must be ratio of protective transformer on the 11KV side?

Q.5 Solve any Two.

- a) With neat diagram explain percentage differential protection scheme of delta- star connected transformer indicate all three phases.
- **b)** What is restriking voltage? Derive an expression of RV & RRRV in terms of system voltage, inductance and capacitance.
- c) Explain the different protection schemes of industrial motors.

12

Max. Marks: 56

12

16

16

19

Set

Seat No.				
	B.E. (Part – I)	(New) (CBCS)	Examination Nov/I	Dec-2019
		Electrical E	Engineering	
	ENE	RGY AUDIT A	ND MANAGEMENT	
	Date: Thursday, 12-1)2:30 PM To 05:30 P			Max

Instructions: 1) Q. No. 1	is compulsory and should be solved in first 30 minutes in ans	wer
Book.		

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14 The various types of the instruments, which requires during audit need to 1)
 - be ____.
 - a) easy to carry
 - b) easy to operate c) inexpensive d) all (a) to (c)
 - 2) The current flowing through the resistance is given by .
 - a) $I\cos\emptyset$ b) *I* sin Ø
 - c) $I \tan \emptyset$ d) I cot Ø

3) Acid rain is caused by the release of the following components from combustion of fuels .

- a) SOx and NOx b) Sox and CO₂
- c) CO2 and NOx d) H₂O
- 4) Find out the 'odd' among the following choices for fuel substitution for industrial sector of India .
 - a) LDO with LSHS
 - b) coal with rice husk LPG for soft coke c) natural gas for fertilizer plant d)

5) Infrared thermometer is used to measure

- a) Surface temperature b) Flame temperature
- c) Flue gas temperature d) Hot water temperature
- 6) Phase advancers are used to improve the power factor of
 - Induction motors Induction generators a) b)
 - Synchronous motors Synchronous generators d) C)
- 7) Reactive power is measured in terms of
 - kVA a) kW b)
 - c) kVAR d) None of these
- Sankey diagram is an useful tool to represent _____. 8)
 - a) financial strength of the company
 - b) management philosophy
 - c) input and output energy flow
 - d) human resource strength of the company

SLR-FM-440



Max. Marks: 70

Marks: 14

9) Particles that participate in the strong nuclear interaction are called

b)

d)

b)

- . a) Neutrinos
- c) Leptons
- e) Photons
- 10) Which one is a secondary form of energy?
 - a) furnace oil
 - c) electricity
- d) Coal

Hadrons

Electrons

natural gas

- The objective of material and energy balance is to assess the _____. 11)
 - a) input-output c) losses
- b) conversion efficiency d) all the above

- e) none of these
- 12) Energy supplied by electricity, Q in kCal is equal to _____.
 - a) kWh x 8.6 kWh x 86 b)
 - c) kWh x 860 d)
- A moderator is used to slow _____. 13)
 - a) Proton
 - c) Neutron

- Alpha particles
- Beta particle

- e) Photon
- The force field analysis in energy action planning deals with barrier 14) having
 - a) Positive force only
 - b) Negative force only
 - c) Both negative and positive force
 - d) No force



- - None

 - d)
- b)

Seat	
No.	

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Attempt any four.

- a) What do you mean by energy security? Explain few strategies to ensure energy security of our country.
- **b)** Write the notes on force field analysis.
- c) With suitable examples explain various options available for load curve wave shaping in demand side management.
- d) Explain the role of automatic meter reading in utility energy management.
- e) Explain direct and indirect use of solar energy with suitable examples.

Q.3 Attempt any two.

- a) What is necessity of energy audit? Explain phases of energy audit.
- **b)** Write a short note on solar thermal technology as a energy source.
- c) Discuss United Nations Framework Convention on Climate Change.

Section – II

Q.4 Attempt any four.

- a) What are the principles of writing a report of energy audit?
- **b)** Enlist energy conservation opportunities in pumping system.
- c) What are the various costing techniques?
- d) Give the format of energy audit.
- e) Explain various energy conservation opportunities in illumination.

Q.5 Attempt any two.

- a) What are the objectives of carrying out sensitivity analysis? And what are the different factors that are considered for the sensitivity analysis?
- **b)** Why it is important to reduce T and D losses? Discuss various methods for reducing technical losses.
- c) Explain step wise procedure to carry out a detail energy audit.

Max. Marks: 56

12

16

16

Set

Q

Seat No.

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 - 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Sankey diagram is an useful tool to represent _____. 1)
 - a) financial strength of the company
 - b) management philosophy
 - c) input and output energy flow
 - d) human resource strength of the company
- 2) Particles that participate in the strong nuclear interaction are called
 - Neutrinos a)
 - c) Leptons
 - e) Photons

3) Which one is a secondary form of energy?

- a) furnace oil b) d)
- c) electricity
- 4) The objective of material and energy balance is to assess the _____.
 - a) input-output b)
 - c) losses
 - e) none of these
- Energy supplied by electricity, Q in kCal is equal to _____. 5)
 - a) kWh x 8.6 b) kWh x 86
 - c) kWh x 860 d) None
- A moderator is used to slow _____. 6)
 - a) Proton c) Neutron

b) Alpha particles Beta particle d)

- e) Photon
- 7) The force field analysis in energy action planning deals with barrier having
 - a) Positive force only
 - b) Negative force only
 - c) Both negative and positive force
 - d) No force
- The various types of the instruments, which requires during audit need to 8) be .
 - a) easy to carry c) inexpensive
- b) easy to operate
- all (a) to (c) d)

Max. Marks: 70

Marks: 14

- Hadrons
 - b)
 - d) Electrons

 - natural gas
 - Coal
- conversion efficiency
 - all the above

 - d)

I sin Ø c) $I \tan \emptyset$ d) I cot Ø combustion of fuels . b) Sox and CO₂ a) SOx and NOx c) CO2 and NOx d) H_2O 11) Find out the 'odd' among the following choices for fuel substitution for industrial sector of India _____. a) LDO with LSHS b) coal with rice husk d) LPG for soft coke c) natural gas for fertilizer plant Infrared thermometer is used to measure _____ 12) . Surface temperature b) Flame temperature a) Flue gas temperature d) Hot water temperature C) 13) Phase advancers are used to improve the power factor of . Induction motors b) Induction generators a) Synchronous motors Synchronous generators C) d) Reactive power is measured in terms of ____ 14) kVA a) kW b) c) kVAR d) None of these

- 9) The current flowing through the resistance is given by _____.
 - a) $I\cos\emptyset$ b)
- 10) Acid rain is caused by the release of the following components from

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Set C

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No.	

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Attempt any four.

- a) What do you mean by energy security? Explain few strategies to ensure energy security of our country.
- **b)** Write the notes on force field analysis.
- c) With suitable examples explain various options available for load curve wave shaping in demand side management.
- d) Explain the role of automatic meter reading in utility energy management.
- e) Explain direct and indirect use of solar energy with suitable examples.

Q.3 Attempt any two.

- a) What is necessity of energy audit? Explain phases of energy audit.
- **b)** Write a short note on solar thermal technology as a energy source.
- c) Discuss United Nations Framework Convention on Climate Change.

Section – II

Q.4 Attempt any four.

- a) What are the principles of writing a report of energy audit?
- **b)** Enlist energy conservation opportunities in pumping system.
- c) What are the various costing techniques?
- d) Give the format of energy audit.
- e) Explain various energy conservation opportunities in illumination.

Q.5 Attempt any two.

- a) What are the objectives of carrying out sensitivity analysis? And what are the different factors that are considered for the sensitivity analysis?
- **b)** Why it is important to reduce T and D losses? Discuss various methods for reducing technical losses.
- c) Explain step wise procedure to carry out a detail energy audit.

Max. Marks: 56

12

16

16

Electrical Engineering							
	Day & Date: Thursday, 12-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM Max. Marks: 70						
Instr	uctio	s: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer					
		Book.					
		2) Figures to the right indicates full marks.					
Dura	tion: 3	MCQ/Objective Type Questions Minutes Marks: 14					
Q.1	Cho	se the correct alternatives from the options and rewrite the sentence. 14					
	1)	Infrared thermometer is used to measure a) Surface temperature b) Flame temperature c) Flue gas temperature d) Hot water temperature					
	2)	Phase advancers are used to improve the power factor of a) Induction motors b) Induction generators c) Synchronous motors d) Synchronous generators					
 3) Reactive power is measured in terms of a) kW b) kVA c) kVAR d) None of these 							
	 4) Sankey diagram is an useful tool to represent a) financial strength of the company b) management philosophy c) input and output energy flow d) human resource strength of the company 						
	5)	Particles that participate in the strong nuclear interaction are called					
		a) Neutrinos b) Hadrons c) Leptons d) Electrons e) Photons					
	 6) Which one is a secondary form of energy? a) furnace oil b) natural gas c) electricity d) Coal 						
	 7) The objective of material and energy balance is to assess the a) input-output b) conversion efficiency c) losses d) all the above e) none of these 						
	8) Energy supplied by electricity, Q in kCal is equal to a) kWh x 8.6 b) kWh x 86 c) kWh x 860 d) None						
	9)	A moderator is used to slow a) Proton b) Alpha particles c) Neutron d) Beta particle					

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019

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e) Photon

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- 10) The force field analysis in energy action planning deals with barrier having _____.
 - a) Positive force only
 - b) Negative force only
 - c) Both negative and positive force
 - d) No force

11) The various types of the instruments, which requires during audit need to be _____.

- a) easy to carry b) easy to operate
- c) inexpensive d) all (a) to (c)
- 12) The current flowing through the resistance is given by _____.
 - a) $I \cos \emptyset$ b) $I \sin \emptyset$
 - c) $I \tan \emptyset$ d) $I \cot \emptyset$
- 13) Acid rain is caused by the release of the following components from combustion of fuels _____.
 - a) SOx and NOx

c) CO2 and NOx

- b) Sox and CO_2 d) H_2O
- 14) Find out the 'odd' among the following choices for fuel substitution for industrial sector of India _____.
 - a) LDO with LSHS
 - c) natural gas for fertilizer plant
- b) coal with rice husk

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Set R

d) LPG for soft coke

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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Attempt any four.

- a) What do you mean by energy security? Explain few strategies to ensure energy security of our country.
- **b)** Write the notes on force field analysis.
- c) With suitable examples explain various options available for load curve wave shaping in demand side management.
- d) Explain the role of automatic meter reading in utility energy management.
- e) Explain direct and indirect use of solar energy with suitable examples.

Q.3 Attempt any two.

- a) What is necessity of energy audit? Explain phases of energy audit.
- **b)** Write a short note on solar thermal technology as a energy source.
- c) Discuss United Nations Framework Convention on Climate Change.

Section – II

Q.4 Attempt any four.

- a) What are the principles of writing a report of energy audit?
- **b)** Enlist energy conservation opportunities in pumping system.
- c) What are the various costing techniques?
- d) Give the format of energy audit.
- e) Explain various energy conservation opportunities in illumination.

Q.5 Attempt any two.

- a) What are the objectives of carrying out sensitivity analysis? And what are the different factors that are considered for the sensitivity analysis?
- **b)** Why it is important to reduce T and D losses? Discuss various methods for reducing technical losses.
- c) Explain step wise procedure to carry out a detail energy audit.



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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT AND MANAGEMENT							
	Day & Date: Thursday, 12-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM						
Insti	 Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book. 2) Figures to the right indicates full marks. 						
		MCQ/Objective Type Questions	5				
Dura	ation: 3	30 Minutes	Marks: 14				
Q.1	Cho 1)	oose the correct alternatives from the options and r Which one is a secondary form of energy?	ewrite the sentence. 14				
		a) furnace oil b) natural ga c) electricity d) Coal	S				
	2)	The objective of material and energy balance is to as a) input-output b) conversion c) losses d) all the abo e) none of these	n efficiency				
	3)	Energy supplied by electricity, Q in kCal is equal to _ a) kWh x 8.6 b) kWh x 86 c) kWh x 860 d) None					
	4)	A moderator is used to slow a) Proton b) Alpha part c) Neutron d) Beta partic e) Photon					
	5)	 The force field analysis in energy action planning dea having a) Positive force only b) Negative force only c) Both negative and positive force d) No force 	als with barrier				
	6)	The various types of the instruments, which requires be a) easy to carry b) easy to op c) inexpensive d) all (a) to (d)	perate				
	7)	The current flowing through the resistance is given b a) $I \cos \emptyset$ b) $I \sin \emptyset$ c) $I \tan \emptyset$ d) $I \cot \emptyset$	у				
	8)	Acid rain is caused by the release of the following cocombustion of fuelsa) SOx and NOxb) Sox and Cc) CO2 and NOxd) H2O					

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SLR-FM-440 Set 9) Find out the 'odd' among the following choices for fuel substitution for industrial sector of India _____. a) LDO with LSHS b) coal with rice husk natural gas for fertilizer plant d) LPG for soft coke C) 10) Infrared thermometer is used to measure Flame temperature Surface temperature b) a) Flue gas temperature d) Hot water temperature C) 11) Phase advancers are used to improve the power factor of _____. Induction motors b) Induction generators a) Synchronous motors d) Synchronous generators c) Reactive power is measured in terms of _ 12) a) kW kVA b) c) kVAR d) None of these Sankey diagram is an useful tool to represent _____. 13) a) financial strength of the company b) management philosophy c) input and output energy flow d) human resource strength of the company

- 14) Particles that participate in the strong nuclear interaction are called
 - a) Neutrinos

b) Hadrons

c) Leptons

d) Electrons

e) Photons

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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Attempt any four.

- a) What do you mean by energy security? Explain few strategies to ensure energy security of our country.
- **b)** Write the notes on force field analysis.
- c) With suitable examples explain various options available for load curve wave shaping in demand side management.
- d) Explain the role of automatic meter reading in utility energy management.
- e) Explain direct and indirect use of solar energy with suitable examples.

Q.3 Attempt any two.

- a) What is necessity of energy audit? Explain phases of energy audit.
- **b)** Write a short note on solar thermal technology as a energy source.
- c) Discuss United Nations Framework Convention on Climate Change.

Section – II

Q.4 Attempt any four.

- a) What are the principles of writing a report of energy audit?
- **b)** Enlist energy conservation opportunities in pumping system.
- c) What are the various costing techniques?
- d) Give the format of energy audit.
- e) Explain various energy conservation opportunities in illumination.

Q.5 Attempt any two.

- a) What are the objectives of carrying out sensitivity analysis? And what are the different factors that are considered for the sensitivity analysis?
- **b)** Why it is important to reduce T and D losses? Discuss various methods for reducing technical losses.
- c) Explain step wise procedure to carry out a detail energy audit.



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NO.			ļ			
B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering						
		EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM				
		Saturday, 14-12-2019 Max. PM To 05:30 PM	Marks	3: 70		
Instru	uctior	 : 1) Q. No. 1 is compulsory and should be solved in first 30 minutes i book. 2) Figures to the right indicate full marks. 	n ans	wer		
Durat	ion: 3	MCQ/Objective Type Questions Minutes	Marks	s: 14		
Q.1		se the correct alternatives from the options.		14		
Q . 1	1)	Reflection coefficient of voltage (K_r) for open circuit is		14		
	·	a) 0 b) +2				
		c) +1 d) -1				
	2)	 The most accurate and versatile method of achieving reactive power compensation is by using a) Switched capacitors b) Fixed capacitor with controlled reactor c) Saturable reactor with capacitor bank d) Switched capacitor with controlled reactor 				
	3)	Switching over-voltages are more hazardous than lightning surges in of	case			
		a) Low voltage systems b) 11 kV systems c) Unbalanced systems d) EHV and UHV systems				
	4)	Which of the following method may be used to inject reactive power i ransmission line?	n the			
		a) Series capacitorb) Synchronous capacitorsc) Both a and bd) None of these				
	5)	For 100% series compensation, resonance occur at				
		a)Power frequencyb)50% of Power frequencyc)40% of Power frequencyd)None of these				
	6)	The conductors of an EHV line is selected on the basis of a) Current carrying capacity b) Corona and RI performanc c) Line voltage d) None of these	e			
	7)	The power loss is important for the design of a) Generator b) Motor c) Feeder d) Transmission line				
	8)	Third mode of propagation is called as a) Line to ground b) Phase to phase c) Homopolar d) Inter-phase				

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Set P

- For Aeolian vibration the frequency of vibration is usually limited to ______
 Hz and the amplitudes less than _____ cm.
 - a) 20 Hz, 2.5 cm b) 25 Hz, 2.5 cm
 - c) 50 Hz, 2.5 cm d) 50 Hz. 3.5 cm
- 10) The positive sequence reactance per phase in ohms/km in 750 kV transmission line is _____.
 - a) 0.272 b) 0.227
 - c) 0.722 d) None of these
- 11) Operating 750 KV line gives AN at a level of _____.
 - a) 50 dB b) 55.4 dB
 - c) 52 dB d) 58.5 dB

12) The allowable noise level at one MHz is ____

- a) 22 dB b) 26 dB
- c) 30 dB d) 32 dB

13) Voltage gradient on a transmission line conductor is highest _____.

- a) at the surface of the conductor
- b) at the centre of the conductor
- c) at the distance of one radius from the surface
- d) none of these
- 14) Refraction coefficient of current (J_T) is given by

a)	$2Z_0$	b)	$Z_0 - Z_t$
	$Z_0 + Z_t$		$Z_0 + Z_t$
C)	$2Z_t$	d)	$Z_t - Z_0$
-	$Z_0 + Z_t$		$Z_0 + Z_t$

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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) How the audible noise is generated and what are the characteristics?
- **b)** Derive equation for line energization with trapped charge voltage.
- c) Derive differential equations and solutions for general case in travelling waves.
- d) Explain in detail advantages and disadvantages of high voltage.
- e) Explain the relation between temperature rise and current carrying capacity of EHVAC line.
- f) Write short notes on limits for radio interference.

Q.3 Attempt any two.

- a) A power of 12000 MW is required to be transmitted over a distance of 1000 km. At voltage levels of 400 kV determine.
 - 1) Possible no. of circuits required with equal magnitudes for sending and receiving end voltages with 30° phase difference.
 - 2) The currents transmitted;
 - 3) The total line losses

Assume the value of x = 0.327 for 400 kV.

- b) Explain the charge potential relations of multi-conductor lines.
- c) Explain reflection and refraction of travelling waves.

Section – II

Q.4 Attempt any four.

- a) Explain the term power circle diagram and its use.
- **b)** Explain the conductor-tower, conductor-ground and conductor-conductor clearances for the design of EHV lines.
- c) State the factors under steady state in design of EHV lines?
- d) Explain the term ferro-resonance over voltages.
- e) State & explain the sources of over voltages.
- f) Explain in detail static reactive compensating system.

Q.5 Attempt any two.

- a) Explain line insulation design based upon transient overvoltages in detail.
- **b)** Derive the expressions for generalized constants of transmission line.
- c) Explain in detail sinusoidal excitation lumped parameter circuit.

Max. Marks: 56

12

16

16

Seat No.				Set Q
		B.E. (Part – I) (New) (CBCS) E Electrical En		
		EXTRA HIGH VOLTAGE AC	-	-
		e: Saturday, 14-12-2019 0 PM To 05:30 PM		Max. Marks: 70
Instru	uctio	, , , ,	ould l	be solved in first 30 minutes in answer
		book. 2) Figures to the right indicate ful	l mar	ks.
		MCQ/Objective T	уре	Questions
Durat	ion: 3	0 Minutes		Marks: 14
Q.1	Cho (1)	ose the correct alternatives from the Third mode of propagation is called	-	
	1)	Third mode of propagation is calleda) Line to groundc) Homopolar	as b) d)	
	2)	For Aeolian vibration the frequency		•
		Hz and the amplitudes less than a) 20 Hz, 2.5 cm		cm. 25 Hz, 2.5 cm
		c) 50 Hz, 2.5 cm	d)	50 Hz. 3.5 cm
	3)	The positive sequence reactance per transmission line is	er pha	ase in ohms/km in 750 kV
		a) 0.272	b)	0.227
		c) 0.722	d)	None of these
	4)	Operating 750 KV line gives AN at a		
		a) 50 dB c) 52 dB	b) d)	55.4 dB 58.5 dB
	5)	The allowable noise level at one MH	lz is _	
		a) 22 dB c) 30 dB	b) d)	26 dB 32 dB
	6)	c) 30 dB Voltage gradient on a transmission	,	
	0)	a) at the surface of the conductor		
		b) at the centre of the conductorc) at the distance of one radius from	m th	
		c) at the distance of one radius frod) none of these		esurace
	7)	Refraction coefficient of current (J _T)	is giv	ven by
		a) $\frac{2Z_0}{Z_0+Z_t}$	b)	$\frac{Z_0 - Z_t}{Z_0 + Z_t}$
		c) $2Z_t$	d)	$\frac{Z_0 + Z_t}{Z_t - Z_0}$
		$\overline{Z_0 + Z_t}$	- /	$\overline{Z_0 + Z_t}$
	8)	Reflection coefficient of voltage (K _r)		•
		a) 0	b)	+2

<i>~</i> ,	•		
C)	+1	d)	-1

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- The most accurate and versatile method of achieving reactive power compensation is by using _____.
 - a) Switched capacitors
 - b) Fixed capacitor with controlled reactor
 - c) Saturable reactor with capacitor bank
 - d) Switched capacitor with controlled reactor
- 10) Switching over-voltages are more hazardous than lightning surges in case of _____.
 - a) Low voltage systems b) 11 kV systems
 - c) Unbalanced systems d) EHV and UHV systems
- 11) Which of the following method may be used to inject reactive power in the transmission line?
 - a) Series capacitor
- b) Synchronous capacitors
- c) Both a and b d) None of these
- 12) For 100% series compensation, resonance occur at ____
 - a) Power frequency
- b) 50% of Power frequency
- c) 40% of Power frequency
- d) None of these
- 13) The conductors of an EHV line is selected on the basis of _
 - a) Current carrying capacity
- b) Corona and RI performanced) None of these
- 14) The power loss is important for the design of ____
 - a) Generator
 - c) Feeder

c) Line voltage

b) Motord) Transmission line



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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) How the audible noise is generated and what are the characteristics?
- **b)** Derive equation for line energization with trapped charge voltage.
- c) Derive differential equations and solutions for general case in travelling waves.
- d) Explain in detail advantages and disadvantages of high voltage.
- e) Explain the relation between temperature rise and current carrying capacity of EHVAC line.
- f) Write short notes on limits for radio interference.

Q.3 Attempt any two.

- a) A power of 12000 MW is required to be transmitted over a distance of 1000 km. At voltage levels of 400 kV determine.
 - 1) Possible no. of circuits required with equal magnitudes for sending and receiving end voltages with 30° phase difference.
 - 2) The currents transmitted;
 - 3) The total line losses

Assume the value of x = 0.327 for 400 kV.

- b) Explain the charge potential relations of multi-conductor lines.
- c) Explain reflection and refraction of travelling waves.

Section – II

Q.4 Attempt any four.

- a) Explain the term power circle diagram and its use.
- **b)** Explain the conductor-tower, conductor-ground and conductor-conductor clearances for the design of EHV lines.
- c) State the factors under steady state in design of EHV lines?
- d) Explain the term ferro-resonance over voltages.
- e) State & explain the sources of over voltages.
- f) Explain in detail static reactive compensating system.

Q.5 Attempt any two.

- a) Explain line insulation design based upon transient overvoltages in detail.
- **b)** Derive the expressions for generalized constants of transmission line.
- c) Explain in detail sinusoidal excitation lumped parameter circuit.

Max. Marks: 56

12

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Seat No.				Set R	
	B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering				
	E	XTRA HIGH VOLTAGE AC T			
•		aturday, 14-12-2019 M To 05:30 PM		Max. Marks: 70	
Instru		book.		e solved in first 30 minutes in answer	
		2) Figures to the right indicate full			
Duratio	on: 30 M	MCQ/Objective Ty	pe (Auestions Marks: 14	
Q.1 (Choose	the correct alternatives from the	e opt	tions. 14	
	1) Fo a)	r 100% series compensation, reso	nanc b)	e occur at 50% of Power frequency	
2	a)	e conductors of an EHV line is sele Current carrying capacity Line voltage			
;			esigr b) d)		
2	a)	0	as b) d)		
į		r Aeolian vibration the frequency o			
		and the amplitudes less than 20 Hz, 2.5 cm 50 Hz, 2.5 cm	cr b) d)	n. 25 Hz, 2.5 cm 50 Hz. 3.5 cm	
(6) Th	e positive sequence reactance per	^r pha	se in ohms/km in 750 kV	
	tra a) c)	nsmission line is 0.272 0.722	b) d)	0.227 None of these	
-	7) Op	perating 750 KV line gives AN at a	level	of	
	a) c)	50 dB 52 dB	b) d)	55.4 dB 58.5 dB	
8	,	e allowable noise level at one MHz 22 dB 30 dB	z is _ b) d)	 26 dB 32 dB	
9	9) Vo a) b) c)	Itage gradient on a transmission lin at the surface of the conductor at the centre of the conductor at the distance of one radius from		-	

c) at the distance of one radius from the surfaced) none of these

Set R

10) Refraction coefficient of current (J_T) is given by

a)	$2Z_0$	()	b)	$Z_0 - Z_t$
	$Z_0 + Z_t$			$Z_0 + Z_t$
c)	$2Z_t$		d)	$Z_t - Z_0$
	$Z_0 + Z_t$			$Z_0 + Z_t$

11) Reflection coefficient of voltage (K_r) for open circuit is _____.

- a) 0 b) +2
- c) +1 d) -1
- 12) The most accurate and versatile method of achieving reactive power compensation is by using _____.
 - a) Switched capacitors
 - b) Fixed capacitor with controlled reactor
 - c) Saturable reactor with capacitor bank
 - d) Switched capacitor with controlled reactor
- 13) Switching over-voltages are more hazardous than lightning surges in case of _____.
 - a) Low voltage systemsc) Unbalanced systems
- b) 11 kV systems
- d) EHV and UHV systems
- 14) Which of the following method may be used to inject reactive power in the transmission line?
 - a) Series capacitor
 - c) Both a and b

- b) Synchronous capacitors
- d) None of these

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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) How the audible noise is generated and what are the characteristics?
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 - 3) The total line losses

Assume the value of x = 0.327 for 400 kV.

- b) Explain the charge potential relations of multi-conductor lines.
- c) Explain reflection and refraction of travelling waves.

Section – II

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- a) Explain the term power circle diagram and its use.
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- c) State the factors under steady state in design of EHV lines?
- d) Explain the term ferro-resonance over voltages.
- e) State & explain the sources of over voltages.
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Q.5 Attempt any two.

- a) Explain line insulation design based upon transient overvoltages in detail.
- **b)** Derive the expressions for generalized constants of transmission line.
- c) Explain in detail sinusoidal excitation lumped parameter circuit.

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Max. Marks: 56

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Seat No.		Se	ət	S	
		B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM			
		e: Saturday, 14-12-2019 Max. Ma D PM To 05:30 PM	arks	s: 70)
Instru	uctior	 ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in a book. 2) Figures to the right indicate full marks. 	ansv	wer	
		MCQ/Objective Type Questions			
Durat	ion: 3		arks	s: 14	┝
Q.1	Choo	ose the correct alternatives from the options.		14	L
.	1)	The positive sequence reactance per phase in ohms/km in 750 kV transmission line is		• ¬	r
		a) 0.272 b) 0.227 c) 0.722 d) None of these			
	2)	Operating 750 KV line gives AN at a level of			
		a) 50 dB b) 55.4 dB			
		c) 52 dB d) 58.5 dB			
	3)	The allowable noise level at one MHz is			
		a) 22 dB b) 26 dB c) 30 dB d) 32 dB			
	4)	 Voltage gradient on a transmission line conductor is highest a) at the surface of the conductor b) at the centre of the conductor c) at the distance of one radius from the surface d) none of these 			
	5)	Refraction coefficient of current (J_T) is given by			
		a) $\frac{2Z_0}{Z_0 + Z_t}$ b) $\frac{Z_0 - Z_t}{Z_0 + Z_t}$			
		c) $\underline{Z_0 + Z_t}$ d) $\underline{Z_t - Z_0}$			
		$Z_{0} = Z_{0} = Z_{1}$ $Z_{0} = Z_{1}$ $Z_{0} = Z_{1}$			
	6)	Reflection coefficient of voltage (K _r) for open circuit is			
		a) 0 b) +2			
	7)	 c) +1 d) -1 The most accurate and versatile method of achieving reactive power compensation is by using a) Switched capacitors b) Fixed capacitor with controlled reactor c) Saturable reactor with capacitor bank d) Switched capacitor with controlled reactor 			

d) Switched capacitor with controlled reactor

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8)	Switching over-voltages are more ha of a) Low voltage systems c) Unbalanced systems	b)	11 kV systems
9)	Which of the following method may transmission line?	,	•
	a) Series capacitorc) Both a and b	b) d)	Synchronous capacitors None of these
10)	For 100% series compensation, reso a) Power frequency c) 40% of Power frequency	b)	50% of Power frequency
11)	The conductors of an EHV line is se a) Current carrying capacity c) Line voltage	b)	
12)	The power loss is important for the o a) Generator c) Feeder	•	Motor
13)	Third mode of propagation is called a) Line to ground c) Homopolar	b)	Phase to phase Inter-phase
14)	For Aeolian vibration the frequency of Hz and the amplitudes less than a) 20 Hz, 2.5 cm c) 50 Hz, 2.5 cm	C	m. 25 Hz, 2.5 cm

Set S

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Page	12	of	12

Seat	
No.	

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) How the audible noise is generated and what are the characteristics?
- **b)** Derive equation for line energization with trapped charge voltage.
- c) Derive differential equations and solutions for general case in travelling waves.
- d) Explain in detail advantages and disadvantages of high voltage.
- e) Explain the relation between temperature rise and current carrying capacity of EHVAC line.
- f) Write short notes on limits for radio interference.

Q.3 Attempt any two.

- a) A power of 12000 MW is required to be transmitted over a distance of 1000 km. At voltage levels of 400 kV determine.
 - 1) Possible no. of circuits required with equal magnitudes for sending and receiving end voltages with 30° phase difference.
 - 2) The currents transmitted;
 - 3) The total line losses

Assume the value of x = 0.327 for 400 kV.

- b) Explain the charge potential relations of multi-conductor lines.
- c) Explain reflection and refraction of travelling waves.

Section – II

Q.4 Attempt any four.

- a) Explain the term power circle diagram and its use.
- **b)** Explain the conductor-tower, conductor-ground and conductor-conductor clearances for the design of EHV lines.
- c) State the factors under steady state in design of EHV lines?
- d) Explain the term ferro-resonance over voltages.
- e) State & explain the sources of over voltages.
- f) Explain in detail static reactive compensating system.

Q.5 Attempt any two.

- a) Explain line insulation design based upon transient overvoltages in detail.
- **b)** Derive the expressions for generalized constants of transmission line.
- c) Explain in detail sinusoidal excitation lumped parameter circuit.

12

16

Max. Marks: 56

12

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book Page No.3

- 2) Figures to the right indicate full mark.
- 3) Assume suitable data if necessary & mention it clearly.

MCQ/Objective Type Questions

b)

b)

d)

d)

Duration: 30 Minutes

Choose the correct alternatives from the options. Q.1

- In ladder diagram each rung is 1)
 - Program Statement a)
 - Statement for an input only Statement for an output only c) d)
- Input with a particular terminal number can be used 2) Only once in a Program
 - Many times in a Program a)
 - c) Only once in a Rung
- To develop a logical AND gate the NO switch should be connected . 3)
 - a) In series

- b) In parallel
- c) Series & parallel
- 4) PLC stands for _
 - a) Programmable Logo Controller
 - b) None of these
 - c) Pneumatic Latching Circuit
 - d) Programmable Logic Controller
- PLCs are designed for use in the control of a wide variety of 5) manufacturing machines and systems
 - a) Special-Purpose Industrial Computers
 - b) Personal computers
 - c) Electromechanical systems
 - d) All of the above
- The first company to build PLC was 6)
 - a) General Motors b) Allen Bradley
 - c) Square D d) Modicon
- 7) Analog I/O modules deals with_
 - a) Continuously Variables Analog signals
 - b) Discrete Analog Signals
 - c) Continuously Variables digital signals
 - d) Discrete digital Signals

Max. Marks: 70

Marks: 14

14



No.

Seat

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- Symbol of Circuit Element

None of the above

Neither of the above.

8) SCADA system is _____. a) Software b) Hardware c) Combination of Software & Hardware d) None of the above The important function of SCDA is _ 9) a) Data Acquisition b) Alarm processing c) Information Display d) All the above 10) RTU has ____ a) Static Memory b) Dynamic Memory c) Static & Dynamic Memory None of the above d) 11) In OSI model layer No 7 consist of _ b) Data link layer a) Physical Layer c) Network Layer **Application Layer** d) 12) Which layer provides the services to user? Application Layer Data link layer a) b) Physical Layer d) **Network Layer** C) 13) High speed Ethernet works on ____ a) Coaxial cable b) Twisted pair cable Optical fiber None of the mentioned d) C) 14) OSI stands for _____ . Open system interconnection a)

- b) Operating system interface
- c) Optical service implementation
- d) None of the above

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Seat No.

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any Four:

- Define programmable logic controller. Enlist brands of PLC. a)
- b) Explain scan cycle in detail.
- Draw gate logic & ladder logic of AND & NAND Gates. C)
- Explain Speed control of DC motor with DC Source. d)
- Explain different types of analog switches. e)
- Explain Central Processing Unit of PLC. **f**)

Q.3 Solve any Two:

- a) Develop PLC Logic for DC Motor In Forward & Reverse Direction.
 - Forward stop Reverse starter 1)
 - 2) Forward Reverse Starter
- b) A process fan is to run only when all of the following conditions are met.
 - Input 1 is OFF 1)
 - 2) Input 2 is ON or Input 3 is ON, both 2 and 3 are ON
 - 3) Inputs 5 & 6 are both ON
 - One or more of inputs 7, 8, or 9 is ON Develop Relay logic, Gate logic 4) & Ladder Logic.
- C) Draw and Explain Analysis of Rungs.

Section - II

Solve any four: Q.4

- What are SCADA System desirable Properties? a)
- State advantages and disadvantages of SCADA System. b)
- Explain Human Machine Interface. c)
- d) What are different system operating states in power system?
- Explain Device Net protocol in detail. e)
- Explain Profibus Protocol System. **f**)

Solve any two. Q.5

- What Security implementation of the SCADA Protocols? a)
- b) Draw and explain SCADA system in water purification system.
- c) Explain
 - Master terminal Unit 1)
 - 2) **Remote Terminal Unit**

Max. Marks: 56

12

16

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a) c)	Optical fiber	b) d)	None of the mentioned	
OS a) b) c) d)	I stands for Open system interconnection Operating system interface Optical service implementation None of the above			
In la a) c)	adder diagram each rung is Program Statement Statement for an input only	 b) d)	Symbol of Circuit Element Statement for an output only	
Inp a) c)	ut with a particular terminal numb Many times in a Program Only once in a Rung	er car b) d)	n be used Only once in a Program None of the above	
				Page 4 of 12

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** PLC AND SCADA

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer

MCQ/Objective Type Questions

3) Assume suitable data if necessary & mention it clearly.

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

9)

Book Page No.3

2) Figures to the right indicate full mark.

Duration: 30 Minutes Marks: 14 14 Q.1 Choose the correct alternatives from the options. 1) SCADA system is . a) Software b) Hardware c) Combination of Software & Hardware d) None of the above 2) The important function of SCDA is a) Data Acquisition b) Alarm processing c) Information Display d) All the above 3) RTU has a) Static Memory b) Dynamic Memory c) Static & Dynamic Memory d) None of the above 4) In OSI model layer No 7 consist of _ Data link laver a) Physical Laver b) c) Network Layer **Application Layer** d) 5) Which layer provides the services to user? a) Application Layer Data link layer b) C) Physical Layer d) Network Layer High speed Ethernet works on ____ 6) . הו Twisted pair cable Coaxial cable a) c) OSI 7) a) b) c) d) 8) In la a)

Max. Marks: 70

Seat No.



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Q

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- 10) To develop a logical AND gate the NO switch should be connected _____.
 - a) In series

- b) In parallel
- c) Series & parallel
- d) Neither of the above.

- 11) PLC stands for _____
 - a) Programmable Logo Controller
 - b) None of these
 - c) Pneumatic Latching Circuit
 - d) Programmable Logic Controller
- 12) PLCs are designed for use in the control of a wide variety of manufacturing machines and systems _____.
 - a) Special-Purpose Industrial Computers
 - b) Personal computers
 - c) Electromechanical systems
 - d) All of the above
- 13) The first company to build PLC was _
 - a) General Motors

- b) Allen Bradley
- c) Square D
- d) Modicon
- 14) Analog I/O modules deals with___
 - a) Continuously Variables Analog signals
 - b) Discrete Analog Signals
 - c) Continuously Variables digital signals
 - d) Discrete digital Signals

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019

Electrical Engineering PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any Four:

Seat

No.

- Define programmable logic controller. Enlist brands of PLC. a)
- b) Explain scan cycle in detail.
- Draw gate logic & ladder logic of AND & NAND Gates. C)
- Explain Speed control of DC motor with DC Source. d)
- Explain different types of analog switches. e)
- Explain Central Processing Unit of PLC. **f**)

Q.3 Solve any Two:

- a) Develop PLC Logic for DC Motor In Forward & Reverse Direction.
 - Forward stop Reverse starter 1)
 - 2) Forward Reverse Starter
- b) A process fan is to run only when all of the following conditions are met.
 - Input 1 is OFF 1)
 - 2) Input 2 is ON or Input 3 is ON, both 2 and 3 are ON
 - 3) Inputs 5 & 6 are both ON
 - One or more of inputs 7, 8, or 9 is ON Develop Relay logic, Gate logic 4) & Ladder Logic.
- C) Draw and Explain Analysis of Rungs.

Section - II

Solve any four: Q.4

- What are SCADA System desirable Properties? a)
- State advantages and disadvantages of SCADA System. b)
- Explain Human Machine Interface. c)
- d) What are different system operating states in power system?
- Explain Device Net protocol in detail. e)
- Explain Profibus Protocol System. **f**)

Solve any two. Q.5

- What Security implementation of the SCADA Protocols? a)
- b) Draw and explain SCADA system in water purification system.
- c) Explain
 - Master terminal Unit 1)
 - 2) **Remote Terminal Unit**

Max. Marks: 56

12

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B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** PLC AND SCADA Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM **Instructions:** 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book Page No.3 2) Figures to the right indicate full mark. 3) Assume suitable data if necessary & mention it clearly. MCQ/Objective Type Questions **Duration: 30 Minutes** Choose the correct alternatives from the options.

- 1) PLCs are designed for use in the control of a wide variety of manufacturing machines and systems
 - a) Special-Purpose Industrial Computers
 - b) Personal computers
 - c) Electromechanical systems
 - d) All of the above

Seat

No.

Q.1

2) The first company to build PLC was

- a) General Motors Allen Bradley b)
- c) Square D d) Modicon
- Analog I/O modules deals with 3)
 - a) Continuously Variables Analog signals
 - b) Discrete Analog Signals
 - c) Continuously Variables digital signals
 - d) Discrete digital Signals
- 4) SCADA system is _____.
 - a) Software
 - b) Hardware
 - c) Combination of Software & Hardware
 - d) None of the above

The important function of SCDA is 5)

- a) Data Acquisition b) Alarm processing
- c) Information Display All the above d)
- RTU has . 6) a) Static Memory
 - b) Dynamic Memory c) Static & Dynamic Memory d) None of the above

In OSI model layer No 7 consist of 7)

- a) Physical Layer Data link layer b)
- c) Network Layer **Application Layer** d)

Which layer provides the services to user? 8)

- a) Application Layer b) Data link layer c) Physical Layer
 - d) **Network Layer**

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R

Max. Marks: 70

Marks: 14

9) High speed Ethernet works on _____

- a) Coaxial cable
- c) Optical fiber
- 10) OSI stands for _____.
 - Open system interconnection a)
 - Operating system interface b)
 - Optical service implementation C)
 - d) None of the above
- In ladder diagram each rung is _____. 11)

a) Many times in a Program

- a) Program Statement
- Symbol of Circuit Element b) c) Statement for an input only d) Statement for an output only

b)

- 12) Input with a particular terminal number can be used _____
 - Only once in a Program b)
 - None of the above c) Only once in a Rung d)
- To develop a logical AND gate the NO switch should be connected _____. 13)
 - a) In series

In parallel b) d) Neither of the above.

- 14) PLC stands for
 - a) Programmable Logo Controller
 - b) None of these

c) Series & parallel

- c) Pneumatic Latching Circuit
- d) Programmable Logic Controller

- Twisted pair cable
- None of the mentioned d)



Set

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Seat No.

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any Four:

- a) Define programmable logic controller. Enlist brands of PLC.
- b) Explain scan cycle in detail.
- c) Draw gate logic & ladder logic of AND & NAND Gates.
- d) Explain Speed control of DC motor with DC Source.
- e) Explain different types of analog switches.
- f) Explain Central Processing Unit of PLC.

Q.3 Solve any Two:

- a) Develop PLC Logic for DC Motor In Forward & Reverse Direction.
 - 1) Forward stop Reverse starter
 - 2) Forward Reverse Starter
- **b)** A process fan is to run only when all of the following conditions are met.
 - 1) Input 1 is OFF
 - 2) Input 2 is ON or Input 3 is ON, both 2 and 3 are ON
 - 3) Inputs 5 & 6 are both ON
 - 4) One or more of inputs 7, 8, or 9 is ON Develop Relay logic, Gate logic & Ladder Logic.
- c) Draw and Explain Analysis of Rungs.

Section - II

Q.4 Solve any four:

- a) What are SCADA System desirable Properties?
- **b)** State advantages and disadvantages of SCADA System.
- c) Explain Human Machine Interface.
- d) What are different system operating states in power system?
- e) Explain Device Net protocol in detail.
- f) Explain Profibus Protocol System.

Q.5 Solve any two.

- a) What Security implementation of the SCADA Protocols?
- b) Draw and explain SCADA system in water purification system.
- c) Explain
 - 1) Master terminal Unit
 - 2) Remote Terminal Unit

2

Max. Marks: 56

16

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Seat	
No.	

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer
Book Page No.3

- 2) Figures to the right indicate full mark.
- 3) Assume suitable data if necessary & mention it clearly.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options. 1) RTU has _____.

- a) Static Memory b) Dynamic Memory
 - c) Static & Dynamic Memory d) None of the above

2)	In OSI model layer No 7 consist of _		
	a) Dhycical Layor	b)	Data link

a) Physical Layerb) Data link layerc) Network Layerd) Application Layer

3) Which layer provides the services to user?

- a) Application Layer b) Data link layer
- c) Physical Layer d) Network Layer

4) High speed Ethernet works on _____

- a) Coaxial cable
 - c) Optical fiber d) None of the mentioned

b)

5) OSI stands for _____

9)

- a) Open system interconnection
- b) Operating system interface
- c) Optical service implementation
- d) None of the above

6) In ladder diagram each rung is _____

- a) Program Statement b) Symbol of Circuit Element
- c) Statement for an input only d) Statement for an output only
- 7) Input with a particular terminal number can be used _____
 - a) Many times in a Program
- b) Only once in a Program

Twisted pair cable

- c) Only once in a Rung d) None of the above
- 8) To develop a logical AND gate the NO switch should be connected _____.
 a) In series b) In parallel
 - a) In seriesc) Series & parallel
- d) Neither of the above.
- PLC stands for _____.
- a) Programmable Logo Controllerb) None of these
- c) Pneumatic Latching Circuit
- d) Programmable Logic Controller

Max. Marks: 70

Set

Marks: 14

10) PLCs are designed for use in the control of a wide variety of manufacturing machines and systems _____.

- a) Special-Purpose Industrial Computers
- b) Personal computers
- c) Electromechanical systems
- d) All of the above

11) The first company to build PLC was _____

- a) General Motors
- b) Allen Bradley

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Set S

- c) Square D d) Modicon
- 12) Analog I/O modules deals with____
 - a) Continuously Variables Analog signals
 - b) Discrete Analog Signals
 - c) Continuously Variables digital signals
 - d) Discrete digital Signals
- 13) SCADA system is _____.
 - a) Software
 - b) Hardware
 - c) Combination of Software & Hardware
 - d) None of the above

14) The important function of SCDA is _____

- a) Data Acquisitionc) Information Display
- d) A
- b) Alarm processing
 - All the above

Seat No.

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering** PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any Four:

- Define programmable logic controller. Enlist brands of PLC. a)
- b) Explain scan cycle in detail.
- Draw gate logic & ladder logic of AND & NAND Gates. C)
- Explain Speed control of DC motor with DC Source. d)
- Explain different types of analog switches. e)
- Explain Central Processing Unit of PLC. **f**)

Q.3 Solve any Two:

- Develop PLC Logic for DC Motor In Forward & Reverse Direction. a)
 - Forward stop Reverse starter 1)
 - 2) Forward Reverse Starter
- b) A process fan is to run only when all of the following conditions are met.
 - Input 1 is OFF 1)
 - 2) Input 2 is ON or Input 3 is ON, both 2 and 3 are ON
 - 3) Inputs 5 & 6 are both ON
 - 4) One or more of inputs 7, 8, or 9 is ON Develop Relay logic, Gate logic & Ladder Logic.
- C) Draw and Explain Analysis of Rungs.

Section - II

Q.4 Solve any four:

- What are SCADA System desirable Properties? a)
- State advantages and disadvantages of SCADA System. b)
- Explain Human Machine Interface. c)
- d) What are different system operating states in power system?
- Explain Device Net protocol in detail. e)
- Explain Profibus Protocol System. **f**)

Solve any two. Q.5

- What Security implementation of the SCADA Protocols? a)
- b) Draw and explain SCADA system in water purification system.
- c) Explain
 - Master terminal Unit 1)
 - 2) **Remote Terminal Unit**

Max. Marks: 56

16

12



16

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

d)

 $x(n) y(n) \leftrightarrow x(z)y(z)$

Q.1 Choose the correct alternatives from the options.

- 1) Linearity property of z- transform is given by b) $x(n) + y(n) \leftrightarrow x(z) + y(z)$
 - $x(n) + y(n) \leftrightarrow x(z)y(z)$ a)
 - $x(n)y(n) \leftrightarrow x(z) + y(z)$ c)
- 2) Which of condition is to be satisfied for the fourier transform of a sequence to be equal as z- transform of same sequence?
 - a) |z| = 1b) |z| < 1
 - d) c) |z| > 1can never be equal
- 3) What is the highest frequency that is contained in the sampled signal?
 - a) 2 fs b) fs/2
 - c) Fs d) None of above
- Linear convolution of two real sequence with P and Q points respectively 4) can be converted to circular convolution by appending extra zeros to fill its length is
 - a) P+Q P+Q+1 b) c) P+Q-1 d) P-Q-1

5) Goertzel algorithm evaluates the _

- **DFT** coefficients a) DTFT coefficients b)
- c) z- transform d) FT coefficient
- The size of input data blocks in overlap add method is _____. 6)
 - L+M a) L b) d) L+M+1 c) L+M-1
- 7) Circular convolution of sequence $x(n) = \{1,2,1\} \& h(n) = \{1,-2,2\}$ a) $\{3, 2, -1\}$ b) $\{-1,2,3\}$
 - c) $\{2,3,-1\}$ $\{3, 2, -2\}$ d)
- FIR filter is always stable because ____ 8)
 - a) all its poles one at origin b) all its zeros are at origin c) h(n) = h(N - 1 - n)none of above d)
- FIR filter is also known as _____ filter. 9)
 - Cascade structure Transversal a) b)
 - ARMA AR c) d)

Duration: 30 Minutes

Set

Max. Marks: 70

Ρ

Marks: 14

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			Set P
10)	In Bilinear transformation the relation a) $\Omega = wt$ c) $\Omega = \tan(\Omega T)$	b)	ween Ω and w is $\Omega = \frac{w/t}{T}$ $\Omega = \frac{2}{T} \tan\left(\frac{w}{2}\right)$
11)	Which of following is frequency dom a) $0 \ge 20 \log H(j\Omega) $ c) $20 \log H(i\Omega) \le K_s$	b)	$20\log H(j\Omega) \ge k_p$
12)	In IIR filter design, Bilinear transforr to plane. a) Z to S c) S to J	b)	n is a mapping from plane S to z J to S
13)	The basic process that's going on ir a) Quantization c) Logorithmic transformation	b)	MAC
14)	FIR filters have and IIR filters a) zeros, poles & zeros c) zeros, zeros	b)	

Seat	
No.	

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if required.

Section – I

Q.2 Solve any four.

- a) What is FFT? What its significance in DSP?
- **b)** Compare correlation and convolution used in DSP.
- c) Determine output if $h(n) = \{1,1,1\}$ and $x(n) = \{1,2,3,1\}$ using circular convolution.
- d) What is twiddle factor and explain its significance?
- e) Explain linear phase filter with example.

Q.3 Solve any two.

- a) Compute 8 point DFT of a sequence $x(n) = \{1,1,1,1,1,1,1,1\}$. Sketch magnitude spectrum.
- b) Compute IDFT of sequence. $X(k) = \{1, 1 + j, 2, 1 - 2j, 0, 1 + 2j, o, 1 - j\}.$
- c) Write note on DWT.

Section – II

Q.4 Solve any four.

- a) State the advantage of digital filter over Analog filter.
- b) Discuss the characteristic of FIR filter.
- c) List down the design steps in implementing IIR filter.
- d) What is finite word length effects in FIR filter?
- e) Write note on LMS Algorithm.

Q.5 Solve ant two.

a) Using frequency sampling method, Design a band pass filter with following specification.

sampling frequency = $800 H_z$, $fc_1 = 1000 H_2$, $fc_2 = 3000 H_z$.

- b) Explain in detail application of DSP in power system.
- c) Explain the functional Block diagram of DSP processor. (TMS 320 C54 XX).

Max. Marks: 56

Set

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Electrical Engineering DIGITAL SIGNAL PROCESSING					
	Day & Date: Tuesday, 17-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM				
Instr	uctio	ns: 1) Q. No. 1 is compulsory and sho	uld be	e solved in first 30 minutes in answer	
		book. 2) Figures to the right indicate full i 3) Assume suitable data if necessa		S.	
_		MCQ/Objective Ty	pe C		
Dura	tion: 3	30 Minutes		Marks: 14	
Q.1	Cho 1)	ose the correct alternatives from the — FIR filter is always stable because	-	ions. 14	
	•)	a) all its poles one at origin c) $h(n) = h(N - 1 - n)$		all its zeros are at origin none of above	
	2)	,	b)	Transversal AR	
	3)		b)	where Ω and w is $\Omega = w/t$ $\Omega = \frac{2}{T} \tan\left(\frac{w}{2}\right)$	
	4)	Which of following is frequency doma a) $0 \ge 20 \log H(j\Omega) $ c) $20 \log H(i\Omega) \le K_s$	b)	$20\log H(j\Omega) \ge k_p$	
	5)	,	b)	is a mapping from plane S to z J to S	
	6)	,	side a b) d)	DSP chip is MAC None	
	7)		ave _ b) d)	poles & zeros, zeros none of above	
	8)	Linearity property of z- transform is g a) $x(n) + y(n) \leftrightarrow x(z)y(z)$ c) $x(n)y(n) \leftrightarrow x(z) + y(z)$	b)	$x(n) + y(n) \leftrightarrow x(z) + y(z)$	
	9)	,			

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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019

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Set Q

What is the highest frequency that is contained in the sampled signal? 10)

a) 2 fs

b) fs/2 **SLR-FM-443**

Set Q

- c) Fs d) None of above
- Linear convolution of two real sequence with P and Q points respectively 11) can be converted to circular convolution by appending extra zeros to fill its length is ____.
 - a) P+Q P+Q+1 b) c) P+Q-1 d) P-Q-1

	,	,	
12)	Goertzel algorithm evaluates the	e	
	a) DTFT coefficients	b)	DFT coefficients
	c) z- transform	d)	FT coefficient
13)	The size of input data blocks in	overlan a	dd method is

- The size of input data blocks in overlap add method is _____. 13)
 - L+M a) L b)
 - L+M+1 c) L+M-1 d)
- 14) Circular convolution of sequence $x(n) = \{1, 2, 1\} \& h(n) = \{1, -2, 2\}$
 - a) $\{3, 2, -1\}$ b) $\{-1,2,3\}$
 - {3,2, -2} c) $\{2,3,-1\}$ d)

Seat	
No.	

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if required.

Section – I

Q.2 Solve any four.

- a) What is FFT? What its significance in DSP?
- **b)** Compare correlation and convolution used in DSP.
- c) Determine output if $h(n) = \{1,1,1\}$ and $x(n) = \{1,2,3,1\}$ using circular convolution.
- d) What is twiddle factor and explain its significance?
- e) Explain linear phase filter with example.

Q.3 Solve any two.

- a) Compute 8 point DFT of a sequence $x(n) = \{1,1,1,1,1,1,1,1\}$. Sketch magnitude spectrum.
- b) Compute IDFT of sequence. $X(k) = \{1, 1 + j, 2, 1 - 2j, 0, 1 + 2j, o, 1 - j\}.$
- c) Write note on DWT.

Section – II

Q.4 Solve any four.

- a) State the advantage of digital filter over Analog filter.
- b) Discuss the characteristic of FIR filter.
- c) List down the design steps in implementing IIR filter.
- d) What is finite word length effects in FIR filter?
- e) Write note on LMS Algorithm.

Q.5 Solve ant two.

a) Using frequency sampling method, Design a band pass filter with following specification.

sampling frequency = $800 H_z$, $fc_1 = 1000 H_2$, $fc_2 = 3000 H_z$.

- b) Explain in detail application of DSP in power system.
- c) Explain the functional Block diagram of DSP processor. (TMS 320 C54 XX).

Max. Marks: 56

Set

16

12

16

		B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019	
		Electrical Engineering DIGITAL SIGNAL PROCESSING	
		e: Tuesday, 17-12-2019 Max. Marks: 70 30 PM To 05:30 PM)
Instr	uctio	ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer	
		book. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary.	
		MCQ/Objective Type Questions	
Dura	ition: 3	30 Minutes Marks: 14	4
Q.1	Cho 1)	ose the correct alternatives from the options. 14 Goertzel algorithm evaluates the	4
	1)	a) DTFT coefficients b) DFT coefficients c) z- transform d) FT coefficient	
	2)	The size of input data blocks in overlap add method is a) L b) L+M c) L+M-1 d) L+M+1	
	3)	Circular convolution of sequence $x(n) = \{1,2,1\} \& h(n) = \{1,-2,2\}$ a) $\{3,2,-1\}$ b) $\{-1,2,3\}$ c) $\{2,3,-1\}$ d) $\{3,2,-2\}$	
	4)	FIR filter is always stable becausea) all its poles one at originb) all its zeros are at originc) $h(n) = h(N - 1 - n)$ d) none of above	
	5)	FIR filter is also known as filter. a) Cascade structure b) Transversal c) ARMA d) AR	
	6)	In Bilinear transformation the relation between Ω and w is	
		a) $\Omega = wt$ c) $\Omega = \tan(\Omega T)$ b) $\Omega = w/t$ d) $\Omega = \frac{2}{T} \tan(\frac{w}{2})$	
	7)	Which of following is frequency domain & specification?	
		a) $0 \ge 20 \log H(j\Omega) $ b) $20 \log H(j\Omega) \ge k_p$ c) $20 \log H(i\Omega) \le K_s$ d) All of above	
	8)	In IIR filter design, Bilinear transformation is a mapping from plane to plane. a) Z to S b) S to z	
		c) S to J d) J to S	
	9)	The basic process that's going on inside a DSP chip is a) Quantization b) MAC c) Logorithmic transformation d) None	

Set R

No.

B E (Part – I) (New) (CBCS) Examination Nov/Dec-2019

Seat

Set R FIR filters have ____ and IIR filters have ____ a) zeros, poles & zeros b) poles & zeros, zeros c) zeros, zeros d) none of above Linearity property of z- transform is given by _____. a) $x(n) + y(n) \leftrightarrow x(z)y(z)$ b) $x(n) + y(n) \leftrightarrow x(z) + y(z)$ c) $x(n)y(n) \leftrightarrow x(z) + y(z)$ d) $x(n) y(n) \leftrightarrow x(z)y(z)$ Which of condition is to be satisfied for the fourier transform of a

- 12) sequence to be equal as z- transform of same sequence? |z| < 1
 - a) |z| = 1b) c) |z| > 1
 - d) can never be equal
- What is the highest frequency that is contained in the sampled signal? 13)
 - a) 2 fs b) fs/2
 - c) Fs d) None of above
- 14) Linear convolution of two real sequence with P and Q points respectively can be converted to circular convolution by appending extra zeros to fill its length is _____.
 - a) P+Q

11)

P+Q+1 b) d) c) P+Q-1 P-Q-1

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- 10)

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No.	

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if required.

Section – I

Q.2 Solve any four.

- a) What is FFT? What its significance in DSP?
- **b)** Compare correlation and convolution used in DSP.
- c) Determine output if $h(n) = \{1,1,1\}$ and $x(n) = \{1,2,3,1\}$ using circular convolution.
- d) What is twiddle factor and explain its significance?
- e) Explain linear phase filter with example.

Q.3 Solve any two.

- a) Compute 8 point DFT of a sequence $x(n) = \{1,1,1,1,1,1,1,1\}$. Sketch magnitude spectrum.
- b) Compute IDFT of sequence. $X(k) = \{1, 1 + j, 2, 1 - 2j, 0, 1 + 2j, o, 1 - j\}.$
- c) Write note on DWT.

Section – II

Q.4 Solve any four.

- a) State the advantage of digital filter over Analog filter.
- b) Discuss the characteristic of FIR filter.
- c) List down the design steps in implementing IIR filter.
- d) What is finite word length effects in FIR filter?
- e) Write note on LMS Algorithm.

Q.5 Solve ant two.

a) Using frequency sampling method, Design a band pass filter with following specification.

sampling frequency = $800 H_z$, $fc_1 = 1000 H_2$, $fc_2 = 3000 H_z$.

- b) Explain in detail application of DSP in power system.
- c) Explain the functional Block diagram of DSP processor. (TMS 320 C54 XX).

Max. Marks: 56

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16

-		0 PM To 05:30 PM		
Instr	uctio	book. 2) Figures to the right indicate ful	l marl	be solved in first 30 minutes in answer
		 Assume suitable data if neces MCQ/Objective T 	•	Questions
Dura	tion: 3	0 Minutes	уре	Marks: 14
Q.1	Cho	ose the correct alternatives from t	ne op	tions. 14
	1)	In Bilinear transformation the relation	-	
		a) $\Omega = wt$	b)	$\Omega = w/t$
		c) $\Omega = \tan(\Omega T)$	d)	$\Omega = \frac{2}{T} \tan\left(\frac{w}{2}\right)$
	2)	Which of following is frequency don	nain 8	specification?
		a) $0 \ge 20 \log H(j\Omega) $	b)	$20\log H(j\Omega) \ge k_p$
		c) $20\log H(i\Omega) \le K_s$	d)	All of above
	3)	In IIR filter design, Bilinear transforr to plane.	natior	n is a mapping from plane
		a) Z to S	,	S to z
		c) S to J	d)	J to S
	4)	The basic process that's going on in	nside	• • • • • • • • • • • • • • • • • • • •
		a) Quantization	b)	MAC
		c) Logorithmic transformation	d)	None
	5)	FIR filters have and IIR filters		
		a) zeros, poles & zeros	b)	•
	•	c) zeros, zeros	,	none of above
	6)	Linearity property of z- transform is $2 - \pi (z) = \pi (z) + \pi $	-	•
		a) $x(n) + y(n) \leftrightarrow x(z)y(z)$ c) $x(n)y(n) \leftrightarrow x(z) + y(z)$	b) (b	$x(n) + y(n) \leftrightarrow x(z) + y(z)$ $x(n) y(n) \leftrightarrow x(z)y(z)$
	7)	Which of condition is to be satisfied		
	7)	sequence to be equal as z- transfor		
		a) $ z = 1$	b)	z < 1
		c) $ z > 1$	d)	can never be equal
	8)	What is the highest frequency that i	s con	tained in the sampled signal?
	,	a) 2 fs	b)	fs/2
		c) Fs	d)	None of above

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019

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Max. Marks: 70

9)	Linear convolution of two real seque can be converted to circular convolu length is a) P + Q	ution k	
	c) P+Q-1	d)	P-Q-1
10)	Goertzel algorithm evaluates the a) DTFT coefficients c) z- transform	b)	DFT coefficients FT coefficient
11)	The size of input data blocks in over a) L c) L+M-1	b)	dd method is L+M L+M+1
12)	Circular convolution of sequence x(a) {3,2,-1} c) {2,3,-1}	b)	$\{1,2,1\} \& h(n) = \{1,-2,2\} \\ \{-1,2,3\} \\ \{3,2,-2\}$
13)	FIR filter is always stable because _ a) all its poles one at origin c) $h(n) = h(N - 1 - n)$	b)	all its zeros are at origin none of above
14)	FIR filter is also known as filt a) Cascade structure c) ARMA		Transversal AR

Set S

Seat	
No.	

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if required.

Section – I

Q.2 Solve any four.

- a) What is FFT? What its significance in DSP?
- **b)** Compare correlation and convolution used in DSP.
- c) Determine output if $h(n) = \{1,1,1\}$ and $x(n) = \{1,2,3,1\}$ using circular convolution.
- d) What is twiddle factor and explain its significance?
- e) Explain linear phase filter with example.

Q.3 Solve any two.

- a) Compute 8 point DFT of a sequence $x(n) = \{1,1,1,1,1,1,1,1\}$. Sketch magnitude spectrum.
- b) Compute IDFT of sequence. $X(k) = \{1, 1 + j, 2, 1 - 2j, 0, 1 + 2j, o, 1 - j\}.$
- c) Write note on DWT.

Section – II

Q.4 Solve any four.

- a) State the advantage of digital filter over Analog filter.
- b) Discuss the characteristic of FIR filter.
- c) List down the design steps in implementing IIR filter.
- d) What is finite word length effects in FIR filter?
- e) Write note on LMS Algorithm.

Q.5 Solve ant two.

a) Using frequency sampling method, Design a band pass filter with following specification.

sampling frequency = $800 H_z$, $fc_1 = 1000 H_2$, $fc_2 = 3000 H_z$.

- b) Explain in detail application of DSP in power system.
- c) Explain the functional Block diagram of DSP processor. (TMS 320 C54 XX).

Max. Marks: 56

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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

RENEWABLE ENERGY SOURCES

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

Seat

No.

Q.1 Choose the correct alternatives from the options.

- For low head and high discharge, the hydraulic turbine used is . 1) Francis turbine b)
 - Kaplan turbine a)
 - Pelton wheel
- 2) In pumped storage ____
 - a) Power is produced by means of pumps
 - b) Water is stored by pumping to high pressures
 - c) Downstream water is pumped up-stream during off load periods

d)

d) Water is re circulated through turbine

3) Cost of operation of which plant is least

- a) Gas turbine plant
- c) Nuclear power plant
- 4) A Pelton wheel is _____.
 - a) Inward flow impulse turbine
 - Inward flow reaction turbine c)
- In which of the following power plant the availability of power is least 5) reliable?

b)

d)

b)

d)

- a) Solar power plant
- c) Tidal power plant
- 6) Geothermal energy is
 - a) A renewable energy resource
 - c) inexhaustible energy source
- In hydrothermal source of geothermal energy _ 7)
 - a) hot water or steam is available b) hot gases are available
 - c) molten lava is available none of the above d)
- 8) Which power plant is free from environmental pollution problems?
 - a) Thermal power plant
 - Nuclear power plant b)
 - Hydro power plant c)
 - d) Geothermal energy power plant

- Thermal power plant b)
- d) Hydroelectric plant
- b) Outward flow impulse turbine

Geothermal power plant

alternative energy source

d)

Wind power plant

any of the above

- Axial flow impulse turbine

Jonual turbine

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Max. Marks: 70

Marks: 14

- Set P
- 9) In India, the first tidal power plant is likely to come up in _____.
 - a) Bay of Bengal

b) Korba

Gulf of kutch

- c) Singrauli d)
- 10) The load factor for which of hydroelectric plant is high _____.
 - a) Run-off river plant without pondage
 - b) Run-off river plant with pondage
 - c) Storage reservoir plants
 - d) Pumped storage plants
- 11) The purpose of trash rack is _____.
 - a) To reduced water hammer effect
 - b) To reduced cavitation effect
 - c) To avoid entry of debris
 - d) To avoid excess water to entry in
- 12) The purpose of spillway is _____.
 - a) To discharge water
 - b) For irrigation purpose water connection
 - c) It discharge excess water
 - d) None
- 13) The voltage of a single solar cell is _____
 - a) 0.5 V b) 1V
 - c) 1.1V d) 5W
- 14) The total power of a wind stream is proportional to _____.
 - a) velocity of stream
- b) (velocity of stream)2
- c) (velocity of stream)3 d) 1/velocity of stream

tidal energy conversion system with proper diagram.	

d) Different methods of solar energy storage. Brief the components wind energy conversion system. e) Explain horizontal axis wind mills. **f)** Q.3 Attempt any two. a)

- Explain savonious and durries wind mill operation with diagram.
- b) Describe solar Photovoltaic technology.

Explain solar water heating system.

Describe solar thermal power system.

Explain operating characteristics of wind turbine with graph. c)

Classification of concentrating solar energy collectors.

Section – II

Q.3 Attempt any four.

- Explains types of biogas digesters. a) Brief combustion characteristics of biogas. b)
 - Potential in India for geothermal energy. c)
 - What are resources of geothermal energy? d)
 - Describe tidal and wave energy. e)
- Explain carnot cycle. **f**)

Q.4 Attempt any two.

- Explain fixed drum type biogas plant. a)
- Explain double chamber biogas plant. b)
- Explain C)

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B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019

2) Figures to the right indicate full marks. 3) Assume suitable data if necessary.

Electrical Engineering RENEWABLE ENERGY SOURCES

Section – I

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Attempt any four.

Instructions: 1) All questions are compulsory.

Seat No.

Q.2

a) b)

c)

Max. Marks: 56

Set

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No.						
		_		_	_	_

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- 1) Which power plant is free from environmental pollution problems?
 - a) Thermal power plant
 - b) Nuclear power plant
 - c) Hydro power plant
 - d) Geothermal energy power plant
- 2) In India, the first tidal power plant is likely to come up in _____.
 - a) Bay of Bengal b) Korba
 - c) Singrauli d) Gulf of kutch
- 3) The load factor for which of hydroelectric plant is high _____.
 - a) Run-off river plant without pondage
 - b) Run-off river plant with pondage
 - c) Storage reservoir plants
 - d) Pumped storage plants
- 4) The purpose of trash rack is _____.
 - a) To reduced water hammer effect
 - b) To reduced cavitation effect
 - c) To avoid entry of debris
 - d) To avoid excess water to entry in
- 5) The purpose of spillway is _____.
 - a) To discharge water
 - b) For irrigation purpose water connection
 - c) It discharge excess water
 - d) None
- 6) The voltage of a single solar cell is _____
 - a) 0.5 V b) 1V c) 1.1V d) 5W
- 7) The total power of a wind stream is proportional to _____
 - a) velocity of stream b) (velocity of stream)2
 - c) (velocity of stream)3 d) 1/velocity of stream
- 8) For low head and high discharge, the hydraulic turbine used is _____.
 - a) Kaplan turbinec) Pelton wheel
- b) Francis turbine
- d) Jonual turbine



Max. Marks: 70

9) In pumped storage _____.

- a) Power is produced by means of pumps
- b) Water is stored by pumping to high pressures
- c) Downstream water is pumped up-stream during off load periods
- d) Water is re circulated through turbine

Cost of operation of which plant is least 10)

- a) Gas turbine plant
- c) Nuclear power plant
- Thermal power plant b)
- d) Hydroelectric plant
- A Pelton wheel is ____ 11)
 - a) Inward flow impulse turbine
 - c) Inward flow reaction turbine
- b) Outward flow impulse turbine Axial flow impulse turbine d)

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Set

In which of the following power plant the availability of power is least 12) reliable?

d)

- a) Solar power plant
- b) Wind power plant Geothermal power plant
- c) Tidal power plant

13) Geothermal energy is _

- a) A renewable energy resource
- c) inexhaustible energy source
- alternative energy source b) any of the above d)
- In hydrothermal source of geothermal energy _____. 14)
 - a) hot water or steam is available
 - c) molten lava is available
- hot gases are available b)
- d) none of the above

tidal energy conversion system with proper diagram.	

Q.3 Attempt any two. Explain savonious and durries wind mill operation with diagram. a) b) Describe solar Photovoltaic technology. c)

Explain horizontal axis wind mills.

Q.3

Section – II Attempt any four.

Classification of concentrating solar energy collectors.

Brief the components wind energy conversion system.

Seat No.

Q.2

a) b)

c) d)

e)

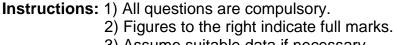
f)

- Explain operating characteristics of wind turbine with graph. Explains types of biogas digesters. a) Brief combustion characteristics of biogas. b)
- Potential in India for geothermal energy. c)
- What are resources of geothermal energy?
- d)
- Describe tidal and wave energy. e)
- Explain carnot cycle. **f**)

Q.4 Attempt any two.

- a)
- Explain fixed drum type biogas plant.
- b)
- Explain double chamber biogas plant.
- Explain ti c)

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Day & Date: Tuesday, 17-12-2019

Time: 02:30 PM To 05:30 PM

Attempt any four.

3) Assume suitable data if necessary.

Explain solar water heating system.

Describe solar thermal power system.

Different methods of solar energy storage.

Section – I

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering RENEWABLE ENERGY SOURCES**

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Max. Marks: 56

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 Electrical Engineering

RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options.

 In which of the following power plant the availability of power is least reliable?

b)

d)

- a) Solar power plant
- c) Tidal power plant
- 2) Geothermal energy is
 - a) A renewable energy resource
 - c) inexhaustible energy source

3) In hydrothermal source of geothermal energy _____.

- a) hot water or steam is available b) hot gases are available
- c) molten lava is available d) none of the above

4) Which power plant is free from environmental pollution problems?

- a) Thermal power plant
- b) Nuclear power plant
- c) Hydro power plant
- d) Geothermal energy power plant
- 5) In India, the first tidal power plant is likely to come up in _____.
 - a) Bay of Bengal b) Korba
 - c) Singrauli d) Gulf of kutch
- 6) The load factor for which of hydroelectric plant is high _____.
 - a) Run-off river plant without pondage
 - b) Run-off river plant with pondage
 - c) Storage reservoir plants
 - d) Pumped storage plants
- 7) The purpose of trash rack is _____.
 - a) To reduced water hammer effect
 - b) To reduced cavitation effect
 - c) To avoid entry of debris
 - d) To avoid excess water to entry in
- 8) The purpose of spillway is _____.
 - a) To discharge water
 - b) For irrigation purpose water connection
 - c) It discharge excess water
 - d) None

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Set

R



Marks: 14

14

Geothermal power plant

Wind power plant

- b) alternative energy source
- d) any of the above

SLR-FM-444 Set R

- 9) The voltage of a single solar cell is _____
 - a) 0.5 V b) 1V
 - c) 1.1V d) 5W
- 10) The total power of a wind stream is proportional to _____.
 - a) velocity of stream
- b) (velocity of stream)2d) 1/velocity of stream
- c) (velocity of stream)3
- 11) For low head and high discharge, the hydraulic turbine used is _____.
 - b) Francis turbine
 - c) Pelton wheel d) Jonual turbine
- 12) In pumped storage ____

a) Kaplan turbine

- a) Power is produced by means of pumps
- b) Water is stored by pumping to high pressures
- c) Downstream water is pumped up-stream during off load periods
- d) Water is re circulated through turbine
- 13) Cost of operation of which plant is least _
 - a) Gas turbine plant
 - c) Nuclear power plant
- b) Thermal power plant
- d) Hydroelectric plant
- 14) A Pelton wheel is _____.
 - a) Inward flow impulse turbine
 - c) Inward flow reaction turbine
- b) Outward flow impulse turbine
- d) Axial flow impulse turbine

Explain double chamber biogas plant. Explain tidal energy conversion system with proper diagram.

Explain savonious and durries wind mill operation with diagram. a) b) Describe solar Photovoltaic technology. Explain operating characteristics of wind turbine with graph. c) Section – II Q.3 Attempt any four.

Potential in India for geothermal energy.

Explain fixed drum type biogas plant.

What are resources of geothermal energy?

Explain horizontal axis wind mills.

Explain solar water heating system.

Describe solar thermal power system.

Different methods of solar energy storage.

C)

d)

e)

f)

a)

b)

C)

Q.4

Explains types of biogas digesters. a) Brief combustion characteristics of biogas. b)

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering RENEWABLE ENERGY SOURCES**

Section – I

Attempt any two.

Explain carnot cycle.

Attempt any two.

Describe tidal and wave energy.

12

16

12

16

Max. Marks: 56

Seat	
No.	

Day & Date: Tuesday, 17-12-2019

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks. 3) Assume suitable data if necessary.

Classification of concentrating solar energy collectors.

Brief the components wind energy conversion system.

Time: 02:30 PM To 05:30 PM

Attempt any four.

Q.2

Q.3

a) b)

c) d)

e)

f)

SLR-FM-444

Set

Seat	
No.	

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering RENEWABLE ENERGY SOURCES**

Day & Date: Tuesday, 17-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- 1) The load factor for which of hydroelectric plant is high .
 - a) Run-off river plant without pondage
 - b) Run-off river plant with pondage
 - c) Storage reservoir plants
 - d) Pumped storage plants
- 2) The purpose of trash rack is .
 - a) To reduced water hammer effect
 - b) To reduced cavitation effect
 - c) To avoid entry of debris
 - d) To avoid excess water to entry in
- 3) The purpose of spillway is _____.
 - a) To discharge water
 - For irrigation purpose water connection b)
 - c) It discharge excess water
 - d) None

4) The voltage of a single solar cell is _

- b) a) 0.5 V 1V c) 1.1V d) 5W
- 5) The total power of a wind stream is proportional to _____.
 - a) velocity of stream b)
 - c) (velocity of stream)3 d)
- For low head and high discharge, the hydraulic turbine used is _____. 6)
 - a) Kaplan turbine
 - c) Pelton wheel d)
- 7) In pumped storage ____
 - a) Power is produced by means of pumps
 - b) Water is stored by pumping to high pressures
 - c) Downstream water is pumped up-stream during off load periods
 - d) Water is re circulated through turbine
- 8) Cost of operation of which plant is least _
 - a) Gas turbine plant Thermal power plant b)
 - Nuclear power plant Hydroelectric plant c) d)



Set

Marks: 14

- 1/velocity of stream
- Francis turbine b)
- (velocity of stream)2

- - Jonual turbine

- 9) A Pelton wheel is _____.
 - a) Inward flow impulse turbine
 - Inward flow reaction turbine c)
- In which of the following power plant the availability of power is least reliable?
 - Solar power plant a)
 - Tidal power plant C)
- 11) Geothermal energy is ____
 - a) A renewable energy resource
 - inexhaustible energy source C)

b) Outward flow impulse turbine

SLR-FM-444

Set

- d) Axial flow impulse turbine
- 10)
 - b) Wind power plant
 - Geothermal power plant d)
 - b) alternative energy source
 - d) any of the above
- In hydrothermal source of geothermal energy _____. 12)
 - a) hot water or steam is available hot gases are available b)
 - c) molten lava is available none of the above d)
- 13) Which power plant is free from environmental pollution problems?
 - a) Thermal power plant
 - b) Nuclear power plant
 - c) Hydro power plant
 - d) Geothermal energy power plant
- In India, the first tidal power plant is likely to come up in _____. 14)
 - Bay of Bengal a) Singrauli

c)

- Korba b)
- d) Gulf of kutch

tidal energy conversion system with proper diagram.			

d) Different methods of solar energy storage. Brief the components wind energy conversion system. e) Explain horizontal axis wind mills. **f)** Q.3 Attempt any two. Explain savonious and durries wind mill operation with diagram. a) b) Describe solar Photovoltaic technology. Explain operating characteristics of wind turbine with graph. c)

Classification of concentrating solar energy collectors.

2) Figures to the right indicate full marks. 3) Assume suitable data if necessary.

Section – II

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019 **Electrical Engineering RENEWABLE ENERGY SOURCES**

Section – I

Q.3

Seat No.

Q.2

a) b)

c)

- Attempt any four. a)
 - Explains types of biogas digesters.

Explain solar water heating system.

Describe solar thermal power system.

- Brief combustion characteristics of biogas. b)
- Potential in India for geothermal energy.
- c) What are resources of geothermal energy? d)
- Describe tidal and wave energy. e)
- Explain carnot cycle. **f**)

Day & Date: Tuesday, 17-12-2019

Instructions: 1) All questions are compulsory.

Time: 02:30 PM To 05:30 PM

Attempt any four.

Q.4 Attempt any two.

- Explain fixed drum type biogas plant. a)
- Explain double chamber biogas plant. b)
- Explain [•] c)

16

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Max. Marks: 56

SLR-FM-444

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019

Electrical Engineering ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 - 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

6)

C)

C)

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) During regenerative braking mode, back emf is _____ than supply voltage.
 - Less a)

Equal to

- b) More
- None of these d)
- 2) What is meant by plugging?
 - Phase sequence of supply is reversed a)
 - b) **Disconnecting source**
 - Stored energy is dissipated c)
 - All of these d)

3) Speed control of IM drives is possible from _

- Rotor side only Stator side only a) b)
- Stator and Rotor side d) None of these c)
- 4) The motors, because of their inherent characteristics, are best suited for the rolling mills.
 - dc motors a)
 - slip ring induction motors b)
 - squirrel cage induction motors c)
 - single phase motors. d)

5) The variable frequency supply to I.M for speed control can be made available using _____. a)

- VSI b) CSI
- Cycloconverter d) All of these C)
- For plugging operation the armature voltage and back emf are in _____ direction. Same Opposite a) b)
 - Both a and b d) None of these c)
- The advantage of a synchronous motor in addition to its constant speed 7) is
 - high power factor a) lower cost C)
- better efficiency b) d) all of the above

8) To save the energy during braking

- dynamic braking is used a)
 - b) plugging is used regenerative braking is used d) mechanical braking is used



Max. Marks: 70

Marks: 14



- 9) Full Converter operates in _____ & ____ quadrant.
 - a) First, Third b) First, Fourth
 - First, Second d) Third, Fourth C)
- With rotor resistance control using chopper; "the equivalent resistance 10) included in the rotor winding of an I.M. is _____.
 - $R(1-\delta)$ $R + \delta$ a) b)
 - R

Set

 $\overline{(1-\delta)}$

c)

None of these

- d)
- As rotor resistance increases the maximum torque of I.M. _____. 11)
 - Increases a)
 - b) Decreases
 - Does not change C)
 - First increases and then decreases d)
- 12) In VSI I.M drives, r.m.s value of the fundamental phase voltage is _____.
 - $\frac{\pi}{\sqrt{2}}$ Vd $\frac{\sqrt{2}}{2}$ Vd a) b) $\frac{\pi}{\sqrt{3\pi}}$ Vd $\frac{1}{\sqrt{3}}$ Vd c) d)
- The efficiency by using rotor resistance control in I.M is _____. 13)
 - High a) b) Low
 - Very high d) None of these c)
- 14) Effect of friction torque is more pronounced .
 - when drive is running on full load a)
 - when drive is being started b)
 - when drive is being stop C)
 - when drive is running at half the rated speed d)

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any Four.

- a) Write and explain different parts of electrical drive system.
- b) A 230 V 960 RPM and 200 A separately excited d.c. motor has an armature resistance of 0.02 ohm. The motor is fed from chopper which provides both motoring and braking operations. The source has voltage of 230 V. Assume continuous conduction. Calculate duty ratio of chopper for motoring operation at rated torque and 350 RPM.
- c) To control the speed of separately excited d.c. motor, draw circuit and output voltage and current waveforms for single phase fully controlled rectifier circuit. Derive expression for average d.c. voltage.
- d) Write factors on which choice of electric drive depends.
- e) Explain how moment to inertia is determined experimentally.

Q.3 Solve any Two.

- a) Derive the expression for torque and moment of inertia for loads with rotational motion.
- **b)** Explain dual converter control of d.c. separately excited motor for multi quadrant operation.
- c) A 220 V d.c. series motor runs at 1000 RPM (clock-wise) and takes an armature current of 100 A. when driving the load with constant torque. The resistance of the armature and field winding are 0.05 Ω each and find magnitude and direction of motor speed and armature current if motor terminal voltage is reversed and Nos. of turns in field winding is reduced to 80%. Assume linear magnetic circuit.

Section – II

Q.4 Solve any Four.

- A 2.8kW, 400 volt, 50Hz, 4pole ,1370 r.p.m., delta connected 3 phase squirrel-cage induction motor has following parameters referred to stator : Rs=2 Ω. Rr'=5 Ω, Xs = Xr' =5 Ω, Xm= 80 Ω. Motor speed is controlled by stator voltage control. When driving a fan load it runs at rated speed at rated voltage. Calculate torque at 1200 r.p.m. speed.
- **b)** Explain with neat diagram slip power recovery scheme for speed control of slip ring induction motor. Draw speed torque characteristics with varying firing angle of the inverter.
- c) Compare V.S.I. with C.S.I. Fed drives.
- d) The rotor of 2 pole 50 Hz slip ring induction motor has a resistance of 0.25 ohms per phase and runs at 2880 r.p.m. at full load. Calculate external resistance per phase which must be added to lower the speed to 2400 r.p.m. The torque is constant at both the speeds.

Max. Marks: 56

12

16

Set P

e) Explain variable frequency control of multiple synchronous motors fed by V.S.I.

12

Q.5 Solve any Two.

- a) In variable frequency control method of a synchronous motor why v/f ratio is maintained constant up to base speed and V constant above the base speed.
- **b)** Explain scheribus drive.
- c) Explain the advantages and disadvantages of stepper motors.

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Duration: 30 Minutes

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) To save the energy during braking _____
 - a) dynamic braking is used b) plugging is used
 - c) regenerative braking is used d) mechanical braking is used
- 2) Full Converter operates in _____ & ____ quadrant.

	-		•
a)	First, Third	b)	First, Fourth

c) First, Second d) Third, Fourth

3) With rotor resistance control using chopper; "the equivalent resistance included in the rotor winding of an I.M. is _____.

a)	R + δ	b)	$R(1-\delta)$
C)	R	d)	None of these
-	$(1-\delta)$		

4) As rotor resistance increases the maximum torque of I.M. _____.

- a) Increases
- b) Decreases
- c) Does not change
- d) First increases and then decreases

5) In VSI I.M drives, r.m.s value of the fundamental phase voltage is _____.

a)	$\frac{\sqrt{2}}{\pi}$ Vd	b)	$\frac{\pi}{\sqrt{2}}$ Vd
c)	$\frac{\sqrt[n]{3\pi}}{2}$ Vd	d)	$\frac{1}{\sqrt{3}}$ Vd

6) The efficiency by using rotor resistance control in I.M is _____.

- a) Highb) Lowc) Very highd) None of these
- 7) Effect of friction torque is more pronounced _____.
 - a) when drive is running on full load
 - b) when drive is being started
 - c) when drive is being stop
 - d) when drive is running at half the rated speed
- 8) During regenerative braking mode, back emf is _____ than supply voltage.
 - a) Less

C)

Equal to

b) More d) None of these



Max. Marks: 70

SLR-FM-446

Marks: 14

- 9) What is meant by plugging?
 - a) Phase sequence of supply is reversed
 - b) Disconnecting source

Rotor side only

- c) Stored energy is dissipated
- d) All of these

a)

- 10) Speed control of IM drives is possible from _
 - b) Stator side only

SLR-FM-446

Set

- c) Stator and Rotor side d) None of these
- 11) The _____ motors, because of their inherent characteristics, are best suited for the rolling mills.
 - a) dc motors
 - b) slip ring induction motors
 - c) squirrel cage induction motors
 - d) single phase motors.

12) The variable frequency supply to I.M for speed control can be made available using _____.

- a) VSI b) CSI
- c) Cycloconverter d) All of these
- 13) For plugging operation the armature voltage and back emf are in ____ direction.a) Same b) Opposite
 - c) Both a and b d) None of these
- 14) The advantage of a synchronous motor in addition to its constant speed is _____.
 - a) high power factor
- b) better efficiency
- c) lower cost
- d) all of the above

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any Four.

- a) Write and explain different parts of electrical drive system.
- b) A 230 V 960 RPM and 200 A separately excited d.c. motor has an armature resistance of 0.02 ohm. The motor is fed from chopper which provides both motoring and braking operations. The source has voltage of 230 V. Assume continuous conduction. Calculate duty ratio of chopper for motoring operation at rated torque and 350 RPM.
- c) To control the speed of separately excited d.c. motor, draw circuit and output voltage and current waveforms for single phase fully controlled rectifier circuit. Derive expression for average d.c. voltage.
- d) Write factors on which choice of electric drive depends.
- e) Explain how moment to inertia is determined experimentally.

Q.3 Solve any Two.

- a) Derive the expression for torque and moment of inertia for loads with rotational motion.
- **b)** Explain dual converter control of d.c. separately excited motor for multi quadrant operation.
- c) A 220 V d.c. series motor runs at 1000 RPM (clock-wise) and takes an armature current of 100 A. when driving the load with constant torque. The resistance of the armature and field winding are 0.05 Ω each and find magnitude and direction of motor speed and armature current if motor terminal voltage is reversed and Nos. of turns in field winding is reduced to 80%. Assume linear magnetic circuit.

Section – II

Q.4 Solve any Four.

- A 2.8kW, 400 volt, 50Hz, 4pole ,1370 r.p.m., delta connected 3 phase squirrel-cage induction motor has following parameters referred to stator : Rs=2 Ω. Rr'=5 Ω, Xs = Xr' =5 Ω, Xm= 80 Ω. Motor speed is controlled by stator voltage control. When driving a fan load it runs at rated speed at rated voltage. Calculate torque at 1200 r.p.m. speed.
- **b)** Explain with neat diagram slip power recovery scheme for speed control of slip ring induction motor. Draw speed torque characteristics with varying firing angle of the inverter.
- c) Compare V.S.I. with C.S.I. Fed drives.
- d) The rotor of 2 pole 50 Hz slip ring induction motor has a resistance of 0.25 ohms per phase and runs at 2880 r.p.m. at full load. Calculate external resistance per phase which must be added to lower the speed to 2400 r.p.m. The torque is constant at both the speeds.

Max. Marks: 56

12

16



Set Q

e) Explain variable frequency control of multiple synchronous motors fed by V.S.I.

12

Q.5 Solve any Two.

- a) In variable frequency control method of a synchronous motor why v/f ratio is maintained constant up to base speed and V constant above the base speed.
- **b)** Explain scheribus drive.
- c) Explain the advantages and disadvantages of stepper motors.

Seat No.			Set R			
110.	B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL DRIVES & CONTROL					
	Date: Saturday, 07-12-2019 02:30 PM To 05:30 PM		Max. Marks: 70			
Instruc	tions: 1) Q. No. 1 is compulsory and s book. 2) Figures to the right indicates					
	, C					
Duratio	n: 30 Minutes	Type	Marks: 14			
Q.1 C	hoose the correct alternatives from					
1	 The variable frequency supply to available using a) VSI c) Cycloconverter 	l.M for s b) d)	speed control can be made CSI All of these			
2	 For plugging operation the armatulation Same Both a and b 	ure volta b) d)	ge and back emf are in direction. Opposite None of these			
3) The advantage of a synchronous is a) high power factor c) lower cost 	motor ir b) d)	addition to its constant speed better efficiency all of the above			
4	,	g b)	plugging is used mechanical braking is used			
5) Full Converter operates in a) First, Third c) First, Second	& b) d)	_ quadrant. First, Fourth Third, Fourth			
6) With rotor resistance control using included in the rotor winding of an a) $R + \delta$ c) $\frac{R}{(1-\delta)}$		•			
7	 As rotor resistance increases the a) Increases b) Decreases c) Does not change d) First increases and then dec 		m torque of I.M			
8) In VSI I.M drives, r.m.s value of th a) $\frac{\sqrt{2}}{\pi}$ Vd c) $\frac{\sqrt{3}\pi}{2}$ Vd	b)	$\frac{\pi}{\sqrt{2}}$ Vd			

SLR-FM-446



- Set
- 9) The efficiency by using rotor resistance control in I.M is .
 - High a)
- b) Low
- Very high None of these C) d)
- Effect of friction torque is more pronounced _____. 10)
 - when drive is running on full load a)
 - when drive is being started b)
 - when drive is being stop c)
 - when drive is running at half the rated speed d)
- During regenerative braking mode, back emf is _____ than supply voltage. 11)
 - More Less b)
 - a) Equal to d) None of these c)
- 12) What is meant by plugging?
 - Phase sequence of supply is reversed a)
 - **Disconnecting source** b)
 - c) Stored energy is dissipated
 - d) All of these
- 13) Speed control of IM drives is possible from _____.
 - Rotor side only b) Stator side only a)
 - Stator and Rotor side d) None of these C)
- 14) The _____ motors, because of their inherent characteristics, are best suited for the rolling mills.
 - dc motors a)
 - slip ring induction motors b)
 - squirrel cage induction motors c)
 - single phase motors. d)

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any Four.

- a) Write and explain different parts of electrical drive system.
- b) A 230 V 960 RPM and 200 A separately excited d.c. motor has an armature resistance of 0.02 ohm. The motor is fed from chopper which provides both motoring and braking operations. The source has voltage of 230 V. Assume continuous conduction. Calculate duty ratio of chopper for motoring operation at rated torque and 350 RPM.
- c) To control the speed of separately excited d.c. motor, draw circuit and output voltage and current waveforms for single phase fully controlled rectifier circuit. Derive expression for average d.c. voltage.
- d) Write factors on which choice of electric drive depends.
- e) Explain how moment to inertia is determined experimentally.

Q.3 Solve any Two.

- a) Derive the expression for torque and moment of inertia for loads with rotational motion.
- **b)** Explain dual converter control of d.c. separately excited motor for multi quadrant operation.
- c) A 220 V d.c. series motor runs at 1000 RPM (clock-wise) and takes an armature current of 100 A. when driving the load with constant torque. The resistance of the armature and field winding are 0.05 Ω each and find magnitude and direction of motor speed and armature current if motor terminal voltage is reversed and Nos. of turns in field winding is reduced to 80%. Assume linear magnetic circuit.

Section – II

Q.4 Solve any Four.

- A 2.8kW, 400 volt, 50Hz, 4pole ,1370 r.p.m., delta connected 3 phase squirrel-cage induction motor has following parameters referred to stator : Rs=2 Ω. Rr'=5 Ω, Xs = Xr' =5 Ω, Xm= 80 Ω. Motor speed is controlled by stator voltage control. When driving a fan load it runs at rated speed at rated voltage. Calculate torque at 1200 r.p.m. speed.
- **b)** Explain with neat diagram slip power recovery scheme for speed control of slip ring induction motor. Draw speed torque characteristics with varying firing angle of the inverter.
- c) Compare V.S.I. with C.S.I. Fed drives.
- d) The rotor of 2 pole 50 Hz slip ring induction motor has a resistance of 0.25 ohms per phase and runs at 2880 r.p.m. at full load. Calculate external resistance per phase which must be added to lower the speed to 2400 r.p.m. The torque is constant at both the speeds.

Max. Marks: 56

12

16

Set R

e) Explain variable frequency control of multiple synchronous motors fed by V.S.I.

12

Q.5 Solve any Two.

- a) In variable frequency control method of a synchronous motor why v/f ratio is maintained constant up to base speed and V constant above the base speed.
- **b)** Explain scheribus drive.
- c) Explain the advantages and disadvantages of stepper motors.

	d)	None of these	
t by plugging? equence of supply is re ecting source nergy is dissipated se	everse	ed	
of IM drives is possibl	e fror	n	
le only	b)	Stator side only	
nd Rotor side	d)	None of these	
			Dago

Seat No.

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL DRIVES & CONTROL**

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- With rotor resistance control using chopper; "the equivalent resistance 1) included in the rotor winding of an I.M. is _
 - a) $R + \delta$ $R(1-\delta)$ b)
 - R c) d) None of these $(1-\delta)$

As rotor resistance increases the maximum torque of I.M. _____. 2)

- Increases a)
- b) Decreases
- Does not change c)
- First increases and then decreases d)

3) In VSI I.M drives, r.m.s value of the fundamental phase voltage is _____.

- $\frac{\pi}{\sqrt{2}}$ Vd $\frac{\sqrt{2}}{\sqrt{2}}$ Vd b) a) d) $\frac{1}{\sqrt{3}}$ Vd $\frac{\sqrt[n]{3\pi}}{2}$ Vd C)
- 4) The efficiency by using rotor resistance control in I.M is _____.
 - High b) Low a)
 - d) None of these C) Very high
- 5) Effect of friction torque is more pronounced .
 - when drive is running on full load a)
 - when drive is being started b)
 - when drive is being stop c)
 - when drive is running at half the rated speed d)
- 6) During regenerative braking mode, back emf is _____ than supply voltage.
 - a) Less b) More
 - ذله Equal to c)
- 7) What is meant
 - Phase se a)
 - b) Disconne
 - C) Stored en
 - All of thes d)

c)

- Speed control 8) a)
 - Rotor side Stator and

SLR-FM-446



Max. Marks: 70

Marks: 14



- 9) The _____ motors, because of their inherent characteristics, are best suited for the rolling mills.
 - a) dc motors

13)

14)

- b) slip ring induction motors
- c) squirrel cage induction motors
- d) single phase motors.
- 10) The variable frequency supply to I.M for speed control can be made available using _____.
 - a) VSI b) CSI
 - c) Cycloconverter d) All of these
- 11) For plugging operation the armature voltage and back emf are in _____ direction.
 - a) Same b) Opposite
 - c) Both a and b d) None of these

12) The advantage of a synchronous motor in addition to its constant speed is .

a) high power factor b) better efficiency lower cost d) all of the above C) To save the energy during braking _ dynamic braking is used b) plugging is used a) regenerative braking is used d) mechanical braking is used C) Full Converter operates in _____ & ____ quadrant. First, Fourth First, Third b) a) C) First, Second d) Third, Fourth

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any Four.

- a) Write and explain different parts of electrical drive system.
- A 230 V 960 RPM and 200 A separately excited d.c. motor has an armature resistance of 0.02 ohm. The motor is fed from chopper which provides both motoring and braking operations. The source has voltage of 230 V. Assume continuous conduction. Calculate duty ratio of chopper for motoring operation at rated torque and 350 RPM.
- c) To control the speed of separately excited d.c. motor, draw circuit and output voltage and current waveforms for single phase fully controlled rectifier circuit. Derive expression for average d.c. voltage.
- d) Write factors on which choice of electric drive depends.
- e) Explain how moment to inertia is determined experimentally.

Q.3 Solve any Two.

- a) Derive the expression for torque and moment of inertia for loads with rotational motion.
- **b)** Explain dual converter control of d.c. separately excited motor for multi quadrant operation.
- c) A 220 V d.c. series motor runs at 1000 RPM (clock-wise) and takes an armature current of 100 A. when driving the load with constant torque. The resistance of the armature and field winding are 0.05 Ω each and find magnitude and direction of motor speed and armature current if motor terminal voltage is reversed and Nos. of turns in field winding is reduced to 80%. Assume linear magnetic circuit.

Section – II

Q.4 Solve any Four.

- A 2.8kW, 400 volt, 50Hz, 4pole ,1370 r.p.m., delta connected 3 phase squirrel-cage induction motor has following parameters referred to stator : Rs=2 Ω. Rr'=5 Ω, Xs = Xr' =5 Ω, Xm= 80 Ω. Motor speed is controlled by stator voltage control. When driving a fan load it runs at rated speed at rated voltage. Calculate torque at 1200 r.p.m. speed.
- **b)** Explain with neat diagram slip power recovery scheme for speed control of slip ring induction motor. Draw speed torque characteristics with varying firing angle of the inverter.
- c) Compare V.S.I. with C.S.I. Fed drives.
- d) The rotor of 2 pole 50 Hz slip ring induction motor has a resistance of 0.25 ohms per phase and runs at 2880 r.p.m. at full load. Calculate external resistance per phase which must be added to lower the speed to 2400 r.p.m. The torque is constant at both the speeds.

Max. Marks: 56

12

16



e) Explain variable frequency control of multiple synchronous motors fed by V.S.I.

12

Q.5 Solve any Two.

- a) In variable frequency control method of a synchronous motor why v/f ratio is maintained constant up to base speed and V constant above the base speed.
- **b)** Explain scheribus drive.
- c) Explain the advantages and disadvantages of stepper motors.

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time:02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Discrimination between main and back up protection is provided by the 1) use of relays which are .
 - a) Fact Slow

c)

- b) Sensitive
- None of the above d)
- 2) If the strands of the fusing wire are twisted, what happens to the fusing current?
 - a) Increases
 - b) Reduces
 - No change/ remains same C)
 - d) Depends on the value of current, increases or decreases
- 3) The arc resistance depends on which among the following factors?
 - a) Cross section of the arc Length of the arc b)
 - Degree of ionization d) All of the above c)
- 4) Protective relays are devices that detect abnormal conditions in circuits by measuring
 - Current during abnormal condition a)
 - Voltage during abnormal condition b)
 - Constantly the electrical quantities which differ during normal & c) abnormal condition
 - None of the above d)
- 5) The heat produced at the contact point, due to passage of current, will least depend on .
 - a) Contact resistance
 - Time during which the current flows b)
 - Current flowing C)

C)

- d) Temperature of the surrounding medium
- Up to what voltage a cartridge type of fuse can be used? 6)
 - a) 400 V 11 KV b) 20 KV d) 33 KV c)
- Protective relays can be designed to respond to 7)
 - a) Light intensity, impedance
 - Temperature, resistance, b) reactance
 - Voltage and current All of these d)



Marks: 14

Set

Max. Marks: 70

			SLR-FM-4	47
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8)	For ground fault, which of the rela a) Plain impedance relay c) Reactance relay	•		
9)	 If the fault occurs near the imped a) Constant for all distances b) Lower than that of if fault occ c) Higher than that of if fault oc d) None of the above 	curs av	way from the relay	
10)	Which circuit breaker is preferred system? a) Bulk oil type c) SF6	l to be b) d)	e installed in extra high voltage AC Air blast Vacuum	
11)	 In a single bus-bar system there a) Fault occurs on the bus itsel b) Fault occurs on neutral line c) Two or more faults occur sin d) Fault occurs with respect to 	nultane	,	
12)	 In a circuit breaker, ionization is f a) Increase in field strength b) Increase in mean free length c) High temperature of the surr d) All of the above 			
13)	 Why the resistance switching is u a) Reduce the magnitude of fau b) Control the CB operating time c) Damp out the fast transient d) Change the fault current power 	ult curr e	rent	
14)	 What happen in arc extinction us a) Arc resistance is decreased b) Arc resistance is increased v 	with tir	me	

- c) No change it remains samed) Arc resistance is kept zero

Seat	
No.	

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

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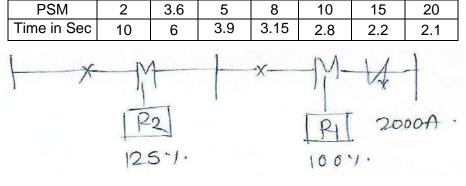
Section – I

Q.2 Solve any Four

- a) Explain desirable qualities of protective scheme.
- **b)** With neat sketch explain induction cup relay.
- c) Describe percentage differential relay with neat diagram.
- d) Explain overcurrent protection scheme for ring main feeder with neat sketch.
- e) Explain MHO relay for distance protection. Draw its characteristics on R-X diagram.

Q.3 Solve any Two

- a) Explain microprocessor based reactance relay with block diagram and flow chart.
- **b)** Explain construction and operation of electromechanical directional power relay.
- c) Fault current of relay 1 is 2000 A set on 100%. Current transformer ratio 200/1.Relay 2 set on 125%. For discrimination the time gradient margin between relay is 0.5 Second. Determine time of operation of relay 1 & relay 2. Assuming both relay have characteristics as shown in following table and relay 1 has time setting multiplier of 0.2



Section - II

Q.4 Solve any Four

- a) With neat sketch explain the phenomenon of current chopping in circuit breaker.
- b) Explain ferranti surge absorber with neat diagram.
- c) Draw & describe construction and operation of vacuum circuit breaker.
- d) With neat sketch explain current zero interruption method of arc.
- e) Explain differential protection of generator with neat diagram.

Max. Marks: 56

12

16



Set P

Q.5 Solve any Two

a)

- With neat diagram explain percentage differential protection scheme of transformer indicate all three phases.
- **b)** What is restriking voltage? Derive an expression of RV & RRRV in terms of system voltage, inductance and capacitance.
- c) In a 220 KV system the reactance and capacitance up to the location of the circuit breaker is 8 ohms and 0.025µf respectively. A resistance of 600 ohms is connected across the contacts of circuit breaker Calculate the following.
 - 1) Natural frequency of oscillation.
 - 2) Damped frequency of oscillation.
 - 3) Critical value of resistance which will give no transient oscillation.
 - 4) The value of resistance which will give damped frequency of oscillation, one fourth of natural frequency of oscillation.

Set

Max. Marks: 70

Seat	
No.	

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time:02:30 PM To 05:30 PM

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MCQ/Objective Type Questions

Duration: 30 Minutes

1)

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- For ground fault, which of the relay is preferred _____?
 - a) Plain impedance relayc) Reactance relay
 - b) Directional relayd) Overcurrent relay
- 2) If the fault occurs near the impedance relay, the VII ratio will be .
 - a) Constant for all distances
 - b) Lower than that of if fault occurs away from the relay
 - c) Higher than that of if fault occurs away from the relay
 - d) None of the above
- 3) Which circuit breaker is preferred to be installed in extra high voltage AC system?
 - a) Bulk oil type b) Air blast
 - c) SF6 d) Vacuum
- 4) In a single bus-bar system there will be complete shut down when _____.
 - a) Fault occurs on the bus itself
 - b) Fault occurs on neutral line
 - c) Two or more faults occur simultaneously
 - d) Fault occurs with respect to earthing
- 5) In a circuit breaker, ionization is facilitated by _____.
 - a) Increase in field strength
 - b) Increase in mean free length
 - c) High temperature of the surrounding medium
 - d) All of the above
- 6) Why the resistance switching is used in air blast circuit breaker?
 - a) Reduce the magnitude of fault current
 - b) Control the CB operating time
 - c) Damp out the fast transient
 - d) Change the fault current power factor
- 7) What happen in arc extinction using high resistance method?
 - a) Arc resistance is decreased with time
 - b) Arc resistance is increased with time
 - c) No change it remains same
 - d) Arc resistance is kept zero

- a) Fact c) Slow
- b) Sensitive
- d) None of the above

Set

- 9) If the strands of the fusing wire are twisted, what happens to the fusing current?
 - a) Increases
 - b) Reduces
 - c) No change/ remains same
 - d) Depends on the value of current, increases or decreases
- 10) The arc resistance depends on which among the following factors?
 - a) Cross section of the arc b) Length of the arc
 - c) Degree of ionization d) All of the above
- Protective relays are devices that detect abnormal conditions in circuits by measuring _____.
 - a) Current during abnormal condition
 - b) Voltage during abnormal condition
 - c) Constantly the electrical quantities which differ during normal & abnormal condition
 - d) None of the above
- 12) The heat produced at the contact point, due to passage of current, will least depend on _____.
 - a) Contact resistance
 - b) Time during which the current flows
 - c) Current flowing
 - d) Temperature of the surrounding medium
- 13) Up to what voltage a cartridge type of fuse can be used?
 - a) 400 V b) 11 KV
 - c) 20 KV d) 33 KV
- 14) Protective relays can be designed to respond to _____
 - a) Light intensity, impedance
- b) Temperature, resistance, reactance
- c) Voltage and current d) All of these

Set

Max. Marks: 56

Seat	
No.	

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

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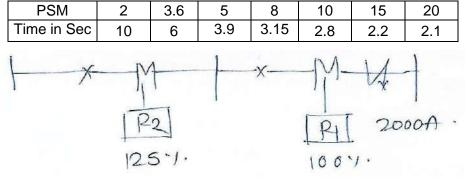
Section – I

Q.2 Solve any Four

- a) Explain desirable qualities of protective scheme.
- **b)** With neat sketch explain induction cup relay.
- c) Describe percentage differential relay with neat diagram.
- d) Explain overcurrent protection scheme for ring main feeder with neat sketch.
- e) Explain MHO relay for distance protection. Draw its characteristics on R-X diagram.

Q.3 Solve any Two

- a) Explain microprocessor based reactance relay with block diagram and flow chart.
- **b)** Explain construction and operation of electromechanical directional power relay.
- c) Fault current of relay 1 is 2000 A set on 100%. Current transformer ratio 200/1.Relay 2 set on 125%. For discrimination the time gradient margin between relay is 0.5 Second. Determine time of operation of relay 1 & relay 2. Assuming both relay have characteristics as shown in following table and relay 1 has time setting multiplier of 0.2



Section - II

Q.4 Solve any Four

- a) With neat sketch explain the phenomenon of current chopping in circuit breaker.
- b) Explain ferranti surge absorber with neat diagram.
- c) Draw & describe construction and operation of vacuum circuit breaker.
- d) With neat sketch explain current zero interruption method of arc.
- e) Explain differential protection of generator with neat diagram.

16

12

Set Q

12

Q.5 Solve any Two

- a) With neat diagram explain percentage differential protection scheme of transformer indicate all three phases.
- **b)** What is restriking voltage? Derive an expression of RV & RRRV in terms of system voltage, inductance and capacitance.
- c) In a 220 KV system the reactance and capacitance up to the location of the circuit breaker is 8 ohms and 0.025µf respectively. A resistance of 600 ohms is connected across the contacts of circuit breaker Calculate the following.
 - 1) Natural frequency of oscillation.
 - 2) Damped frequency of oscillation.
 - 3) Critical value of resistance which will give no transient oscillation.
 - 4) The value of resistance which will give damped frequency of oscillation, one fourth of natural frequency of oscillation.

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B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The heat produced at the contact point, due to passage of current, will least depend on _____.
 - a) Contact resistance
 - b) Time during which the current flows
 - c) Current flowing
 - d) Temperature of the surrounding medium
- 2) Up to what voltage a cartridge type of fuse can be used?
 - a) 400 V b) 11 KV
 - c) 20 KV d) 33 KV

3) Protective relays can be designed to respond to _____.

- a) Light intensity, impedance b) Temperature, resistance, reactance
- c) Voltage and current d) All of these
- 4) For ground fault, which of the relay is preferred _____?
 - a) Plain impedance relay b) Directional relay
 - c) Reactance relay d) Overcurrent relay

5) If the fault occurs near the impedance relay, the VII ratio will be _____.

- a) Constant for all distances
- b) Lower than that of if fault occurs away from the relay
- c) Higher than that of if fault occurs away from the relay
- d) None of the above
- 6) Which circuit breaker is preferred to be installed in extra high voltage AC system?
 - a) Bulk oil type b) Air blast
 - c) SF6 d) Vacuum
- 7) In a single bus-bar system there will be complete shut down when _____.
 - a) Fault occurs on the bus itself
 - b) Fault occurs on neutral line
 - c) Two or more faults occur simultaneously
 - d) Fault occurs with respect to earthing



Max. Marks: 70

In a circuit breaker, ionization is facilitated by _____. 8)

- a) Increase in field strength
- b) Increase in mean free length
- c) High temperature of the surrounding medium
- d) All of the above
- Why the resistance switching is used in air blast circuit breaker? 9)
 - a) Reduce the magnitude of fault current
 - b) Control the CB operating time
 - c) Damp out the fast transient
 - d) Change the fault current power factor
- What happen in arc extinction using high resistance method? 10)
 - Arc resistance is decreased with time a)
 - b) Arc resistance is increased with time
 - c) No change it remains same
 - d) Arc resistance is kept zero
- 11) Discrimination between main and back up protection is provided by the use of relays which are .
 - a) Fact b) Sensitive c) Slow
 - d) None of the above
- 12) If the strands of the fusing wire are twisted, what happens to the fusing current?
 - a) Increases
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 - No change/ remains same C)
 - d) Depends on the value of current, increases or decreases
- 13) The arc resistance depends on which among the following factors?
 - Cross section of the arc Length of the arc b) a)
 - Degree of ionization d) All of the above C)
- Protective relays are devices that detect abnormal conditions in circuits by 14) measuring
 - Current during abnormal condition a)
 - b) Voltage during abnormal condition
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 - d) None of the above

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B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

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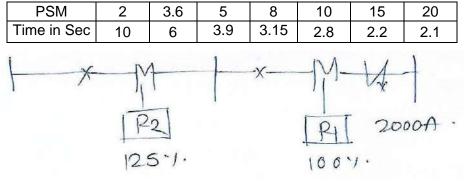
Section – I

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- **b)** With neat sketch explain induction cup relay.
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Q.3 Solve any Two

- a) Explain microprocessor based reactance relay with block diagram and flow chart.
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- c) Fault current of relay 1 is 2000 A set on 100%. Current transformer ratio 200/1.Relay 2 set on 125%. For discrimination the time gradient margin between relay is 0.5 Second. Determine time of operation of relay 1 & relay 2. Assuming both relay have characteristics as shown in following table and relay 1 has time setting multiplier of 0.2



Section - II

Q.4 Solve any Four

- a) With neat sketch explain the phenomenon of current chopping in circuit breaker.
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- d) With neat sketch explain current zero interruption method of arc.
- e) Explain differential protection of generator with neat diagram.

16

12



Max. Marks: 56

Set R

Q.5 Solve any Two

- a) With neat diagram explain percentage differential protection scheme of transformer indicate all three phases.
- **b)** What is restriking voltage? Derive an expression of RV & RRRV in terms of system voltage, inductance and capacitance.
- c) In a 220 KV system the reactance and capacitance up to the location of the circuit breaker is 8 ohms and 0.025µf respectively. A resistance of 600 ohms is connected across the contacts of circuit breaker Calculate the following.
 - 1) Natural frequency of oscillation.
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Seat No.

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** SWITCHGEAR & PROTECTION

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MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Which circuit breaker is preferred to be installed in extra high voltage AC 1) system?
 - a) Bulk oil type Air blast b)
 - SF6 d) Vacuum C)
- 2) In a single bus-bar system there will be complete shut down when _____.
 - a) Fault occurs on the bus itself
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- Discrimination between main and back up protection is provided by the 6) use of relays which are .
 - Sensitive b)
 - Slow d) None of the above c)
- 7) If the strands of the fusing wire are twisted, what happens to the fusing current?
 - a) Increases
 - b) Reduces

a) Fact

- No change/ remains same c)
- Depends on the value of current, increases or decreases d)

Max. Marks: 70

Marks: 14



- 8) The arc resistance depends on which among the following factors?
 - Cross section of the arc a)
- Length of the arc b)

Set | S

- C) Degree of ionization
- d) All of the above
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- 11) Up to what voltage a cartridge type of fuse can be used?
 - 400 V 11 KV b) a)
 - 20 KV d) 33 KV c)

12) Protective relays can be designed to respond to _____.

- a) Light intensity, impedance b) Temperature, resistance,
- reactance All of these c) Voltage and current d)
- 13) For ground fault, which of the relay is preferred _____?
 - a) Plain impedance relay b) Directional relay
 - Reactance relay d) c) **Overcurrent relay**
- If the fault occurs near the impedance relay, the VII ratio will be _____. 14)
 - Constant for all distances a)
 - Lower than that of if fault occurs away from the relay b)
 - c) Higher than that of if fault occurs away from the relay
 - d) None of the above

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B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Time:02:30 PM To 05:30 PM

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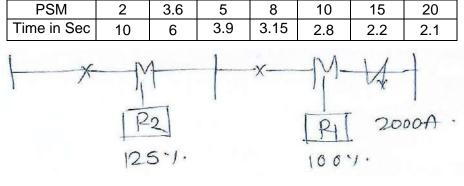
Section – I

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- a) Explain microprocessor based reactance relay with block diagram and flow chart.
- **b)** Explain construction and operation of electromechanical directional power relay.
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Section - II

Q.4 Solve any Four

- a) With neat sketch explain the phenomenon of current chopping in circuit breaker.
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- d) With neat sketch explain current zero interruption method of arc.
- e) Explain differential protection of generator with neat diagram.

12

Max. Marks: 56

Set



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12

Q.5 Solve any Two

a)

- With neat diagram explain percentage differential protection scheme of transformer indicate all three phases.
- **b)** What is restriking voltage? Derive an expression of RV & RRRV in terms of system voltage, inductance and capacitance.
- c) In a 220 KV system the reactance and capacitance up to the location of the circuit breaker is 8 ohms and 0.025µf respectively. A resistance of 600 ohms is connected across the contacts of circuit breaker Calculate the following.
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 - 3) Critical value of resistance which will give no transient oscillation.
 - 4) The value of resistance which will give damped frequency of oscillation, one fourth of natural frequency of oscillation.

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering					
		ELECTRICAL UTILIZATION			
	Day & Date: Thursday, 12-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM				
Insti	uctio	ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.			
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		MCQ/Objective Type Questions			
		30 Minutes Marks: 14			
Q.1	Cho 1)	ose the correct alternatives from the options and rewrite the sentence. 14 In resistance furnace the atmosphere is			
	.,	a) Oxidising b) Deoxidising c) Reducing d) Neutral			
	2)	In direct arc furnace which of the following is of high value? a) Current b) Voltage c) Power Factor d) All of these			
	3)	The main application of indirect arc furnace is to melt a) Iron b) Steel c) Non-ferrous metals d) None of these			
	4)	Projection welding can be considered as a mass production form of			
		a)Seam weldingb)Spot weldingc)Upset weldingd)Flash welding			
	5)	Maintenance requirements are least in case ofa) Electric locomotivesb) Diesel locomotivesc) Steam locomotivesd) All of these			
	6)	 When the speed of the train is estimated taking into account the time of stop at a station in addition to the actual running time between stops, is known as a) Average speed b) Schedule speed c) Notching speed d) Free running speed 			
	7)	The unit of luminous flux is a) steradian b) candela c) lumen d) lux			
	8)	 Which of the following factor affects specific energy consumption? a) Distance between stops b) Gradient c) retardation and acceleration values d) All of the above 			

B E (Part – I) (CGPA) Examination Nov/Dec-2019

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SLR-FM-448

Set P

d) All of the above

- **SLR-FM-448** Set 9) Trapezoidal speed-time curve is the closer approximation for _____. main line service b) suburban service a) urban service d) urban and suburban service c) Which of the following lamp gives nearly monochromatic light? 10) a) Sodium vapor lamp b) GLS lamp c) Tube light d) Mercury vapor lamp 11) Energy consumption in propelling the train is required for . a) acceleration b) work against gravity while moving up the gradient c) work against the resistance to motion d) all of the above 12) Specific energy consumption is least in ____ urban service sub-urban service a) b) equal for all types of services main-line service d) C) Which of the following will need the highest level of illumination? 13) Proof reading Bed rooms b) a) Hospital wards Railway platforms c) d) The Act which has been enacted to provide for efficient use of energy and 14) its conservation and for matters connected therewith is? a) Indian Electricity Act 2003
 - c) Indian Electricity Act 2010
- Energy Conservation Act 2001 b)
- d) **Energy Conservation Act 2007**

Seat No.

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL UTILIZATION

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Instructions: 1) All questions are compulsory.

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Section – I

Q.2 Solve any four of the following.

- a) Derive an expression for the tractive effort developed by a train unit.
- **b)** Explain the terms dead weight, effective weight, and adhesive weight in locomotive.
- c) Discuss the factors which affect the schedule speed of a train. What is difference exist in speed time curve in case of urban and suburban services.
- **d)** Explain the suitable connection diagrams, the resistance control method employed in the dc traction drives.
- e) Give the schematic diagram of 1500 V de train equipment of 2 dc series motor wired for series parallel operation during starting and explain it.
- f) Explain the transition methods in traction system.

Q.3 Solve any two of the following.

- a) Two 600 V motors each having a resistance of 0.1 ohm are started on the series parallel system, the main current per motor throughout the starting period being 300 A. The starting period is 15 seconds and the train speed at the end of this period is 29 km per hour. Calculate
 - 1) the rheostatic losses (in KWh) during the series and the parallel combination.
 - 2) the train speed at which transition from series to parallel must be made.
- b) An electrical train has quadrilateral speed time curve with uniform acceleration from rest at 2 kmphps for 30 seconds, coasting for 50 seconds, braking period of 20 seconds. The train is moving a uniform up gradient of 1%, tractive resistance 40 N/tone, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run.
- c) Explain Trapezoidal Speed-Time curve. Derive expression for Crest speed in terms of total time, total distance.

Max. Marks: 56

12



Section – II

Q.4 Solve any four of the following

- a) State and explain the laws of illumination.
- **b)** Describe the factors considered for the selection of motors.
- c) Explain the principle of electric spot welding and seam welding.
- d) Sate, giving reasons, what type of motors you would consider suitable for the following drives:
 - 1) Air Compressor
 - 2) Reciprocating Pumps
 - 3) Paper Mill Drive and
 - 4) Electric Traction
- e) Explain the advantages and disadvantages of dielectric heating.
- f) Explain the properties of heating element.

Q.5 Solve any two of the following

- a) What is discharge lamp? Explain the Sodium Vapour lamp.
- **b)** Explain the energy consumption methods/ factors followed in small and large scale industries.
- c) Describe the construction and working of an electric arc furnace.

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Seat No.

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL UTILIZATION**

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- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 - 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

a)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Which of the following factor affects specific energy consumption? 1)
 - a) Distance between stops
 - b) Gradient
 - c) retardation and acceleration values
 - d) All of the above

2) Trapezoidal speed-time curve is the closer approximation for _____.

- main line service suburban service b)
- urban service urban and suburban service d) c)

3) Which of the following lamp gives nearly monochromatic light?

- Sodium vapor lamp GLS lamp b) a)
- Tube light d) Mercury vapor lamp c)
- 4) Energy consumption in propelling the train is required for _____.
 - a) acceleration
 - b) work against gravity while moving up the gradient
 - c) work against the resistance to motion
 - d) all of the above

5) Specific energy consumption is least in _

- urban service sub-urban service b) a) c) main-line service d) equal for all types of services
- 6) Which of the following will need the highest level of illumination?
 - a) Proof reading b) Bed rooms
 - c) Hospital wards d) Railway platforms
- The Act which has been enacted to provide for efficient use of energy and 7) its conservation and for matters connected therewith is?
 - Indian Electricity Act 2003 a)
- **Energy Conservation Act 2001** b)
- c) Indian Electricity Act 2010 d) **Energy Conservation Act 2007**
- In resistance furnace the atmosphere is _ 8)
 - Deoxidising a) Oxidising b)
 - c) Reducing d) Neutral
- 9) In direct arc furnace which of the following is of high value?
 - a) Current

c)

b) Voltage **Power Factor** All of these d)

Set

Marks: 14

Max. Marks: 70

- 10) The main application of indirect arc furnace is to melt _____.
 - a) Iron

12)

b) Steel

d)

- c) Non-ferrous metals
- 11) Projection welding can be considered as a mass production form of
 - Seam welding a)
 - c) Upset welding

- b) Spot welding Flash welding d)
- Maintenance requirements are least in case of _____.
- **Diesel** locomotives a) Electric locomotives b)
- c) Steam locomotives d) All of these
- When the speed of the train is estimated taking into account the time of 13) stop at a station in addition to the actual running time between stops, is known as . Schedule speed
 - a) Average speed c) Notching speed
- b) d)
- The unit of luminous flux is _____. 14)
 - a) steradian
 - c) lumen

b) candela

Free running speed

d) lux Set Q

- None of these

Seat No.

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL UTILIZATION

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any four of the following.

- a) Derive an expression for the tractive effort developed by a train unit.
- b) Explain the terms dead weight, effective weight, and adhesive weight in locomotive.
- c) Discuss the factors which affect the schedule speed of a train. What is difference exist in speed time curve in case of urban and suburban services.
- **d)** Explain the suitable connection diagrams, the resistance control method employed in the dc traction drives.
- e) Give the schematic diagram of 1500 V de train equipment of 2 dc series motor wired for series parallel operation during starting and explain it.
- f) Explain the transition methods in traction system.

Q.3 Solve any two of the following.

- a) Two 600 V motors each having a resistance of 0.1 ohm are started on the series parallel system, the main current per motor throughout the starting period being 300 A. The starting period is 15 seconds and the train speed at the end of this period is 29 km per hour. Calculate
 - 1) the rheostatic losses (in KWh) during the series and the parallel combination.
 - 2) the train speed at which transition from series to parallel must be made.
- b) An electrical train has quadrilateral speed time curve with uniform acceleration from rest at 2 kmphps for 30 seconds, coasting for 50 seconds, braking period of 20 seconds. The train is moving a uniform up gradient of 1%, tractive resistance 40 N/tone, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run.
- c) Explain Trapezoidal Speed-Time curve. Derive expression for Crest speed in terms of total time, total distance.

Max. Marks: 56

12

16

Set Q

Section – II

Q.4 Solve any four of the following

- a) State and explain the laws of illumination.
- **b)** Describe the factors considered for the selection of motors.
- c) Explain the principle of electric spot welding and seam welding.
- d) Sate, giving reasons, what type of motors you would consider suitable for the following drives:
 - 1) Air Compressor
 - 2) Reciprocating Pumps
 - 3) Paper Mill Drive and
 - 4) Electric Traction
- e) Explain the advantages and disadvantages of dielectric heating.
- f) Explain the properties of heating element.

Q.5 Solve any two of the following

- a) What is discharge lamp? Explain the Sodium Vapour lamp.
- **b)** Explain the energy consumption methods/ factors followed in small and large scale industries.
- c) Describe the construction and working of an electric arc furnace.

SLR-FM-448

Set

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

ELECTRICAL UTILIZATION

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 - 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Maintenance requirements are least in case of _____
 - a) Electric locomotives c) Steam locomotives
- **Diesel locomotives** b) d) All of these
- 2) When the speed of the train is estimated taking into account the time of stop at a station in addition to the actual running time between stops, is known as .
 - a) Average speed c) Notching speed
- The unit of luminous flux is _____. 3)
 - a) steradian b) candela
 - c) lumen d) lux
- 4) Which of the following factor affects specific energy consumption?
 - a) Distance between stops
 - b) Gradient
 - c) retardation and acceleration values
 - d) All of the above
- 5) Trapezoidal speed-time curve is the closer approximation for _____.
 - a) main line service b) suburban service
 - urban and suburban service c) urban service d)
- Which of the following lamp gives nearly monochromatic light? 6)
 - a) Sodium vapor lamp b) GLS lamp
 - c) Tube light d) Mercury vapor lamp
- 7) Energy consumption in propelling the train is required for _____.
 - a) acceleration
 - b) work against gravity while moving up the gradient
 - work against the resistance to motion c)
 - d) all of the above

8) Specific energy consumption is least in ____

- urban service sub-urban service a) b)
- c) main-line service d) equal for all types of services



R

Marks: 14



- b) Schedule speed
- Free running speed d)

SLR-FM-448

Set

- 9) Which of the following will need the highest level of illumination?
 - a) Proof reading

- b) Bed rooms
- c) Hospital wards
- d) Railway platforms
- 10) The Act which has been enacted to provide for efficient use of energy and its conservation and for matters connected therewith is?
 - a) Indian Electricity Act 2003
- b) Energy Conservation Act 2001d) Energy Conservation Act 2007

Set R

- c) Indian Electricity Act 2010 d)
- 11) In resistance furnace the atmosphere is _____.
 - a) Oxidising b) Deoxidising
 - c) Reducing d) Neutral
- 12) In direct arc furnace which of the following is of high value?
 - a) Current b) Voltage
 - c) Power Factor d) All of these
- 13) The main application of indirect arc furnace is to melt _____.
 - a) Iron b) Steel
 - c) Non-ferrous metals d) None of these
- 14) Projection welding can be considered as a mass production form of
 - a) Seam welding b) Spot welding
 - c) Upset welding d) Flash welding

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL UTILIZATION

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any four of the following.

- a) Derive an expression for the tractive effort developed by a train unit.
- b) Explain the terms dead weight, effective weight, and adhesive weight in locomotive.
- c) Discuss the factors which affect the schedule speed of a train. What is difference exist in speed time curve in case of urban and suburban services.
- **d)** Explain the suitable connection diagrams, the resistance control method employed in the dc traction drives.
- e) Give the schematic diagram of 1500 V de train equipment of 2 dc series motor wired for series parallel operation during starting and explain it.
- f) Explain the transition methods in traction system.

Q.3 Solve any two of the following.

- a) Two 600 V motors each having a resistance of 0.1 ohm are started on the series parallel system, the main current per motor throughout the starting period being 300 A. The starting period is 15 seconds and the train speed at the end of this period is 29 km per hour. Calculate
 - 1) the rheostatic losses (in KWh) during the series and the parallel combination.
 - 2) the train speed at which transition from series to parallel must be made.
- b) An electrical train has quadrilateral speed time curve with uniform acceleration from rest at 2 kmphps for 30 seconds, coasting for 50 seconds, braking period of 20 seconds. The train is moving a uniform up gradient of 1%, tractive resistance 40 N/tone, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run.
- c) Explain Trapezoidal Speed-Time curve. Derive expression for Crest speed in terms of total time, total distance.

Max. Marks: 56

16

Section – II

Q.4 Solve any four of the following

- a) State and explain the laws of illumination.
- **b)** Describe the factors considered for the selection of motors.
- c) Explain the principle of electric spot welding and seam welding.
- d) Sate, giving reasons, what type of motors you would consider suitable for the following drives:
 - 1) Air Compressor
 - 2) Reciprocating Pumps
 - 3) Paper Mill Drive and
 - 4) Electric Traction
- e) Explain the advantages and disadvantages of dielectric heating.
- f) Explain the properties of heating element.

Q.5 Solve any two of the following

- a) What is discharge lamp? Explain the Sodium Vapour lamp.
- **b)** Explain the energy consumption methods/ factors followed in small and large scale industries.
- c) Describe the construction and working of an electric arc furnace.

SLR-FM-448

Set

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

ELECTRICAL UTILIZATION Day & Date: Thursday, 12-12-2019

Time: 02:30 PM To 05:30 PM

Seat

No.

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 - 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

1)

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - Which of the following lamp gives nearly monochromatic light?
 - GLS lamp a) Sodium vapor lamp b)
 - c) Tube light d) Mercury vapor lamp
 - 2) Energy consumption in propelling the train is required for _____.
 - a) acceleration
 - b) work against gravity while moving up the gradient
 - work against the resistance to motion C)
 - d) all of the above

3) Specific energy consumption is least in ____

- urban service sub-urban service a) b)
- main-line service equal for all types of services c) d)
- 4) Which of the following will need the highest level of illumination?
 - a) Proof reading Bed rooms b) Railway platforms d)
 - c) Hospital wards
- The Act which has been enacted to provide for efficient use of energy and 5) its conservation and for matters connected therewith is?

b)

d)

- a) Indian Electricity Act 2003
- c) Indian Electricity Act 2010
- 6) In resistance furnace the atmosphere is ____
 - Oxidising b) a)
 - Reducing d) Neutral c)
- In direct arc furnace which of the following is of high value? 7)
 - a) Current Voltage b)
 - c) Power Factor d) All of these
- 8) The main application of indirect arc furnace is to melt _____.
 - Steel a) Iron b)
 - Non-ferrous metals d) None of these c)
- 9) Projection welding can be considered as a mass production form of
 - Seam welding Spot welding b) a)
 - Upset welding Flash welding d) C)

SLR-FM-448



Max. Marks: 70

Set

Marks: 14

Energy Conservation Act 2007

Energy Conservation Act 2001

Deoxidising

10)	Maintenance	requirements	are least in	case of
,				

- a) Electric locomotives
- b) **Diesel locomotives**

Set S

- c) Steam locomotives
- All of these d)
- 11) When the speed of the train is estimated taking into account the time of stop at a station in addition to the actual running time between stops, is known as _____.
 - a) Average speed
- b) Schedule speed
- c) Notching speed
- Free running speed d)
- The unit of luminous flux is _____. 12)
 - a) steradian b) candela
 - c) lumen d) lux
- 13) Which of the following factor affects specific energy consumption?
 - a) Distance between stops
 - b) Gradient
 - c) retardation and acceleration values
 - d) All of the above
- 14) Trapezoidal speed-time curve is the closer approximation for _____.
 - a) main line service
- b) suburban service
- c) urban service
- urban and suburban service d)

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL UTILIZATION

Day & Date: Thursday, 12-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any four of the following.

- a) Derive an expression for the tractive effort developed by a train unit.
- b) Explain the terms dead weight, effective weight, and adhesive weight in locomotive.
- c) Discuss the factors which affect the schedule speed of a train. What is difference exist in speed time curve in case of urban and suburban services.
- **d)** Explain the suitable connection diagrams, the resistance control method employed in the dc traction drives.
- e) Give the schematic diagram of 1500 V de train equipment of 2 dc series motor wired for series parallel operation during starting and explain it.
- f) Explain the transition methods in traction system.

Q.3 Solve any two of the following.

- a) Two 600 V motors each having a resistance of 0.1 ohm are started on the series parallel system, the main current per motor throughout the starting period being 300 A. The starting period is 15 seconds and the train speed at the end of this period is 29 km per hour. Calculate
 - 1) the rheostatic losses (in KWh) during the series and the parallel combination.
 - 2) the train speed at which transition from series to parallel must be made.
- b) An electrical train has quadrilateral speed time curve with uniform acceleration from rest at 2 kmphps for 30 seconds, coasting for 50 seconds, braking period of 20 seconds. The train is moving a uniform up gradient of 1%, tractive resistance 40 N/tone, rotational inertia effect 10% of dead weight, duration of stop 15 seconds and overall efficiency of transmission gear and motor as 75%. Calculate its schedule speed and specific energy consumption of run.
- c) Explain Trapezoidal Speed-Time curve. Derive expression for Crest speed in terms of total time, total distance.

Max. Marks: 56

Section – II

Q.4 Solve any four of the following

- a) State and explain the laws of illumination.
- **b)** Describe the factors considered for the selection of motors.
- c) Explain the principle of electric spot welding and seam welding.
- d) Sate, giving reasons, what type of motors you would consider suitable for the following drives:
 - 1) Air Compressor
 - 2) Reciprocating Pumps
 - 3) Paper Mill Drive and
 - 4) Electric Traction
- e) Explain the advantages and disadvantages of dielectric heating.
- f) Explain the properties of heating element.

Q.5 Solve any two of the following

- a) What is discharge lamp? Explain the Sodium Vapour lamp.
- **b)** Explain the energy consumption methods/ factors followed in small and large scale industries.
- c) Describe the construction and working of an electric arc furnace.

12

SLR-FM-448 Set S

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book.

PLC AND SCADA

2) Figures to the right indicate full mark.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options.

- How is the speed of operation of conventional relay system as compared 1) to digital controllers?
 - a) Very Slow
 - c) Same

- Very Fast b)
- Almost Similar d)
- The PLC is used in _____ 2)
 - a) machine tools
 - b) automated assembly equipment
 - c) moulding and extrusion machines
 - d) all of the above
- is a method used to observe the operation or execution of a control 3) program one time.
 - a) Step scan b) Test rung scan
 - c) Single scan d) All of the above
- 4) When _____ contacts are actuated, they disrupt the power supply through them.
 - Normally Open Type a) Both a) And b) c)
- b) Normally Closed Type None of The Above
- d)
- 5) of PLCs can be done in very little time. Installation
 - a) Programming
 - c) Commissioning
- d) All of the above

b)

- 6) An up-counter CTU counts
 - a) Upward from 0 to -32767 and then wraps around to +32768
 - Upward from +32767 to 0 and then wraps around to -32768 b)
 - Upward from 0 to +32767 and then wraps around to -32768 C)
 - Upward from -32767 to 0 and then wraps around to +32768 d)

SLR-FM-449



Max. Marks: 70

Marks: 14

Set 7) How do the variations in an average value get affected by PWM period? a) Longer the PWM period, faster will be the variation in an average value b) Shorter the PWM period, faster will be the variation in an average value c) Shorter the PWM period, slower will be the variation in an average value d) Longer the PWM period, slower will be the variation in an average value 8) In OSI model layer No 6 consist of _ **Presentation Laver** a) Physical layer b) c) Network layer d) Transport layer Talus 100 RTU and Talus 200 RTU are the product of _____ Company. 9) a) ABB b) Motorola c) Rockwell Automation Schneider Electric d) The important function of SCDA is ____ 10) a) Data Acquisition b) Information Display Alarm processing All the above c) d) 11) Ethernet frame consists of _____. a) MAC adder b) IP address c) both a) and b) d) none of the mentioned 12) helps to transfer of files between computers. FTP SMTP a) b) c) SNMP Telnet d) Which of the following protocol used for HVAC control, Building 13) Automation? a) Modbus b) Device Net **DNP 3.0** C) d) BACNet 14) High speed Ethernet works on ____ a) Coaxial cable b) Twisted pair cable c) Optical Fibre None of the mentioned d)

Seat No.

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering PLC AND SCADA

Day & Date: Saturday,14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicate full marks.

Section - I

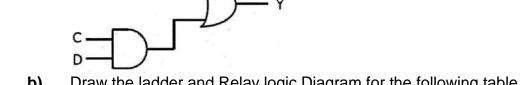
Q.2 Solve any Four:

- a) What are the different types of PLC timer? Explain OFF Delay (TOFF) timer.
- **b)** Define Programmable Logic Controller. Explain Central processing Unit.
- c) State and Explain advantages and Disadvantages of PLC in details.
- d) Explain brief history of PLC along with some important names.
- e) Explain properties of SCADA system.
- f) Explain variable Speed (Variable Frequency) AC motor drive.

Q.3 Solve any Two:

В

 a) Draw Relay logic, Ladder diagram for given logic diagram & also write Boolean Expression.



b) Draw the ladder and Relay logic Diagram for the following table Input-I1,I2

Output-Q1,Q2,Q3,Q4

l1	12	Q1	Q2	Q3	Q4
0	0	1	1	1	0
0	1	0	1	1	1
1	0	1	0	1	1
1	1	1	1	0	1

c) Conveyor C is to run when any one of four inputs is on. It is to stop when any one of four other inputs is on. Develop PLC Ladder logic, Relay Logic & Boolean logic for above problem.

Max. Marks: 56

12



Set P

Section - II

Q.4 Solve any four:

- a) What are the Security implementations of the SCADA Protocols?
- b) Draw and explain basic SCADA architecture.
- c) With block diagram explain how SCADA System is used in Automatic sub Station control.
- **d)** Write a note on the TCP/IP Protocols.
- e) List various functions of SCADA.
- f) Explain SCADA data transfer through PLCC.

Q.5 Solve any two.

- a) Explain with e.g. how SCADA system is used in conventional electric power generation
- **b)** Explain First generation SCADA system in detail.
- c) Draw and explain Seven layers of OSI model and their functions.

16

Seat No.			Set Q				
	B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering PLC AND SCADA						
	Day & Date: Saturday,14-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM						
Instru	Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book.						
	Figures to the right indicate full	mark					
	MCQ/Objective Ty	vpe (Questions				
Duratio	n: 30 Minutes		Marks: 14				
Q.1 (hoose the correct alternatives from th In OSI model layer No 6 consist of _	e opt	ions. 14				
	a) Physical layerc) Network layer	b) d)	Presentation Layer Transport layer				
2) Talus 100 RTU and Talus 200 RTU a a) ABB c) Rockwell Automation	are th b) d)	e product of Company. Motorola Schneider Electric				
3) The important function of SCDA is _ a) Data Acquisition c) Alarm processing	b) d)	Information Display All the above				
۷) Ethernet frame consists of a) MAC adder c) both a) and b)	b) d)	IP address none of the mentioned				
5) helps to transfer of files between a) FTP c) SNMP		omputers. SMTP Telnet				
6) Which of the following protocol used Automation?	for H	VAC control, Building				
	a) Modbus c) DNP 3.0	b) d)	Device Net BACNet				
7	 High speed Ethernet works on a) Coaxial cable c) Optical Fibre 	 b) d)	Twisted pair cable None of the mentioned				
8	 How is the speed of operation of cor to digital controllers? a) Very Slow c) Same 	b) d)	onal relay system as compared Very Fast Almost Similar				
ç	 The PLC is used in a) machine tools b) automated assembly equipment c) moulding and extrusion machine d) all of the shows 						

d) all of the above

- 10) _____ is a method used to observe the operation or execution of a control program one time.
 - a) Step scan

Single scan

C)

- b) Test rung scan d) All of the above
- 11) When _____ contacts are actuated, they disrupt the power supply through them.
 - a) Normally Open Type
- b) Normally Closed Typed) None of The Above
- c) Both a) And b) d)
- 12) _____ of PLCs can be done in very little time.
 - a) Programming

- b) Installation
- c) Commissioning d) All of the above
- 13) An up-counter CTU counts ____
 - a) Upward from 0 to -32767 and then wraps around to +32768
 - b) Upward from +32767 to 0 and then wraps around to -32768
 - c) Upward from 0 to +32767 and then wraps around to -32768
 - d) Upward from -32767 to 0 and then wraps around to +32768
- 14) How do the variations in an average value get affected by PWM period?
 - a) Longer the PWM period, faster will be the variation in an average value
 - b) Shorter the PWM period, faster will be the variation in an average value
 - c) Shorter the PWM period, slower will be the variation in an average value
 - d) Longer the PWM period, slower will be the variation in an average value



Seat No.

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** PLC AND SCADA

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicate full marks.

Section - I

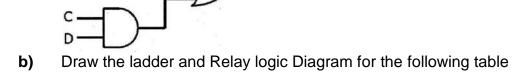
Q.2 Solve any Four:

- What are the different types of PLC timer? Explain OFF Delay (TOFF) a) timer.
- Define Programmable Logic Controller. Explain Central processing Unit. b)
- State and Explain advantages and Disadvantages of PLC in details. c)
- d) Explain brief history of PLC along with some important names.
- Explain properties of SCADA system. e)
- Explain variable Speed (Variable Frequency) AC motor drive. **f**)

Q.3 Solve any Two:

В

Draw Relay logic, Ladder diagram for given logic diagram & also write a) Boolean Expression. Α.



Input-I1,I2

Output-Q1,Q2,Q3,Q4

l1	12	Q1	Q2	Q3	Q4
0	0	1	1	1	0
0	1	0	1	1	1
1	0	1	0	1	1
1	1	1	1	0	1

Conveyor C is to run when any one of four inputs is on. It is to stop when c) any one of four other inputs is on. Develop PLC Ladder logic, Relay Logic & Boolean logic for above problem.

Max. Marks: 56

12



Section - II

Q.4 Solve any four:

- a) What are the Security implementations of the SCADA Protocols?
- b) Draw and explain basic SCADA architecture.
- c) With block diagram explain how SCADA System is used in Automatic sub Station control.
- **d)** Write a note on the TCP/IP Protocols.
- e) List various functions of SCADA.
- f) Explain SCADA data transfer through PLCC.

Q.5 Solve any two.

- a) Explain with e.g. how SCADA system is used in conventional electric power generation
- b) Explain First generation SCADA system in detail.
- c) Draw and explain Seven layers of OSI model and their functions.

16

12

Set Q

SLR-FM-449 Set

Seat No.

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** PLC AND SCADA

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book.

2) Figures to the right indicate full mark.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- of PLCs can be done in very little time. 1)
 - a) Programming

- b) Installation
- d) All of the above
- 2) An up-counter CTU counts

c) Commissioning

- Upward from 0 to -32767 and then wraps around to +32768 a)
- Upward from +32767 to 0 and then wraps around to -32768 b)
- Upward from 0 to +32767 and then wraps around to -32768 c)
- Upward from -32767 to 0 and then wraps around to +32768 d)

How do the variations in an average value get affected by PWM period? 3)

- a) Longer the PWM period, faster will be the variation in an average value
- b) Shorter the PWM period, faster will be the variation in an average value
- c) Shorter the PWM period, slower will be the variation in an average value
- d) Longer the PWM period, slower will be the variation in an average value
- In OSI model layer No 6 consist of 4)
 - a) Physical laver b) **Presentation Laver**
 - Transport layer c) Network layer d)

Talus 100 RTU and Talus 200 RTU are the product of Company. 5)

- a) ABB b) Motorola
- c) Rockwell Automation d) Schneider Electric
- The important function of SCDA is _ 6)
 - Data Acquisition Information Display a) b) c) Alarm processing d) All the above
- Ethernet frame consists of 7)
 - a) MAC adder b) IP address
 - none of the mentioned c) both a) and b) d)

d)

Telnet

- 8) helps to transfer of files between computers. SMTP b)
 - FTP a)
 - c) SNMP

Max. Marks: 70

R

Marks: 14 14

- 9) Which of the following protocol used for HVAC control, Building Automation?
 - a) Modbus b) Device Net
 - DNP 3.0 c) d) BACNet
- 10) High speed Ethernet works on _____.
 - Coaxial cable b) Twisted pair cable Optical Fibre
 - None of the mentioned d)
- 11) How is the speed of operation of conventional relay system as compared to digital controllers?
 - a) Very Slow

a)

C)

- Very Fast b) Almost Similar
- c) Same d)
- The PLC is used in _____. 12)
 - a) machine tools
 - b) automated assembly equipment
 - c) moulding and extrusion machines
 - d) all of the above
- 13) _____ is a method used to observe the operation or execution of a control program one time.
 - a) Step scan b)
 - c) Single scan d) All of the above
- When _____ contacts are actuated, they disrupt the power supply through 14) them.
 - a) Normally Open Type
- Normally Closed Type b)

Test rung scan

c) Both a) And b)

None of The Above d)



Seat No.

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering PLC AND SCADA

Day & Date: Saturday,14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicate full marks.

Section - I

Q.2 Solve any Four:

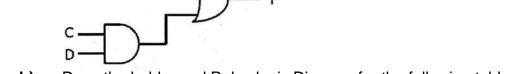
- a) What are the different types of PLC timer? Explain OFF Delay (TOFF) timer.
- **b)** Define Programmable Logic Controller. Explain Central processing Unit.
- c) State and Explain advantages and Disadvantages of PLC in details.
- d) Explain brief history of PLC along with some important names.
- e) Explain properties of SCADA system.
- f) Explain variable Speed (Variable Frequency) AC motor drive.

Q.3 Solve any Two:

Α.

В

a) Draw Relay logic, Ladder diagram for given logic diagram & also write Boolean Expression.



b) Draw the ladder and Relay logic Diagram for the following table Input-I1,I2

Output-Q1,Q2,Q3,Q4

1	12	Q1	Q2	Q3	Q4
0	0	1	1	1	0
0	1	0	1	1	1
1	0	1	0	1	1
1	1	1	1	0	1

c) Conveyor C is to run when any one of four inputs is on. It is to stop when any one of four other inputs is on. Develop PLC Ladder logic, Relay Logic & Boolean logic for above problem.

Max. Marks: 56

12



Section - II

Q.4 Solve any four:

- a) What are the Security implementations of the SCADA Protocols?
- **b)** Draw and explain basic SCADA architecture.
- c) With block diagram explain how SCADA System is used in Automatic sub Station control.
- **d)** Write a note on the TCP/IP Protocols.
- e) List various functions of SCADA.
- f) Explain SCADA data transfer through PLCC.

Q.5 Solve any two.

- a) Explain with e.g. how SCADA system is used in conventional electric power generation
- **b)** Explain First generation SCADA system in detail.
- c) Draw and explain Seven layers of OSI model and their functions.

16

Set R

No				Set	S			
	B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering PLC AND SCADA							
	Day & Date: Saturday,14-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM							
Inst	Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book.							
		2) Figures to the righ						
Dur	ation: 3	30 Minutes	bjective Type	Auestions	: 14			
Q.1	Cho	ose the correct alternat	ives from the op	tions.	14			
	1)	The important function of a) Data Acquisition c) Alarm processing	-	Information Display All the above				
	2)	Ethernet frame consists a) MAC adder c) both a) and b)	of b) d)	IP address none of the mentioned				
	3)	helps to transfer a) FTP c) SNMP	of files between o b) d)	omputers. SMTP Telnet				
	4)	Which of the following p Automation? a) Modbus c) DNP 3.0	protocol used for H b) d)	IVAC control, Building Device Net BACNet				
	5)	High speed Ethernet wo a) Coaxial cable c) Optical Fibre	brks on b) d)	Twisted pair cable None of the mentioned				
	6)	How is the speed of ope to digital controllers? a) Very Slow c) Same	eration of convent b) d)	ional relay system as compared Very Fast Almost Similar				
	7)	The PLC is used in a) machine tools b) automated assemb c) moulding and extru d) all of the above	ly equipment					
	8)	is a method used program one time. a) Step scan c) Single scan	d to observe the o b) d)	peration or execution of a control Test rung scan All of the above				
	9)	When contacts a them. a) Normally Open Typ c) Both a) And b)		disrupt the power supply through Normally Closed Type None of The Above				

SLR-FM-449 Set S

- 10) of PLCs can be done in very little time.
 - a) Programming

Installation b)

c) Commissioning

- All of the above d)
- 11) An up-counter CTU counts _
 - Upward from 0 to -32767 and then wraps around to +32768 a)
 - Upward from +32767 to 0 and then wraps around to -32768 b)
 - Upward from 0 to +32767 and then wraps around to -32768 c)
 - Upward from -32767 to 0 and then wraps around to +32768 d)
- 12) How do the variations in an average value get affected by PWM period?
 - Longer the PWM period, faster will be the variation in an average a) value
 - b) Shorter the PWM period, faster will be the variation in an average value
 - c) Shorter the PWM period, slower will be the variation in an average value
 - d) Longer the PWM period, slower will be the variation in an average value
- 13) In OSI model layer No 6 consist of _
 - **Presentation Layer** a) Physical layer b)
 - c) Network layer d) Transport layer
- 14) Talus 100 RTU and Talus 200 RTU are the product of _____ Company. Motorola
 - ABB a)

c)

- **Rockwell Automation**
- b) d) Schneider Electric

Seat No.

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering PLC AND SCADA

Day & Date: Saturday,14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicate full marks.

Section - I

Q.2 Solve any Four:

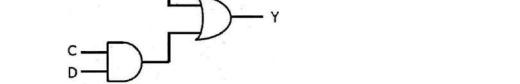
- a) What are the different types of PLC timer? Explain OFF Delay (TOFF) timer.
- **b)** Define Programmable Logic Controller. Explain Central processing Unit.
- c) State and Explain advantages and Disadvantages of PLC in details.
- d) Explain brief history of PLC along with some important names.
- e) Explain properties of SCADA system.
- f) Explain variable Speed (Variable Frequency) AC motor drive.

Q.3 Solve any Two:

Α.

В

a) Draw Relay logic, Ladder diagram for given logic diagram & also write Boolean Expression.



b) Draw the ladder and Relay logic Diagram for the following table Input-I1,I2

Output-Q1,Q2,Q3,Q4

11	12	Q1	Q2	Q3	Q4
0	0	1	1	1	0
0	1	0	1	1	1
1	0	1	0	1	1
1	1	1	1	0	1

c) Conveyor C is to run when any one of four inputs is on. It is to stop when any one of four other inputs is on. Develop PLC Ladder logic, Relay Logic & Boolean logic for above problem.

16

12

Set S

Max. Marks: 56

SLR-FM-449 Set S

Section - II

Q.4 Solve any four:

- a) What are the Security implementations of the SCADA Protocols?
- b) Draw and explain basic SCADA architecture.
- c) With block diagram explain how SCADA System is used in Automatic sub Station control.
- **d)** Write a note on the TCP/IP Protocols.
- e) List various functions of SCADA.
- f) Explain SCADA data transfer through PLCC.

Q.5 Solve any two.

- a) Explain with e.g. how SCADA system is used in conventional electric power generation
- **b)** Explain First generation SCADA system in detail.
- c) Draw and explain Seven layers of OSI model and their functions.

16

Seat No.	t	Set P					
	B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING						
		e: Saturday,14-12-2019 Max. Marks: 70 0 PM To 05:30 PM					
Instr	uctio	 ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. 2) Figures to the right indicate full marks. 					
		MCQ/Objective Type Questions					
Dura	tion: 3	30 Minutes Marks: 14					
Q.1	Cho	ose the correct alternatives from the options. 14					
	1)	Fourier Transform of a train of impulse isa) Sync functionb) Train of impulsec) Modified syncd) Rectangular window					
	2)	The compare valued phase factor W_N can be represented as a) $e^{(-j2\pi N)}$ b) $e^{(-j2\pi/N)}$ c) $e^{-j2\pi}$ d) $e^{-j2\pi KN}$					
	3)	 Band pass filter passes all the frequency components of a) Specified band having a finite range b) Outside of band c) Both a & b d) None 					
	4)	DFT of $x(n) = \delta(n)$ a) 1 b) 0 c) $w = e^{-j\frac{2\pi}{N}}$ d) None					
	5)	DFT of $n(n) = \delta(n - n_0)$ a) e^{-jwn_0} b) e^{jwn_0} c) 1 d) None					
	6)	Fast Convolution techniques isa) Overlap saveb) Overlap addc) a & bd) None of above					
	7)	Two digital filter can be operated in cascade, the same effect can beachieved bya) adding their coefficientb) subtracting their coefficientc) convolving their coefficientd) averaging their coefficient					
	8)	Application of convolution a) FIR filtering b) Addition c) Manipulation					

				Set	Ρ
9)	IIR filter design is based ona) Analogc) Discrete time	b) d)	Digital None		
10)	DWT is transform which captures _ a) Frequency c) Frequency & location	 b) d)	Location None		
11)	The basic process that's going on ir a) Quantization c) Logarithmic transformation	b)	MAC		
12)	For a Blackman window function the (M is length of filter). a) 12 * Pi × M c) Pi * M/8	b)	h of the main lobe is Pi/8 M 12 * Pi/M		
13)	Goertzel Algorithm evaluates the a) DTFT coefficient c) Z transform coefficient	b)	DFT coefficient FT coefficient		
14)	FIR filters are generally as so a) not c) most	ensitiv b) d)	ve to coefficient round off less none		

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** DIGITAL SIGNAL PROCESSING Max. Marks: 56

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Solve any four Q.2

Seat No.

- What is twiddle factor explain. a)
- List down the DFT properties. b)
- List down the properties of DCT. c)
- d) If $x(n) = \{1, 2, 0, 3, -2, 4, 7, 5\}$ evaluate energy
- Compute the sequence x(n) if $X(k) = \{4, -j2, 0, j2\}$. e)

Q.3 Solve any two

- If $H(z) = 8z^3 4z^2 + 11z 2/(z \frac{1}{4})(z^2 z + \frac{1}{2})$ a) realize the system in direct form II.
- b) Find 8 point DFT of a real signal $x(n) = \{1, 1, 1, 1, -1, -1, -1, -1\}$ using DIF, FFF algorithm.
- Find IDFT of sequence c) X(K) = (20, -5.82 - j2.414, 0, -.172 - j.414, 0, -.172 + j.414, 0, -5.82 + j2.414)using DIT FFT algorithm.

Section – II

Solve any four Q.4

- Explain difference in FIR & IIR filter. a)
- Explain with block diagram IIR implementation techniques. b)
- C) Describe the application of DSP in power systems.
- Explain the terms SIMD, BSP & MAC with reference to DSP processor. d)
- What is floating point DSP processor? d)

Q.5 Solve any two

- What is linear phase filter? Explain with example. a)
- Find output y(n) of a filter whose impulse response is $h(n) = \{1,2\}$ and b) $\mathbf{x}(\mathbf{n}) = \{1, 2, -1, 2, 3, -2, -3, -1, 1, 1, 2, -1\}$ using overlap add method.
- c) Design a low pass filter such that out off frequency is 100 Hz and at 300 Hz the attenuation is 20dB, with monotonic shape past 100 Hz, take T =1/2000 sec. (Assume any data required fan designing)
- d) Draw the Architecture function Block diagram of TMS 320C DSP processor.

SLR-FM-450



16

12

16

Seat No.			Set Q				
	B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING						
	Day & Date: Saturday,14-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM Max. Marks: 70						
Instructio	book.		be solved in first 30 minutes in answer				
	2) Figures to the right indicate fu						
Duration: 3	MCQ/Objective T 30 Minutes	ype	Auestions Marks: 14				
Q.1 Cho	ose the correct alternatives from t	he op	tions. 14				
1)	Application of convolution a) FIR filtering c) Manipulation	b) d)	Addition None				
2)	IIR filter design is based ona) Analogc) Discrete time	b) d)	Digital None				
3)	DWT is transform which captures _ a) Frequency c) Frequency & location	 b) d)	Location None				
4)	The basic process that's going on i a) Quantization c) Logarithmic transformation	b)	a DSP chip is MAC Vector calculation				
5)	For a Blackman window function th	e widt	h of the main lobe is				
	(M is length of filter). a) 12 * Pi × M c) Pi * M/8	b) d)	Pi/8 M 12 * Pi/M				
6)	Goertzel Algorithm evaluates the _ a) DTFT coefficient c) Z transform coefficient	 b) d)	DFT coefficient FT coefficient				
7)	FIR filters are generally as s a) not c) most	ensitiv b) d)	ve to coefficient round off less none				
8)	Fourier Transform of a train of impu a) Sync function c) Modified sync	ulse is b) d)	 Train of impulse Rectangular window				
9)	The compare valued phase factor V a) $e^{(-j2\pi N)}$ c) $e^{-j2\pi}$	N _N car b) d)	be represented as $e^{(-j2\pi/N)}$ $e^{-j2\pi KN}$				

				Set	Q
10)	 Band pass filter passes all the freque a) Specified band having a finite ratio b) Outside of band c) Both a & b d) None 	-	components of		
11)	DFT of $x(n) = \delta(n)$ a) 1 c) $w = e^{-j\frac{2\pi}{N}}$	b) d)	0 None		
12)	DFT of $n(n) = \delta(n - n_0)$ a) $e^{-jw n_0}$ c) 1	b) d)	e ^{jwn} 0 None		
13)	Fast Convolution techniques is a) Overlap save c) a & b	 b) d)	Overlap add None of above		
14)	Two digital filter can be operated in achieved by	casca	ade, the same effect can b	е	

- b)
- achieved by _____.a) adding their coefficientc) convolving their coefficient
- subtracting their coefficient averaging their coefficient d)

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING					
-		te: Saturday,14-12-2019 N 30 PM To 05:30 PM	Max. Marks: 56		
Instr	uctic	ons: 1) All questions are compulsory.2) Figures to the right indicate full marks.			
		Section – I			
	a) b) c) d) e)	ve any four What is twiddle factor explain. List down the DFT properties. List down the properties of DCT. If $x(n) = \{1,2,0,3, -2,4,7,5\}$ evaluate energy Compute the sequence $x(n)$ if $X(k) = \{4, -j2, 0, j2\}$.	16		
Q.3	son a) b) c)	Ve any two If $H(z) = 8z^3 - 4z^2 + 11z - 2/(z - \frac{1}{4}) (z^2 - z + \frac{1}{2})$ realize the system in direct form II. Find 8 point DFT of a real signal $x(n) = \{1,1,1,1,-1,-1,-1,-1\}$ using DIF, FFF algorithm. Find IDFT of sequence X(K) = (20, -5.82 - j2.414, 0,172 - j.414, 0,172 + j.414, 0, -5) using DIT FFT algorithm.	12 5.82 + j2.414)		
		Section – II			
Q.4	Sol ^y a) b) c) d) d)	ve any four Explain difference in FIR & IIR filter. Explain with block diagram IIR implementation techniques. Describe the application of DSP in power systems. Explain the terms SIMD, BSP & MAC with reference to DSP proce What is floating point DSP processor?	16 essor.		
Q.5	Sol	ve any two	12		

Q.5 Solve any two

- What is linear phase filter? Explain with example. a)
- b) Find output y(n) of a filter whose impulse response is $h(n) = \{1,2\}$ and $\mathbf{x}(\mathbf{n}) = \{1, 2, -1, 2, 3, -2, -3, -1, 1, 1, 2, -1\}$ using overlap add method.
- Design a low pass filter such that out off frequency is 100 Hz and at 300 Hz c) the attenuation is 20dB, with monotonic shape past 100 Hz, take T =1/2000 sec. (Assume any data required fan designing)
- Draw the Architecture function Block diagram of TMS 320C DSP processor. d)

C

Seat

No.

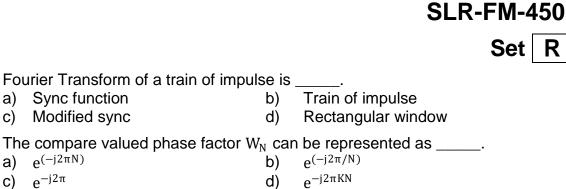
C

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						SLR-FIVI-	430
Seat No.						Set	R
			B.E. (Part – I) (CGP Electr DIGITAL S	ical Eng	ine	ering	
			turday,14-12-2019 I To 05:30 PM			Max. Mark	s: 70
Instru	ction) Q. No. 1 is compulsory book.) Figures to the right inc			e solved in first 30 minutes in ans s.	swer
			MCQ/Obje	ctive Ty	pe C	Questions	
Durati	on: 30	0 Mi			•		s: 14
Q.1	Choo	set	he correct alternatives	s from the	e opt	ions.	14
	1)		$\int of n(n) = \delta(n - n_0)$ e ^{-jw n_0}		۲) ۲	e ^{jwn} 0	
		a) C)	e ^{Jwn}		b) d)	None	
	2)	,	t Convolution technique		ч)		
	<u> </u>		Overlap save		 b)	Overlap add	
			a & b		d)	None of above	
	3)	ach	o digital filter can be ope ieved by adding their coefficient		asca b)	de, the same effect can be subtracting their coefficient	
		c)	convolving their coeffic		d)	averaging their coefficient	
	4)		lication of convolution _ FIR filtering Manipulation		b) d)	Addition None	
	5)	IIR a)	filter design is based on Analog		b)	Digital	
		c)	Discrete time		d)	None	
	6)	DW	T is transform which ca				
			Frequency		b)	Location	
		,	Frequency & location		d)	None	
	7)		e basic process that's go Quantization	•	lde a b)	MAC	
			Logarithmic transforma		d)	Vector calculation	
	8)	For	a Blackman window fur s length of filter).		,	n of the main lobe is	
		,	12 * Pi × M Pi * M/8		b) d)	Pi/8 M 12 * Pi/M	
	9)	Go a) c)	ertzel Algorithm evaluate DTFT coefficient Z transform coefficient		 b) d)	DFT coefficient FT coefficient	
	10)	,		ally as ser	,	e to coefficient round off less none	

Seat



- Band pass filter passes all the frequency components of _____. 13)
 - a) Specified band having a finite range
 - b) Outside of band
 - c) Both a & b
 - d) None

a) $e^{(-j2\pi N)}$

c) $e^{-j2\pi}$

11)

12)

14) DFT of $x(n) = \delta(n)$

a) 1 b) 0
c)
$$w = e^{-j\frac{2\pi}{N}}$$
 d) None

- **Electrical Engineering** DIGITAL SIGNAL PROCESSING Max. Marks: 56 2) Figures to the right indicate full marks. Section – I Solve any four 16 What is twiddle factor explain. a) List down the DFT properties. b) List down the properties of DCT. c) d) If $x(n) = \{1, 2, 0, 3, -2, 4, 7, 5\}$ evaluate energy Compute the sequence x(n) if $X(k) = \{4, -j2, 0, j2\}$. e) Solve any two If $H(z) = 8z^3 - 4z^2 + 11z - 2/(z - \frac{1}{4})(z^2 - z + \frac{1}{2})$ a) realize the system in direct form II. b) Find 8 point DFT of a real signal $x(n) = \{1, 1, 1, 1, -1, -1, -1, -1\}$ using DIF, FFF algorithm. Find IDFT of sequence c) X(K) = (20, -5.82 - j2.414, 0, -.172 - j.414, 0, -.172 + j.414, 0, -5.82 + j2.414)using DIT FFT algorithm. Section – II Solve any four 16 Q.4 Explain difference in FIR & IIR filter. a) Explain with block diagram IIR implementation techniques. b)
 - C) Describe the application of DSP in power systems.
 - Explain the terms SIMD, BSP & MAC with reference to DSP processor. d)
 - What is floating point DSP processor? d)

Q.5 Solve any two

- What is linear phase filter? Explain with example. a)
- Find output y(n) of a filter whose impulse response is $h(n) = \{1,2\}$ and b) $\mathbf{x}(\mathbf{n}) = \{1, 2, -1, 2, 3, -2, -3, -1, 1, 1, 2, -1\}$ using overlap add method.
- c) Design a low pass filter such that out off frequency is 100 Hz and at 300 Hz the attenuation is 20dB, with monotonic shape past 100 Hz, take T =1/2000 sec. (Assume any data required fan designing)
- d) Draw the Architecture function Block diagram of TMS 320C DSP processor.

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

Q.2

Seat No.

Q.3

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Seat						Set S
No.					tion Nov/Dec 2010	
			Electrical Er	ngine	-	
•		aturday,14-12 /I To 05:30 P			Μ	ax. Marks: 70
Instruc		book.	compulsory and sh the right indicate fu		e solved in first 30 minut	es in answer
		, .	ICQ/Objective T			
Duratio	n: 30 Mi			J1		Marks: 14
Q.1 C 1			alternatives from t m which captures _		tions.	14
I) DN a) c)	Frequency Frequency		 b) d)	Location None	
2	́a)	Quantizatio	•••	nside : b) d)	a DSP chip is MAC Vector calculation	
3	́ (М а)	a Blackmar is length of f 12 * Pi × M Pi * M/8		e widt b) d)	h of the main lobe is Pi/8 M 12 * Pi/M	
4) Go a) c)	DTFT coeff	hm evaluates the icient i coefficient	 b) d)	DFT coefficient FT coefficient	
5) FIR a) c)	R filters are _ not most	generally as s	ensitiv b) d)	re to coefficient round off less none	
6	i) Fou a) c)	-		ılse is b) d)	 Train of impulse Rectangular window	
7	í) The a) c)	e compare va $e^{(-j2\pi N)}$ $e^{-j2\pi}$	alued phase factor N	N _N car b) d)	h be represented as $e^{(-j2\pi/N)}$ $e^{-j2\pi KN}$	
8	i) Bai a) b) c) d)	•	and having a finite r	•	components of	
9	a)	T of x(n) = δ 1 w = e ^{-j\frac{2\pi}{N}}	6(n)	b) d)	0 None	

Seat



DFT of $n(n) = \delta(n - n_0)$ 10) a) e^{-jwn_0} e^{jwn_0} b) c) 1 d) None

- Fast Convolution techniques is ____ 11) _• a) Overlap save b) Overlap add
 - None of above c) a&b d)
- 12) Two digital filter can be operated in cascade, the same effect can be achieved by .
 - a) adding their coefficient
 - c) convolving their coefficient
- b) subtracting their coefficient

SLR-FM-450

Set S

averaging their coefficient d)

Addition

Digital

- Application of convolution _____. 13) b)
 - a) FIR filtering
 - c) Manipulation d) None
- IIR filter design is based on _____. 14) b)
 - a) Analog
 - c) Discrete time None d)

Page **11** of **12**

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering DIGITAL SIGNAL PROCESSING

Day & Date: Saturday,14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four

- a) What is twiddle factor explain.
- **b)** List down the DFT properties.
- c) List down the properties of DCT.
- d) If $x(n) = \{1,2,0,3,-2,4,7,5\}$ evaluate energy
- e) Compute the sequence x(n) if $X(k) = \{4, -j2, 0, j2\}$.

Q.3 Solve any two

- a) If $H(z) = 8z^3 4z^2 + 11z 2/(z \frac{1}{4})(z^2 z + \frac{1}{2})$ realize the system in direct form II.
- **b)** Find 8 point DFT of a real signal $x(n) = \{1,1,1,1,-1,-1,-1,-1\}$ using DIF, FFF algorithm.
- c) Find IDFT of sequence X(K) = (20, -5.82 j2.414, 0, -.172 j.414, 0, -.172 + j.414, 0, -5.82 + j2.414) using DIT FFT algorithm.

Section – II

Q.4 Solve any four

- a) Explain difference in FIR & IIR filter.
- **b)** Explain with block diagram IIR implementation techniques.
- c) Describe the application of DSP in power systems.
- d) Explain the terms SIMD, BSP & MAC with reference to DSP processor.
- d) What is floating point DSP processor?

Q.5 Solve any two

- a) What is linear phase filter? Explain with example.
- b) Find output y(n) of a filter whose impulse response is $h(n) = \{1,2\}$ and $x(n) = \{1, 2, -1, 2, 3, -2, -3, -1, 1, 1, 2, -1\}$ using overlap add method.
- c) Design a low pass filter such that out off frequency is 100 Hz and at 300 Hz the attenuation is 20dB, with monotonic shape past 100 Hz, take T = 1/2000 sec. (Assume any data required fan designing)
- d) Draw the Architecture function Block diagram of TMS 320C DSP processor.

Max. Marks: 56

12

16

12

16

SLR-FM-450

Seat No.

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ENERGY AUDIT & MANAGEMENT**

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 - 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- The benchmarking parameter for air conditioning equipment is _____. 1)
 - a) kW/Ton of Refrigeration
 - b) kW/kg of refrigerant handled
 - c) Kcal/m³ of chilled water
 - d) Differential temperature across chiller
 - In the material balance of a process or unit operation process, which 2) component will not be considered on the input side?
 - a) Chemicals Water/air b)
 - c) Recycle d) By product
 - 3) Conservation laws that describe events involving the elementary particles include the conservation of _____.
 - Energy a)
 - Electric charge c)
 - e) All of these are correct
 - 4) The support for energy management is expressed in a formal written declaration of commitment. This is called
 - a) Company policy

c) Energy policy

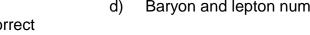
- Management policy b) Energy efficiency d)
- 5) Particles that participate in the strong nuclear interaction are called _____.
 - a) Neutrinos b) Hadrons
 - Leptons d) Electrons c)
 - e) Photon
- Which one is a secondary form of energy? 6)
 - Furnace oil Natural gas a) b)
 - c) Electricity d) Coal
- 7) In material balance of a process, recycle product is always considered as
 - input to process b) output to process a) c) both (a) and (b) none of them d)
- 8) Non-contact speed measurements can be carried out by ____
 - a) Tachometer

c) Oscilloscope

- Stroboscope b)
- Speedometer d)

Linear and angular momentum

- Baryon and lepton number d)



b)

Max. Marks: 70

Marks: 14

14

SLR-FM-451

Set

9) The future value of one dollar in "n" periods at interest rate of "l" present is known as _____.

- Single payment compound amount a)
- b) Single payment present worth
- c) Uniform series compound amount
- d) Sinking fund payment
- 10) Lux meter is used to measure _____ (EA)
 - a) Illumination level
 - b) Sound intensity and illumination level
 - c) Harmonics
 - d) Speed
- In a chemical process of two reactants A (200 kg) and B (200 kg) is used 11) as reactants. If conversion is 50% and A and B reacts in equal proportion then calculate the weight of the product formed.
 - a) 150 kg 200 kg b)
 - 400 kg c) 250 kg d)
- A moderator is used to slow _____. 12)
 - a) Proton
- b) Alpha particles

SLR-FM-451

Set P

Beta particle d)

c) Neutron e) Photon

- Sankey diagram is an useful tool to represent _____. 13)
 - a) Financial strength of the company
 - b) Management philosophy
 - c) Input and output energy flow
 - d) Human resource strength
- Acid rain is caused by the release of the following components from 14) combustion of fuels _____.
 - a) SOx and NOx

b) Sox and CO₂

c) CO₂ and NOx

d) H_2O

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT & MANAGEMENT

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Attempt any four

- a) Explain organization setup for energy management.
- **b)** Write short notes on Kyoto protocol.
- c) Discuss the constraint and challenges on supply side management.
- d) What do you mean by energy security? Explain few strategies to ensure security of our country.
- e) State the responsibilities and duties of energy manager.
- f) Explain how biomass can serve as an energy source

Q.3 Attempt any two

- a) Write a short note on solar thermal technology as an energy source.
- b) Explain the role of SCADA in utility energy management.
- c) Explain salient features of electricity act 2003.

Section – II

Q.4 Answer any four

- a) Enlist energy conservation measures in industrial grade fans and blowers.
- b) Explain step wise procedure to carry out a detail energy audit.
- c) What are the various costing techniques?
- d) Enlist energy conservation opportunities in pumping system.
- e) What is necessity of energy audit? Explain phases of energy audit.
- f) Write note on break even analysis.

Q.5 Attempt any two

- a) Explain the process of cost optimization.
- **b)** Why it is important to reduce T and D losses? Discuss various methods for reducing technical losses.
- c) Explain the following techniques with their use for energy analysis
 - 1) Sankey diagram
 - 2) CUSUM technique



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		/pe u	Ruestions
30 Mi	inutes	•	
No a)	the correct alternatives from th n-contact speed measurements o Tachometer Oscilloscope	an be b)	
is k a) b) c)	e future value of one dollar in "n" nown as Single payment compound amo Single payment present worth Uniform series compound amou Sinking fund payment	unt	ls at interest rate of "I" pre
a) b) c)	reter is used to measure Illumination level Sound intensity and illumination Harmonics Speed	. ,	
as the a)	a chemical process of two reactar reactants. If conversion is 50% ar n calculate the weight of the prod 150 kg 250 kg	nd A a luct fo b)	and B reacts in equal prop
a) c)	noderator is used to slow Proton Neutron Photon	b) d)	Alpha particles Beta particle

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 - 2) Figures to the right indicates full marks.

Time: 02:30 PM To 05:30 PM

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ENERGY AUDIT & MANAGEMENT**

MCQ/Objective Type Questions

Duration: 3

Day & Date: Saturday, 14-12-2019

Q.1 Choo

- 1)
- 2) esent
- 3)
- 4) s used portion
- 5)
 - e) Photon
- Sankey diagram is an useful tool to represent _____. 6)
 - a) Financial strength of the company
 - b) Management philosophy
 - c) Input and output energy flow
 - d) Human resource strength
- Acid rain is caused by the release of the following components from 7) combustion of fuels _____.
 - a) SOx and NOx
 - c) CO₂ and NOx
- Sox and CO₂ b)
- d) H₂O

Max. Marks: 70



Set

Q



Marks: 14

			SLR-FM-451
			Set Q
8)	 The benchmarking parameter for ai a) kW/Ton of Refrigeration b) kW/kg of refrigerant handled c) Kcal/m³ of chilled water d) Differential temperature across 		
9)	In the material balance of a process component will not be considered o a) Chemicals c) Recycle	n the	
10)	Conservation laws that describe even include the conservation of a) Energy c) Electric charge e) All of these are correct	ents ir b) d)	volving the elementary particles Linear and angular momentum Baryon and lepton number
11)	The support for energy management declaration of commitment. This is of a) Company policy c) Energy policy		
12)	Particles that participate in the stron a) Neutrinos c) Leptons e) Photon	ng nuc b) d)	lear interaction are called Hadrons Electrons
13)	Which one is a secondary form of e a) Furnace oil c) Electricity	nergy b) d)	? Natural gas Coal
14)	In material balance of a process, re	cycle	product is always considered as
	a) input to process	b)	output to process

- a) input to processc) both (a) and (b)
- output to process none of them b) d)

Page **5** of **12**

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No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT & MANAGEMENT

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Attempt any four

- a) Explain organization setup for energy management.
- b) Write short notes on Kyoto protocol.
- c) Discuss the constraint and challenges on supply side management.
- d) What do you mean by energy security? Explain few strategies to ensure security of our country.
- e) State the responsibilities and duties of energy manager.
- f) Explain how biomass can serve as an energy source

Q.3 Attempt any two

- a) Write a short note on solar thermal technology as an energy source.
- b) Explain the role of SCADA in utility energy management.
- c) Explain salient features of electricity act 2003.

Section – II

Q.4 Answer any four

- a) Enlist energy conservation measures in industrial grade fans and blowers.
- b) Explain step wise procedure to carry out a detail energy audit.
- c) What are the various costing techniques?
- d) Enlist energy conservation opportunities in pumping system.
- e) What is necessity of energy audit? Explain phases of energy audit.
- f) Write note on break even analysis.

Q.5 Attempt any two

- a) Explain the process of cost optimization.
- **b)** Why it is important to reduce T and D losses? Discuss various methods for reducing technical losses.
- c) Explain the following techniques with their use for energy analysis
 - 1) Sankey diagram
 - 2) CUSUM technique



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B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering					
	ENERGY AUDIT & MANAGEMENT				
	Day & Date: Saturday, 14-12-2019 Max. Marks: 70 Time: 02:30 PM To 05:30 PM				
Instr	uctio	ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer			
		Book. 2) Figures to the right indicates full marks.			
		MCQ/Objective Type Questions			
Dura	tion: 3	30 Minutes Marks: 14			
Q.1	Cho 1)	ose the correct alternatives from the options.14Particles that participate in the strong nuclear interaction are calleda) Neutrinosb) Hadronsc) Leptonsd) Electronse) Photon			
	2)	Which one is a secondary form of energy? a) Furnace oil b) Natural gas c) Electricity d) Coal			
	3) 4)	In material balance of a process, recycle product is always considered as a) input to process b) output to process c) both (a) and (b) d) none of them Non-contact speed measurements can be carried out by			
	7)	a) Tachometer b) Stroboscope c) Oscilloscope d) Speedometer			
	 5) The future value of one dollar in "n" periods at interest rate of "l" present is known as a) Single payment compound amount b) Single payment present worth c) Uniform series compound amount d) Sinking fund payment 				
	 6) Lux meter is used to measure (EA) a) Illumination level b) Sound intensity and illumination level c) Harmonics d) Speed 				
 7) In a chemical process of two reactants A (200 kg) and B (200 kg) is used as reactants. If conversion is 50% and A and B reacts in equal proportion then calculate the weight of the product formed. a) 150 kg b) 200 kg c) 250 kg d) 400 kg 					
	8)	A moderator is used to slowa) Protonb) Alpha particlesc) Neutrond) Beta particlee) Photon			

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019

Seat

No.

C

e) Photon

Page **7** of **12**





Set R

Page 8 of 12

- 9) Sankey diagram is an useful tool to represent _____.
 - a) Financial strength of the company
 - b) Management philosophy
 - c) Input and output energy flow
 - d) Human resource strength
- 10) Acid rain is caused by the release of the following components from combustion of fuels _____.
 - a) SOx and NOx

- b) Sox and CO₂
- c) CO_2 and NOx d) H_2O
- 11) The benchmarking parameter for air conditioning equipment is _____.
 - a) kW/Ton of Refrigeration
 - b) kW/kg of refrigerant handled
 - c) Kcal/ m^3 of chilled water
 - d) Differential temperature across chiller
- 12) In the material balance of a process or unit operation process, which component will not be considered on the input side?
 - a) Chemicals b) Water/air
 - c) Recycle d) By product
- 13) Conservation laws that describe events involving the elementary particles include the conservation of _____.
 - a) Energy

b) Linear and angular momentum

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Set

- d) Baryon and lepton number
- e) All of these are correct
- 14) The support for energy management is expressed in a formal written declaration of commitment. This is called _____.
 - a) Company policy
 - c) Energy policy

c) Electric charge

- b) Management policy
- d) Energy efficiency

Seat	
No.	

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT & MANAGEMENT

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Attempt any four

- a) Explain organization setup for energy management.
- b) Write short notes on Kyoto protocol.
- c) Discuss the constraint and challenges on supply side management.
- d) What do you mean by energy security? Explain few strategies to ensure security of our country.
- e) State the responsibilities and duties of energy manager.
- f) Explain how biomass can serve as an energy source

Q.3 Attempt any two

- a) Write a short note on solar thermal technology as an energy source.
- b) Explain the role of SCADA in utility energy management.
- c) Explain salient features of electricity act 2003.

Section – II

Q.4 Answer any four

- a) Enlist energy conservation measures in industrial grade fans and blowers.
- b) Explain step wise procedure to carry out a detail energy audit.
- c) What are the various costing techniques?
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Q.5 Attempt any two

- a) Explain the process of cost optimization.
- **b)** Why it is important to reduce T and D losses? Discuss various methods for reducing technical losses.
- c) Explain the following techniques with their use for energy analysis
 - 1) Sankey diagram
 - 2) CUSUM technique



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:30 PM To 05:30 PM				
i ons: 1) Q. No. 1 is compulsory and sho Book.	uld b	e solved in first 30 r	
2) Figures to the right indicates ful	l mar	ks.	
	MCQ/Objective Ty	pe C	Questions	
: 30 Mi			_	
Lux a) b) c)	the correct alternatives from th meter is used to measure Illumination level Sound intensity and illumination Harmonics Speed	(EA)		
as r thei a)	t chemical process of two reactan reactants. If conversion is 50% ar n calculate the weight of the prod 150 kg 250 kg	nd A a	and B reacts in equa rmed. 200 kg	
a) c)	noderator is used to slow Proton Neutron Photon	,	Alpha particles Beta particle	
a) b) c)	nkey diagram is an useful tool to r Financial strength of the compar Management philosophy Input and output energy flow Human resource strength	-	sent	
con	d rain is caused by the release of nbustion of fuels SOx and NOx CO ₂ and NOx	the fo b) d)	ollowing component Sox and CO ₂ H ₂ O	
The a) b) c) d)	e benchmarking parameter for air kW/Ton of Refrigeration kW/kg of refrigerant handled Kcal/m ³ of chilled water Differential temperature across o			
	he material balance of a process nponent will not be considered on Chemicals Recycle	the i		

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ENERGY AUDIT & MANAGEMENT**

Day & Date: Saturday, 14-12-2019 Time: 02:

Instruction minutes in answer

Duration:

Seat

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Q.1 Ch

- 1)
- 2) 0 kg) is used al proportion

3)

5) nts from

- 6) is ____.
- 7) s, which

SLR-FM-451



Max. Marks: 70

Marks: 14

		Set S
8)		volving the elementary particles Linear and angular momentum Baryon and lepton number
9)	The support for energy management is expected as a commitment. This is called a Company policy b)	pressed in a formal written Management policy Energy efficiency
10)	a) Neutrinos b)	ear interaction are called Hadrons Electrons
11)	a) Furnace oil b)	Natural gas Coal
12)	In material balance of a process, recycle p	roduct is always considered as
		output to process none of them
13)	a) Tachometer b)	carried out by Stroboscope Speedometer
14)	The future value of one dollar in "n" periods is known as	s at interest rate of "I" present

- a) Single payment compound amount
 b) Single payment present worth
 c) Uniform series compound amount
 d) Sinking fund payment

- SLR-FM-451
 - S

Seat	
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B.E. (Part – I) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENERGY AUDIT & MANAGEMENT

Day & Date: Saturday, 14-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Attempt any four

- a) Explain organization setup for energy management.
- b) Write short notes on Kyoto protocol.
- c) Discuss the constraint and challenges on supply side management.
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- b) Explain the role of SCADA in utility energy management.
- c) Explain salient features of electricity act 2003.

Section – II

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- a) Enlist energy conservation measures in industrial grade fans and blowers.
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- c) What are the various costing techniques?
- d) Enlist energy conservation opportunities in pumping system.
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- a) Explain the process of cost optimization.
- **b)** Why it is important to reduce T and D losses? Discuss various methods for reducing technical losses.
- c) Explain the following techniques with their use for energy analysis
 - 1) Sankey diagram
 - 2) CUSUM technique



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Seat No.					Set P
		·	Electrical Er	ngin	
					M AND HVDC TRANSMISSION
•		riday, 22-11-2 M To 05:30 Pl			Max. Marks: 70
Instrue		book.			d be solved in first 30 minutes in answer
		z) i igules to	right indicate full ma MCQ/Objective T		
Durotic	on: 30 M	inutos		ype	Marks: 14
			ationa		14 Naiks.
		ppropriate op C- TCR type ^v	var generator is ma	ide fo	
) c)	dynamic co		b)	minimizing standly losses
2	,		-	led i	nductor whose effective reactance
	is v a)	aried in a stepwise ma		b)	continuous manner
	c)	linear mann		d)	none of above
3	3) The a) b) c) d)	Line impeda Magnitude o	of sending end volta	age	nds on & receiving end voltage
4	4) Re a)		a capacitive compe) (1 – cosδ)	b)	$Q = (V^2/X)\sin(\delta/2)$
		Q = E1 E2/X			$Q = (2V^2X/X_L) (1 - \sin \delta/2)$
5		-	pensation Vsm & \		
	a) c)	Same Unity		d)	Different None of above
6	6) In I	2	lecrease the capac	itive	o/p ,the current in the reactor is
	a)	Increasing			Decreasing δ angle
_	,	Comparing	0	,	None of above
1		e area A mar argin of the sys	-	_& _	represent transient stability
	a)				$\delta_1 \& \pi/2$ None of the above
8	,				e is the method of
	a) c)	Series com a + b	pensator	,	Shunt compensator none of above
g	9) The a) c)	e minimum lo TSSC TCSC	sses produced by c	omp b) d)	ensator is very loss in GCSC SSSC

Seat No.

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- c) TCSC

10) UPFC is an example of _____.

- a) Combined series -shunt controller
- b) Combined series- series controller
- c) series controller
- d) shunt controller

11) The best location for use of a booster transformer in a transmission line

- is ____.
- a) At the sending end
- b) At the receiving end

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Set

- c) At the intermediate point d) Anywhere in the line
- 12) Passive filters acts as source of _____
 - a) Active power b) Reactive power
 - c) Apparent power d) Only (a) and (c)
- 13) The first commercially used HVDC link was built in _____.
 - a) 2006 b) 1954
 - c) 1986 d) yet to be built

14) As compared to HVAC line, the corona and radio interference on a HVDC line are _____.

- a) Lower
- c) the same

- b) More
- d) all of the above.

Set

Max. Marks: 70

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Attempt any four

- a) Give brief explanation along with necessary diagrams of the FACTS controllers.
- **b)** Explain in detail fixed capacitor thyristor controller reactor.
- c) Explain TSSC
- d) The particulars of series compensated line with TCSC are V=220V, f=60Hz, X=12 Ω , P=56 kW. The Particulars of TCSC are δ =80⁰, C=20 μ F, L=0.4mH. Find
 - i) Degree of series compensation r
 - ii) Compensating capacitive reactance Xcomp
 - iii) Line current I
 - iv) Reactive power Q
- e) Explain Need Of transmission interconnection.

Q.3 Attempt any two

- a) Explain GTO Thyristor Controlled Series Compensator.
- b) Explain objective of a shunt compensator.
- c) Explain how stability margin is increased when series compensator is used for transmission line.

Section – II

Q.4 Attempt any four

- a) Explain UPFC in detail.
- **b)** Explain types of HVDC Links.
- c) What are the modern trends in HVDC transmission?
- d) Explain IPC scheme of firing angle generation.
- e) Explain converter protection against over current in HVDC transmission.

Q.5 Attempt any two

- a) Explain the objective of Voltage and Phase angle regulator.
- b) Explain principle of basic power control of HVDC.
- c) Give brief explanation of Generalized and Multi-Functional FACTS controller.

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Seat No.			Set	Q
		B.E. (Part – II) (CGPA) Examination Nov/Dec-2019		
FL	EXI	Electrical Engineering IBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMIS	SSIO	J
			Marks	
		30 PM To 05:30 PM		
Instru	uctior	ons: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes	in ans	wer
		book. 2) Figures to right indicate full marks.		
		MCQ/Objective Type Questions		
Durat	ion: 3	30 Minutes	Marks	: 14
Q.1	Sele	ect appropriate options		14
	1)	The voltage injection in transmission line is the method of		
		 a) Series compensator b) Shunt compensator c) a + b d) none of above 		
	2)	The minimum losses produced by compensator is very loss in		
	,	a) TSSC b) GCSC		
		c) TCSC d) SSSC		
	3)	UPFC is an example of a) Combined series -shunt controller		
		b) Combined series- series controller		
		c) series controllerd) shunt controller		
	4)	The best location for use of a booster transformer in a transmission lir	ne	
	,	is	-	
		a) At the sending endb) At the receiving endc) At the intermediate pointd) Anywhere in the line		
	5)	Passive filters acts as source of		
	-,	a) Active power b) Reactive power		
		c) Apparent power d) Only (a) and (c)		
	6)	The first commercially used HVDC link was built in a) 2006 b) 1954		
		c) 1986 d) yet to be built		
	7)	As compared to HVAC line, the corona and radio interference on a HV	/DC	
		line are a) Lower		
		c) the same d) all of the above.		
	8)	TSC- TCR type var generator is made for		
		 a) dynamic compensation b) minimizing standly losses c) increasing operating flexibility d) all of the above 		
	9)	A shunt connected, thyristor controlled inductor whose effective react	ance	
	3)	is varied in a		
		a) stepwise manner b) continuous manner		
		c) linear manner d) none of above		

SLR-FM-453 Set C

- 10) The real & reactive power transfer depends on .
 - a) Line impedance
 - Magnitude of sending end voltage b)
 - Phase angle between sending end & receiving end voltage C)
 - d) All of these

11) Reactive power a capacitive compensation is a

- a) $Q = (2V^2/x) (1 \cos \delta)$
- c) $Q = E1 E2/X \sin \delta$
- b) $Q = (V^2/X) \sin(\delta/2)$ d) $Q = (2V^2X/X_L) (1 - \sin \delta/2)$
- 12) In mid-point compensation Vsm & Vmr are _
 - a) Same

- b) Different d) None of above
- In FC -TCR, to decrease the capacitive o/p ,the current in the reactor is 13) increased by _____
 - a) Increasing δ angle
- b) Decreasing δ angle
- c) Comparing δ angle
- d) None of above
- The area "A margin" between _____& ____represent transient stability 14) margin of the system.
 - a) $\delta_1 \& \delta_2$

c) Unity

c) $\delta_3 \& \delta_{crit}$

- b) $\delta_1 \& \pi/2$
- d) None of the above

Set

Max. Marks: 70

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Attempt any four

Seat No.

- a) Give brief explanation along with necessary diagrams of the FACTS controllers.
- **b)** Explain in detail fixed capacitor thyristor controller reactor.
- c) Explain TSSC
- d) The particulars of series compensated line with TCSC are V=220V, f=60Hz, X=12 Ω , P=56 kW. The Particulars of TCSC are δ =80⁰, C=20 μ F, L=0.4mH. Find
 - i) Degree of series compensation r
 - ii) Compensating capacitive reactance Xcomp
 - iii) Line current I
 - iv) Reactive power Q
- e) Explain Need Of transmission interconnection.

Q.3 Attempt any two

- a) Explain GTO Thyristor Controlled Series Compensator.
- **b)** Explain objective of a shunt compensator.
- c) Explain how stability margin is increased when series compensator is used for transmission line.

Section – II

Q.4 Attempt any four

- a) Explain UPFC in detail.
- **b)** Explain types of HVDC Links.
- c) What are the modern trends in HVDC transmission?
- d) Explain IPC scheme of firing angle generation.
- e) Explain converter protection against over current in HVDC transmission.

Q.5 Attempt any two

- a) Explain the objective of Voltage and Phase angle regulator.
- b) Explain principle of basic power control of HVDC.
- c) Give brief explanation of Generalized and Multi-Functional FACTS controller.

16

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Set

Max. Marks: 70

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Select appropriate options

- In mid-point compensation Vsm & Vmr are ____ 1)
 - a) Same c) Unity

- b) Different d) None of above
- 2) In FC -TCR, to decrease the capacitive o/p ,the current in the reactor is increased by _____.
 - a) Increasing δ angle
 - Comparing δ angle C)
- The area "A margin" between _____& ____represent transient stability 3) margin of the system.
 - a) $\delta_1 \& \delta_2$

TSSC

a)

c) $\delta_3 \& \delta_{crit}$

- b) $\delta_1 \& \pi/2$
- d) None of the above

b) Decreasing δ angle

d) None of above

d) none of above

d) yet to be built

- The voltage injection in transmission line is the method of _____ 4) b) Shunt compensator
 - Series compensator a) c)
 - a + b
- The minimum losses produced by compensator is very loss in _____. 5)
 - b) GCSC
 - c) TCSC d) SSSC
- UPFC is an example of . 6)
 - a) Combined series -shunt controller
 - Combined series- series controller b)
 - C) series controller
 - d) shunt controller

The best location for use of a booster transformer in a transmission line 7) is ____.

- a) At the sending end b) At the receiving end
- c) At the intermediate point d) Anywhere in the line
- Passive filters acts as source of ____ 8)
 - a) Active power b) Reactive power
 - c) Apparent power d) Only (a) and (c)
- The first commercially used HVDC link was built in . 9) b) 1954
 - 2006 a)
 - c) 1986

Marks: 14

Set R

- As compared to HVAC line, the corona and radio interference on a HVDC line are _____.
- a) Lower

10)

12)

- b) More
- c) the same
- d) all of the above.
- 11) TSC- TCR type var generator is made for____
 - a) dynamic compensation b) minimizing standly losses
 - increasing operating flexibility d) all of the above C)
 - A shunt connected, thyristor controlled inductor whose effective reactance
 - is varied in a _____.
 - a) stepwise manner
- b) continuous manner
- c) linear manner d) none of above
- 13) The real & reactive power transfer depends on _____.
 - a) Line impedance
 - Magnitude of sending end voltage b)
 - c) Phase angle between sending end & receiving end voltage
 - d) All of these
- 14) Reactive power a capacitive compensation is a

- a) $Q = (2V^2/x) (1 \cos \delta)$ c) $Q = E1 E2/X \sin \delta$ b) $Q = (V^2/X) \sin (\delta/2)$ d) $Q = (2V^2X/X_L) (1 \sin \delta/2)$

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Set | F

Max. Marks: 70

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Attempt any four

Seat

No.

- a) Give brief explanation along with necessary diagrams of the FACTS controllers.
- **b)** Explain in detail fixed capacitor thyristor controller reactor.
- c) Explain TSSC
- d) The particulars of series compensated line with TCSC are V=220V, f=60Hz, X=12 Ω , P=56 kW. The Particulars of TCSC are δ =80⁰, C=20 μ F, L=0.4mH. Find
 - i) Degree of series compensation r
 - ii) Compensating capacitive reactance Xcomp
 - iii) Line current I
 - iv) Reactive power Q
- e) Explain Need Of transmission interconnection.

Q.3 Attempt any two

- a) Explain GTO Thyristor Controlled Series Compensator.
- **b)** Explain objective of a shunt compensator.
- c) Explain how stability margin is increased when series compensator is used for transmission line.

Section – II

Q.4 Attempt any four

- a) Explain UPFC in detail.
- **b)** Explain types of HVDC Links.
- c) What are the modern trends in HVDC transmission?
- **d)** Explain IPC scheme of firing angle generation.
- e) Explain converter protection against over current in HVDC transmission.

Q.5 Attempt any two

- a) Explain the objective of Voltage and Phase angle regulator.
- b) Explain principle of basic power control of HVDC.
- c) Give brief explanation of Generalized and Multi-Functional FACTS controller.

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16

12

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1

Marks: 14

Select appropriate options

- 1) UPFC is an example of _____
 - a) Combined series -shunt controller
 - b) Combined series- series controller
 - c) series controller
 - d) shunt controller
- 2) The best location for use of a booster transformer in a transmission line is .
 - a) At the sending end
 - c) At the intermediate point
- b) At the receiving end
- d) Anywhere in the line

b) Reactive power

- 3) Passive filters acts as source of _____
 - a) Active power
 - c) Apparent power d) Only (a) and (c)
- 4) The first commercially used HVDC link was built in _____.
 - a) 2006 b) 1954
 - c) 1986 d) yet to be built
- 5) As compared to HVAC line, the corona and radio interference on a HVDC line are _____.
 - a) Lower b) More
 - c) the same d) all of the above.
- 6) TSC- TCR type var generator is made for_____
 - a) dynamic compensation b) minimizing standly losses
 - c) increasing operating flexibility d) all of the above
- A shunt connected, thyristor controlled inductor whose effective reactance is varied in a _____.
 - a) stepwise manner b) continuous manner
 - c) linear manner d) none of above
- 8) The real & reactive power transfer depends on _____.
 - a) Line impedance
 - b) Magnitude of sending end voltage
 - c) Phase angle between sending end & receiving end voltage
 - d) All of these

L

Max. Marks: 70

- Set S
- 9) Reactive power a capacitive compensation is a _____.
 - a) $Q = (2V^2/x) (1 \cos \delta)$
- b) $Q = (V^2/X) \sin(\delta/2)$
- c) $Q = E1 E2/X \sin \delta$
- d) $Q = (2V^2 X/X_L) (1 \sin \delta/2)$
- 10) In mid-point compensation Vsm & Vmr are _____.
 - a) Same b) Different
 - c) Unity d) None of above
- 11) In FC -TCR, to decrease the capacitive o/p ,the current in the reactor is increased by _____.
 - a) Increasing δ angle
 - b) Decreasing δ angle
 - c) Comparing δ angle d) None of above
- 12) The area "A margin" between _____& ____represent transient stability margin of the system.
 - a) $\delta_1 \& \delta_2$
 - b) $\delta_1 \& \pi/2$ d) None of the above
- 13) The voltage injection in transmission line is the method of _____.
 - a) Series compensator b) Shunt compensator
 - c) a+b
- d) none of above
- 14) The minimum losses produced by compensator is very loss in _____.
 - a) TSSC

C)

TCSC

c) $\delta_3 \& \delta_{crit}$

- b) GCSC
- d) SSSC

Page **12** of **12**

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Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Attempt any four

- a) Give brief explanation along with necessary diagrams of the FACTS controllers.
- **b)** Explain in detail fixed capacitor thyristor controller reactor.
- c) Explain TSSC
- d) The particulars of series compensated line with TCSC are V=220V, f=60Hz, X=12 Ω , P=56 kW. The Particulars of TCSC are δ =80⁰, C=20 μ F, L=0.4mH. Find
 - i) Degree of series compensation r
 - ii) Compensating capacitive reactance Xcomp
 - iii) Line current I
 - iv) Reactive power Q
- e) Explain Need Of transmission interconnection.

Q.3 Attempt any two

- a) Explain GTO Thyristor Controlled Series Compensator.
- b) Explain objective of a shunt compensator.
- c) Explain how stability margin is increased when series compensator is used for transmission line.

Section – II

Q.4 Attempt any four

- a) Explain UPFC in detail.
- **b)** Explain types of HVDC Links.
- c) What are the modern trends in HVDC transmission?
- d) Explain IPC scheme of firing angle generation.
- e) Explain converter protection against over current in HVDC transmission.

Q.5 Attempt any two

- a) Explain the objective of Voltage and Phase angle regulator.
- **b)** Explain principle of basic power control of HVDC.
- c) Give brief explanation of Generalized and Multi-Functional FACTS controller.

16

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16

Set S

Max. Marks: 70

		B.E. (Part – II) (CGPA) Examina Electrical Engine	
	EL	ECTRICAL INSTALLATION, TESTI	
	& Date	e: Saturday, 23-11-2019 0 PM To 05:30 PM	Max. Marks: 70
Instr	uctio	ns: 1) Q. No. 1 is compulsory and should b Book.	e solved in first 30 minutes in answer
		2) Assume suitable data if necessary a3) Figures to the right indicate full mark	
		MCQ/Objective Type (Questions
Durat	tion: 3	30 Minutes	Marks: 14
Q.1		ose the correct alternatives from the opt rence.	tions and rewrite the 14
	1)	, , , , , , , , , , , , , , , , , , , ,	safety precautions as per IS 5216-1964 IS 5216-1969
	2)	The torque of induction motor isa) Directly proportional to Vb)c) Inversiy proportional to Vd)	Directly proportional to V^2 Inversly proportional to V^2
	3)	While conducting momentary overload test duration of excess load 50 H.P. motor is _ a) 2 sec b) c) 8 sec d)	
	4)	In moisture proofness test, humidity is ma a) 70% b) c) 90% d)	
	5)	In dielectric absorption test by using mege measured at regular interval of and a) 24 hour b) c) 30 min d)	-
	6)	For class A insulating material, maximum a) 60°C b) c) 95°C d)	operating temperature is 90°C 105°C
	7)	Polarization index is greater than for a) 1 b)c) 2 d)	or class A insulation. 1.5 2.5
	8)	The impulse test level is determined by operating value. a) 1 to 2 b) c) 4 to 5 d)	perating level is times 2 to 2.5 7 to 9

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019

No.

Seat

SLR-FM-454

Set P

9) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is ____. a) 100kv 150kv b) c) 220kv d) 325kv 10) Which of the following factors affects on life of insulating material? Temperature b) Deposition of dust a) c) Impurities d) All of these In lead acid battery positive plate (anode) made up of _____. 11) Pb a) PbO_2 b) c) SO_2 d) PbO₃ 12) The type of ELCB are _____. a) Voltage operated b) Current operated c) Both a and b d) Frequency operated 13) level is to be carried out then, we use **Dial indicator** a) Spirit level b) c) Bearing puller d) Filler gauge 14) For rotating machinery, the concrete foundation should be about _____ larger in length and breadth. a) 5 cms

c) 25 cms

- 15 cms
- d) None of these
- While installing electrical machines, checking of foundation for correct
 - b)

Page 2 of 16

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Set P

Max. Marks: 56

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Classify methods of providing artificial respiration. Explain any one in detail.
- **b)** Define the following terms in connection with safety:
 - 1) Responsibility
 - 2) Authority
 - 3) Accountability
 - 4) Monitoring
- c) What are the factors affecting on preventive maintenance schedule? Explain in short.
- d) A brake test was carried out on shunt motor & following the observations for one reading.

Voltage	Current	Speed (rpm)	Spring E	Balance
Voltage	Current	Opeed (ipiii)	W ₁ (kg)	W ₂ (kg)
250V	2A	1500	3	0.2

The radius of break pulley = 7.5 cm. Calculate

- 1) Input
- 2) Torque
- 3) Output
- 4) Efficiency
- e) Explain with neat sketch & resistance equation measurement of DC resistance of three phase induction motor.
- f) Explain with neat sketch open delta method in case of transformer.

Q.3 Attempt any two.

- a) A D.C. machine is tested for Swinburne's test. The machine is rated for 230V, 50A. The observations during test were as follows. No load current = 5A
 Armeture registeres = 10
 - Armature resistance = 1Ω
 - Shunt field resistance = 200Ω

Find full load efficiency, if the machine was tasted as D.C. motor.

- **b)** Classify methods of measurement of slip in case of three phase induction motor. Explain any two methods in detail.
- c) Explain with neat sketch any two methods of temperature rise test in case of transformer.

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Section – II

Q.4 Attempt any four.

- a) State the factors affecting life of insulating material. Explain in brief.
- **b)** State and explain properties of good transformer oil.
- c) Explain with neat sketch Filler gauge.
- d) Write a short note on internal and external causes of failure of equipment.
- e) Discuss in short factors involved in designing machine foundation.
- f) What are the effects of misalignment in case of directly coupled drives and indirectly coupled drives?

Q.5 Attempt any two.

- a) Explain any two methods of measuring temperature of internal parts of windings / machines and apply the correction factor when the machine is hot.
- **b)** 1) Write a short note on general maintenance of lead acid batteries.
 - 2) Explain with neat sketch Dial test indicator.
- c) Discuss in detail electrical fault and mechanical fault on the basis of reasons for development of faults and remedial measures.

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SLR-FM-454 Set P

		Electrical En		
	FI	ECTRICAL INSTALLATION, T	-	-
Dov		e: Saturday, 23-11-2019	LOII	Max. Marks: 70
		0 PM To 05:30 PM		Max. Marks. 70
Instr	uctio	ns: 1) Q. No. 1 is compulsory and she Book.	ould b	be solved in first 30 minutes in answer
		2) Assume suitable data if neces	sarv a	nd mention it clearly.
		3) Figures to the right indicate ful		
		MCQ/Objective T	ype (Questions
Dura	tion: 3	30 Minutes		Marks: 14
Q.1		ose the correct alternatives from the ence.	ne op	tions and rewrite the 14
	1)	The impulse test level is determined normal operating value.	l by o	perating level is times
		a) 1 to 2	b)	2 to 2.5
		c) 4 to 5	d)	7 to 9
	2)	As per I.E.C. for 66 kv system voltagis	ge, th	e impulse withstand voltage
		a) 100kv	b)	150kv
		c) 220kv	d)	325kv
	3)	Which of the following factors affect		•
		a) Temperature c) Impurities	b) d)	Deposition of dust All of these
		, i	,	
	4)	In lead acid battery positive plate (a a) PbO ₂	node) b)	Pb
		c) SO_2	d)	PbO ₃
	5)	The type of ELCB are		
	,	a) Voltage operated	b)	Current operated
		c) Both a and b	d)	Frequency operated
	6)	While installing electrical machines, level is to be carried out then, we us		king of foundation for correct
		a) Spirit level	b)	Dial indicator
		c) Bearing puller	d)	Filler gauge
	7)	For rotating machinery, the concrete larger in length and breadth.	e foun	dation should be about
		a) 5 cms	b)	15 cms
		c) 25 cms	d)	None of these
	8)	Do's and Don'ts are observed caref	•	
		a) IS 5216-1962 c) IS 5216-1966	b) d)	IS 5216-1964 IS 5216-1969
		o, 10 0210 1000	α)	

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019

Set Q

				Set	Q	
9)	The torque of induction motor is a) Directly proportional to V c) Inversly proportional to V	 b) d)	Directly proportional to V^2 Inversly proportional to V^2			
10)	•	r is _ b)	·			
11)		b)	ntained to 80% 110%			
12)	,	_and b)				
13)	,	b)	operating temperature is _ 90°C 105°C			
14)	Polarization index is greater than					

a) 1 b) 1.5 c) 2 d) 2.5 SLR-FM-454

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Classify methods of providing artificial respiration. Explain any one in detail.
- **b)** Define the following terms in connection with safety:
 - 1) Responsibility
 - 2) Authority
 - 3) Accountability
 - 4) Monitoring
- c) What are the factors affecting on preventive maintenance schedule? Explain in short.
- d) A brake test was carried out on shunt motor & following the observations for one reading.

Voltage	Current	Speed (rpm)	Spring E	Balance
Voltage	Current	Speed (ipili)	W ₁ (kg)	W ₂ (kg)
250V	2A	1500	3	0.2

The radius of break pulley = 7.5 cm. Calculate

- 1) Input
- 2) Torque
- 3) Output
- 4) Efficiency
- e) Explain with neat sketch & resistance equation measurement of DC resistance of three phase induction motor.
- f) Explain with neat sketch open delta method in case of transformer.

Q.3 Attempt any two.

- A D.C. machine is tested for Swinburne's test. The machine is rated for 230V, 50A. The observations during test were as follows. No load current = 5A Armature resistance = 1Ω
 - Shunt field resistance = 1Ω

Find full load efficiency, if the machine was tasted as D.C. motor.

- **b)** Classify methods of measurement of slip in case of three phase induction motor. Explain any two methods in detail.
- c) Explain with neat sketch any two methods of temperature rise test in case of transformer.

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Max. Marks: 56

Section – II

Q.4 Attempt any four.

- a) State the factors affecting life of insulating material. Explain in brief.
- **b)** State and explain properties of good transformer oil.
- c) Explain with neat sketch Filler gauge.
- d) Write a short note on internal and external causes of failure of equipment.
- e) Discuss in short factors involved in designing machine foundation.
- f) What are the effects of misalignment in case of directly coupled drives and indirectly coupled drives?

Q.5 Attempt any two.

- a) Explain any two methods of measuring temperature of internal parts of windings / machines and apply the correction factor when the machine is hot.
- **b)** 1) Write a short note on general maintenance of lead acid batteries.
 - 2) Explain with neat sketch Dial test indicator.
- c) Discuss in detail electrical fault and mechanical fault on the basis of reasons for development of faults and remedial measures.

16

12

SLR-FM-454 Set Q

attery positive plate (ar	node)	made up of
	b)	Pb
	d)	PbO ₃
LCB are		
perated	b)	Current operated
nd b	d)	Frequency operated

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

ELECTRICAL INSTALLATION. TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. In dielectric absorption test by using megger, insulation resistance is 1) measured at regular interval of and recorded.
 - a) 24 hour b) 12 hour
 - c) 30 min d) 5 min

2) For class A insulating material, maximum operating temperature is _____.

- a) 60°C 90°C b) c) 95°C 105°C d)
- Polarization index is greater than _ 3) for class A insulation.
 - b) 1.5 1 a) c) 2 2.5 d)
- 4) The impulse test level is determined by operating level is _____ times normal operating value.

a)	1 to 2	-	b)	2 to 2.5
C)	4 to 5		d)	7 to 9

- 5) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
 - 100kv b) 150kv a) c) 220kv d) 325kv

6) Which of the following factors affects on life of insulating material?

- a) Temperature Deposition of dust b) c) Impurities d) All of these
- lata (anada) In lead acid battery 7)
 - a) PbO_2
 - c) SO_2
- The type of EL 8)
 - a) Voltage or c) Both a and

Marks: 14

14

SLR-FM-454

Max. Marks: 70

			SLR-FM-454
			Set R
9)	While installing electrical machines, level is to be carried out then, we us a) Spirit level c) Bearing puller	se b)	•
10)	For rotating machinery, the concrete larger in length and breadth. a) 5 cms c) 25 cms		dation should be about 15 cms None of these
11)	Do's and Don'ts are observed caref a) IS 5216-1962 c) IS 5216-1966	b)	safety precautions as per IS 5216-1964 IS 5216-1969
12)	The torque of induction motor is a) Directly proportional to V c) Inversly proportional to V	b)	Directly proportional to V^2 Inversly proportional to V^2
13)	While conducting momentary overlo duration of excess load 50 H.P. mot a) 2 sec c) 8 sec		
14)	In moisture proofness test, humidity a) 70% c) 90%	is ma b) d)	aintained to 80% 110%

12

SLR-FM-454

Max. Marks: 56

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Classify methods of providing artificial respiration. Explain any one in detail.
- **b)** Define the following terms in connection with safety:
 - 1) Responsibility
 - 2) Authority
 - 3) Accountability
 - 4) Monitoring
- c) What are the factors affecting on preventive maintenance schedule? Explain in short.
- d) A brake test was carried out on shunt motor & following the observations for one reading.

Voltage	Current	Speed (rpm)	Spring E	Balance
voltage	Current	Speed (ipili)	W ₁ (kg)	W ₂ (kg)
250V	2A	1500	3	0.2

The radius of break pulley = 7.5 cm. Calculate

- 1) Input
- 2) Torque
- 3) Output
- 4) Efficiency
- e) Explain with neat sketch & resistance equation measurement of DC resistance of three phase induction motor.
- f) Explain with neat sketch open delta method in case of transformer.

Q.3 Attempt any two.

- a) A D.C. machine is tested for Swinburne's test. The machine is rated for 230V, 50A. The observations during test were as follows. No load current = 5A Armature resistance = 1Ω
 - Armature resistance = 1Ω
 - Shunt field resistance = 200Ω

Find full load efficiency, if the machine was tasted as D.C. motor.

- b) Classify methods of measurement of slip in case of three phase induction motor. Explain any two methods in detail.
- c) Explain with neat sketch any two methods of temperature rise test in case of transformer.

Section – II

Q.4 Attempt any four.

- a) State the factors affecting life of insulating material. Explain in brief.
- **b)** State and explain properties of good transformer oil.
- c) Explain with neat sketch Filler gauge.
- d) Write a short note on internal and external causes of failure of equipment.
- e) Discuss in short factors involved in designing machine foundation.
- f) What are the effects of misalignment in case of directly coupled drives and indirectly coupled drives?

Q.5 Attempt any two.

- a) Explain any two methods of measuring temperature of internal parts of windings / machines and apply the correction factor when the machine is hot.
- **b)** 1) Write a short note on general maintenance of lead acid batteries.
 - 2) Explain with neat sketch Dial test indicator.
- c) Discuss in detail electrical fault and mechanical fault on the basis of reasons for development of faults and remedial measures.

16

12

SLR-FM-454

Set R

		I	B.E. (Part – II) (CGPA)						
Electrical Engineering ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE									
Dov									
Day & Date: Saturday, 23-11-2019 Max Time: 02:30 PM To 05:30 PM Max									
Instr	uctior	is: 1) Q. No. 1 is compulsory an Book.	d should b	e solved in first 30 minu	tes in answer			
	2) Assume suitable data if necessary and mention it clearly.3) Figures to the right indicate full marks.								
Dura	tion: 3	0 Mi	MCQ/Objectiv	е Туре С	Questions	Marks: 14			
Q.1	sente		the correct alternatives fro	om the opt	cions and rewrite the	14			
	1)		ich of the following factors a Temperature	lffects on li b)	fe of insulating material' Deposition of dust	?			
		c)	Impurities	d)	All of these				
	2)		ead acid battery positive pla	· · /	-				
			PbO ₂ SO ₂	b) d)	Pb PbO ₃				
	3)		e type of ELCB are						
		a) c)	Voltage operated Both a and b	b) d)	Current operated Frequency operated				
	4)		ile installing electrical machiel is to be carried out then, v			rrect			
		a)	Spirit level	b)	Dial indicator				
	_)	,	Bearing puller	d)	Filler gauge				
	5)		rotating machinery, the con Jer in length and breadth.	crete foun	dation should be about _				
		a)	5 cms	b)	15 cms				
		c)	25 cms	d)	None of these				
	6)		s and Don'ts are observed o IS 5216-1962	carefully in b)	safety precautions as poly IS 5216-1964	er			
		a) c)	IS 5216-1966	d)	IS 5216-1969				
	7) The torque of induction motor is								
		a)	Directly proportional to V	b) d)	Directly proportional to	-			
	c) Inversiy proportional to V d) Inversiy proportional to V^2								
	8)		ile conducting momentary o ation of excess load 50 H.P.		. on induction motor, the	e			
		a)	2 sec	b)	5 sec				
		C)	8 sec	d)	9.5 sec				

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019

No.

Seat

SLR-FM-454

Set S

9)	In moisture proofness test, humidity a) 70% c) 90%	b)	iintained to 80% 110%
10)	In dielectric absorption test by using measured at regular interval of a) 24 hour c) 30 min	_ and b)	
11)	For class A insulating material, maxi	mum	operating temperature is
,	a) 60°C		90°C
	c) 95°C	d)	105°C
12)	Polarization index is greater than	f	or class A insulation.
,	a) 1		1.5
	c) 2	d)	2.5
13)	The impulse test level is determined normal operating value.	by o	perating level is times
	a) 1 to 2	b)	2 to 2.5
	c) 4 to 5	d)	7 to 9
14)	As per I.E.C. for 66 kv system voltag is	je, the	e impulse withstand voltage

a) 100kv b) 150kv c) 220kv d) 325kv SLR-FM-454

Set S

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Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Classify methods of providing artificial respiration. Explain any one in detail.
- **b)** Define the following terms in connection with safety:
 - 1) Responsibility
 - 2) Authority
 - 3) Accountability
 - 4) Monitoring
- c) What are the factors affecting on preventive maintenance schedule? Explain in short.
- d) A brake test was carried out on shunt motor & following the observations for one reading.

Voltage	Current	Speed (rpm) -	Spring E	Balance
Voltage	Current	Opeed (ipiii)	W ₁ (kg)	W ₂ (kg)
250V	2A	1500	3	0.2

The radius of break pulley = 7.5 cm. Calculate

- 1) Input
- 2) Torque
- 3) Output
- 4) Efficiency
- e) Explain with neat sketch & resistance equation measurement of DC resistance of three phase induction motor.
- f) Explain with neat sketch open delta method in case of transformer.

Q.3 Attempt any two.

- a) A D.C. machine is tested for Swinburne's test. The machine is rated for 230V, 50A. The observations during test were as follows. No load current = 5A Armature resistance = 1Ω
 - Armature resistance = 1Ω
 - Shunt field resistance = 200Ω

Find full load efficiency, if the machine was tasted as D.C. motor.

- **b)** Classify methods of measurement of slip in case of three phase induction motor. Explain any two methods in detail.
- c) Explain with neat sketch any two methods of temperature rise test in case of transformer.

12



Section – II

Q.4 Attempt any four.

- a) State the factors affecting life of insulating material. Explain in brief.
- **b)** State and explain properties of good transformer oil.
- c) Explain with neat sketch Filler gauge.
- d) Write a short note on internal and external causes of failure of equipment.
- e) Discuss in short factors involved in designing machine foundation.
- f) What are the effects of misalignment in case of directly coupled drives and indirectly coupled drives?

Q.5 Attempt any two.

- a) Explain any two methods of measuring temperature of internal parts of windings / machines and apply the correction factor when the machine is hot.
- **b)** 1) Write a short note on general maintenance of lead acid batteries.
 - 2) Explain with neat sketch Dial test indicator.
- c) Discuss in detail electrical fault and mechanical fault on the basis of reasons for development of faults and remedial measures.

16

12

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Set

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019

Electrical Engineering

POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - 1) Which among the following factors influence the cost of generation of electric power?
 - Generator efficiency a)
 - C) Transmission losses d) All of these
 - 2) The most efficient unit is loaded first then the less efficient unit follow, is called
 - Priority ordering a)
 - Patton's Security C)
 - 3) For economic operation, the generator with highest positive incremental transmission loss will operate at
 - The lowest positive incremental cost of production a)
 - The lowest negative incremental cost of production b)
 - The highest positive incremental cost of production C)
 - None of the above d)
 - 4) The rate of drop is frequency control inlet valve due to an increase in generation of power on prime mover is called _
 - Speed regulation a)
 - b) Speed efficiency Governer operation d) None of these c)
 - How is the voltage and frequency controlled in automatic generation 5) control?
 - By controlling the excitation a)
 - By controlling the turbine action b)
 - Turbine speed control for voltage and excitation control for frequency c)
 - Excitation control for voltage and turbine speed control for voltage d)
 - 6) In dynamic programming method the cost function $F_N(X)$ represents .
 - Minimum Cost in Rs/hr of N MW by X number of unit a)
 - Minimum Cost in Rs/hr of X MW by N number of unit b)
 - Minimum Cost in Rs/hr of N MW by Xth unit c)
 - Minimum Cost in Rs/hr of X MW by Nth unit d)

Set

Max. Marks: 70

Marks: 14





- b) Fuel cost
- - b) Dynamic Programming
 - d) None of these

Page 2 of 16

- 7) What is the result of frequency instability?
 - a) Voltage collapse
 - c) Tripping of generating units
- 8) The real power transfer over a line depends mainly on _____
 - a) Power angle
 - c) Receiving end voltage V_r
- d) V_s V_r

b) Frequency swings

b) Sending end voltage V_s

d) Both (b) and (c)

- 9) What is the main cause of voltage instability?
 - a) Generatorsc) Load

- b) Transformersd) Line losses
- 10) Why are the series capacitors used?
 - a) Improve the voltage
 - b) Reduce the fault level
 - c) Compensate for line inductive reactance and improve the stability of the power system
 - d) Improves the power factor
- 11) Contingency definition gives list of components outages
 - a) Which includes the contingencies with high probability of occurance
 - b) Which provide the contingency in decreasing order of severity
 - c) For outage simulation
 - d) Any of the above
- 12) What is power angle equation of synchronous machines?
 - a) An equation between electrical power generated to the angular displacement of the rotor
 - b) An equation between mechanical power generated to the angular displacement of the rotor
 - c) An equation between electrical power generated to the angular displacement of stator windings
 - d) An equation between mechanical power generated to the angular displacement of stator windings
- 13) If a power system observes an accumulated time error, it should correct it by _____.
 - a) Increasing its own generation
 - b) Decreasing its own generation
 - c) Coordinating time error correction with other interconnected systems
 - d) Any of the above
- 14) Which among these phenomenon is / are associated with angle stability?
 - a) Imbalance between the two generator torque
 - b) Stability or synchronism is lost
 - c) Surplus energy is stored up in the rotating masses
 - d) All of these

SLR-FM-455

Set P

Determine the economic operating schedule and corresponding cost of generation if the maximum & minimum loading on each unit is 100MW & 25MW. The shared by both units demand is 180MW and transmission losses neglected. If load is equally shared by both units, determine saving obtained by loading the units as per equal incremental production cost.

c) Explain with illustrative transfer function of the load frequency control of single area system. Draw the block diagram for single area system.

Section – II

Q.4 Solve any four:

- Explain the different methods of improving voltage stability. a)
- b) Explain specifications of load compensator.
- c) Explain the difference between voltage angle and voltage stability.
- d) Explain the necessity of reactive power compensation.
- Explain system state classification with neat diagram. e)

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Solve any four:

Seat No.

- a) Explain the different thermal unit constrains.
- **b)** Explain with a mathematical formulation, optimum generation allocation including transmission losses and penalty factor.
- c) A system consist of two plants connected by tie line and load is located at Plant 2. When 125 MW is transmitted from plant 1 a loss of 12.5 MW takes place on tie line. Determine the generation schedule of both plants and power received by load when λ for system is Rs 70 per Megawatt hour and incremental fuel costs are given by equations

$$\frac{\mathrm{dF1}}{\mathrm{dP1}} = 0.25\mathrm{P}_1 + 40\mathrm{Rs}/\mathrm{MWhr}$$

 $\frac{dF2}{dP2} = 0.20P_2 + 50Rs/MWhr$

- d) What is mean by unit commitment? Explain the necessity of it.
- e) Explain speed governing system with neat sketch.

Q.3 Solve any two:

- a) What are methods of unit commitment? With a suitable example explain the priority list method of unit commitment.
- b) The fuel input per hour of plant 1& plant 2 are given as follows F₁=0.2P₁²+40P₁+120 Rs/hr F₂=0.25P₂²+30P₂+150 Rs/hr

16

Max. Marks: 56

16

Set P

12

Q.5 Solve any two

- a) Write the advantages and dis-advantages of different types of compensating equipment for transmission system.
- **b)** Explain the necessity of power system security.
- c) Explain effective counter measures to prevent voltage instability & methods of improving voltage stability.

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The real power transfer over a line depends mainly on a)
 - Power angle b) Sending end voltage V_s d) $V_s - V_r$
 - Receiving end voltage V_r C)
- 2) What is the main cause of voltage instability?
 - Generators a) Load
 - b) Transformers d) Line losses
- 3) Why are the series capacitors used?
 - Improve the voltage a)
 - Reduce the fault level b)
 - Compensate for line inductive reactance and improve the stability of C) the power system
 - Improves the power factor d)
- 4) Contingency definition gives list of components outages
 - Which includes the contingencies with high probability of occurance a)
 - b) Which provide the contingency in decreasing order of severity
 - For outage simulation C)
 - Any of the above d)
- What is power angle equation of synchronous machines? 5)
 - An equation between electrical power generated to the angular a) displacement of the rotor
 - An equation between mechanical power generated to the angular b) displacement of the rotor
 - An equation between electrical power generated to the angular c) displacement of stator windings
 - An equation between mechanical power generated to the angular d) displacement of stator windings
- If a power system observes an accumulated time error, it should correct it 6) by
 - Increasing its own generation a)
 - Decreasing its own generation b)
 - Coordinating time error correction with other interconnected systems C)
 - Any of the above d)

SLR-FM-455



Max. Marks: 70

Marks: 14

- 7) Which among these phenomenon is/are associated with angle stability?
 - a) Imbalance between the two generator torque
 - b) Stability or synchronism is lost
 - c) Surplus energy is stored up in the rotating masses
 - d) All of these

C)

- 8) Which among the following factors influence the cost of generation of electric power?
 - a) Generator efficiency b) Fuel cost
 - Transmission losses d) All of these
- 9) The most efficient unit is loaded first then the less efficient unit follow, is called _____.
 - a) Priority ordering

b) Dynamic Programming

SLR-FM-455

Set

- c) Patton's Security
- d) None of these
- 10) For economic operation, the generator with highest positive incremental transmission loss will operate at _____.
 - a) The lowest positive incremental cost of production
 - b) The lowest negative incremental cost of production
 - c) The highest positive incremental cost of production
 - d) None of the above
- 11) The rate of drop is frequency control inlet valve due to an increase in generation of power on prime mover is called _____.
 - a) Speed regulation
- b) Speed efficiency
- c) Governer operation
- d) None of these
- 12) How is the voltage and frequency controlled in automatic generation control?
 - a) By controlling the excitation
 - b) By controlling the turbine action
 - c) Turbine speed control for voltage and excitation control for frequency
 - d) Excitation control for voltage and turbine speed control for voltage
- 13) In dynamic programming method the cost function $F_N(X)$ represents _____.
 - a) Minimum Cost in Rs/hr of N MW by X number of unit
 - b) Minimum Cost in Rs/hr of X MW by N number of unit
 - c) Minimum Cost in Rs/hr of N MW by Xth unit
 - d) Minimum Cost in Rs/hr of X MW by Nth unit
- 14) What is the result of frequency instability?
 - a) Voltage collapse

- b) Frequency swings
- c) Tripping of generating units
- d) Both (b) and (c)

Seat No.

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Solve any four:

- a) Explain the different thermal unit constrains.
- b) Explain with a mathematical formulation, optimum generation allocation including transmission losses and penalty factor.
- c) A system consist of two plants connected by tie line and load is located at Plant 2. When 125 MW is transmitted from plant 1 a loss of 12.5 MW takes place on tie line. Determine the generation schedule of both plants and power received by load when λ for system is Rs 70 per Megawatt hour and incremental fuel costs are given by equations

 $\frac{\mathrm{dF1}}{\mathrm{dP1}} = 0.25\mathrm{P}_1 + 40\mathrm{Rs}/\mathrm{MWhr}$

 $\frac{\mathrm{dF2}}{\mathrm{dP2}} = 0.20\mathrm{P}_2 + 50\mathrm{Rs/MWhr}$

- d) What is mean by unit commitment? Explain the necessity of it.
- e) Explain speed governing system with neat sketch.

Q.3 Solve any two:

- a) What are methods of unit commitment? With a suitable example explain the priority list method of unit commitment.
- b) The fuel input per hour of plant 1& plant 2 are given as follows $F_1=0.2P_1^2+40P_1+120$ Rs/hr $F_2=0.25P_2^2+30P_2+150$ Rs/hr

Determine the economic operating schedule and corresponding cost of generation if the maximum & minimum loading on each unit is 100MW & 25MW. The shared by both units demand is 180MW and transmission losses neglected. If load is equally shared by both units, determine saving obtained by loading the units as per equal incremental production cost.

c) Explain with illustrative transfer function of the load frequency control of single area system. Draw the block diagram for single area system.

Section – II

Q.4 Solve any four:

- a) Explain the different methods of improving voltage stability.
- b) Explain specifications of load compensator.
- c) Explain the difference between voltage angle and voltage stability.
- d) Explain the necessity of reactive power compensation.
- e) Explain system state classification with neat diagram.

Max. Marks: 56

16

16



Set Q

12

Q.5 Solve any two

- a) Write the advantages and dis-advantages of different types of compensating equipment for transmission system.
- **b)** Explain the necessity of power system security.
- c) Explain effective counter measures to prevent voltage instability & methods of improving voltage stability.

Seat No.

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) How is the voltage and frequency controlled in automatic generation control?
 - By controlling the excitation a)
 - b) By controlling the turbine action
 - Turbine speed control for voltage and excitation control for frequency c)
 - Excitation control for voltage and turbine speed control for voltage d)

In dynamic programming method the cost function $F_N(X)$ represents _____. 2)

- Minimum Cost in Rs/hr of N MW by X number of unit a)
- Minimum Cost in Rs/hr of X MW by N number of unit b)
- Minimum Cost in Rs/hr of N MW by Xth unit c)
- Minimum Cost in Rs/hr of X MW by Nth unit d)
- What is the result of frequency instability? 3) b) Frequency swings
 - Voltage collapse a)
 - Tripping of generating units
 - The real power transfer over a line depends mainly on _
 - a) Power angle

C)

c)

4)

Sending end voltage V_s b) d) $V_s - V_r$

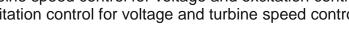
b)

What is the main cause of voltage instability? 5)

Receiving end voltage V_r

- a) Generators
- Load d) Line losses C)
- 6) Why are the series capacitors used?
 - Improve the voltage a)
 - Reduce the fault level b)
 - Compensate for line inductive reactance and improve the stability of C) the power system
 - Improves the power factor d)
- Contingency definition gives list of components outages 7)
 - Which includes the contingencies with high probability of occurance a)
 - Which provide the contingency in decreasing order of severity b)
 - For outage simulation C)
 - Any of the above d)





Set

Max. Marks: 70



d) Both (b) and (c)

Transformers

- 8) What is power angle equation of synchronous machines?
 - An equation between electrical power generated to the angular a) displacement of the rotor
 - b) An equation between mechanical power generated to the angular displacement of the rotor
 - An equation between electrical power generated to the angular c) displacement of stator windings
 - d) An equation between mechanical power generated to the angular displacement of stator windings
- 9) If a power system observes an accumulated time error, it should correct it by _
 - Increasing its own generation a)
 - b) Decreasing its own generation
 - Coordinating time error correction with other interconnected systems c)
 - Any of the above d)
- 10) Which among these phenomenon is/are associated with angle stability?
 - Imbalance between the two generator torgue a)
 - b) Stability or synchronism is lost
 - C) Surplus energy is stored up in the rotating masses
 - All of these d)
- 11) Which among the following factors influence the cost of generation of electric power?
 - Generator efficiency a)
- b) Fuel cost
- Transmission losses C)
- d) All of these
- 12) The most efficient unit is loaded first then the less efficient unit follow, is called
 - a) Priority ordering

b) Dynamic Programming

SLR-FM-455

Set

- Patton's Security d) None of these C)
- For economic operation, the generator with highest positive incremental 13) transmission loss will operate at
 - The lowest positive incremental cost of production a)
 - b) The lowest negative incremental cost of production
 - The highest positive incremental cost of production c)
 - None of the above d)
- The rate of drop is frequency control inlet valve due to an increase in 14) generation of power on prime mover is called _
 - Speed regulation a) c)
- b) Speed efficiency
- Governer operation
- d) None of these

Seat	
No.	

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Max. Marks: 56

16

12

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Solve any four:

- a) Explain the different thermal unit constrains.
- b) Explain with a mathematical formulation, optimum generation allocation including transmission losses and penalty factor.
- c) A system consist of two plants connected by tie line and load is located at Plant 2. When 125 MW is transmitted from plant 1 a loss of 12.5 MW takes place on tie line. Determine the generation schedule of both plants and power received by load when λ for system is Rs 70 per Megawatt hour and incremental fuel costs are given by equations

$$\frac{\mathrm{dF1}}{\mathrm{dP1}} = 0.25\mathrm{P}_1 + 40\mathrm{Rs}/\mathrm{MWhr}$$

 $\frac{\mathrm{dF2}}{\mathrm{dP2}} = 0.20\mathrm{P}_2 + 50\mathrm{Rs/MWhr}$

- d) What is mean by unit commitment? Explain the necessity of it.
- e) Explain speed governing system with neat sketch.

Q.3 Solve any two:

- a) What are methods of unit commitment? With a suitable example explain the priority list method of unit commitment.
- **b)** The fuel input per hour of plant 1& plant 2 are given as follows $F_1=0.2P_1^2+40P_1+120 \text{ Rs/hr}$

 $F_2=0.25P_2^2+30P_2+150$ Rs/hr Determine the economic operating schedule and corresponding cost of generation if the maximum & minimum loading on each unit is 100MW & 25MW.The shared by both units demand is 180MW and transmission losses neglected. If load is equally shared by both units, determine saving obtained by loading the units as per equal incremental production cost.

c) Explain with illustrative transfer function of the load frequency control of single area system. Draw the block diagram for single area system.

Section – II

Q.4 Solve any four:

- a) Explain the different methods of improving voltage stability.
- b) Explain specifications of load compensator.
- c) Explain the difference between voltage angle and voltage stability.
- d) Explain the necessity of reactive power compensation.
- e) Explain system state classification with neat diagram.

Set R

12

Q.5 Solve any two

- a) Write the advantages and dis-advantages of different types of compensating equipment for transmission system.
- **b)** Explain the necessity of power system security.
- c) Explain effective counter measures to prevent voltage instability & methods of improving voltage stability.

Set	S
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B.E. (Part - II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume the suitable data wherever necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat No.

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Why are the series capacitors used?
 - a) Improve the voltage
 - b) Reduce the fault level
 - c) Compensate for line inductive reactance and improve the stability of the power system
 - d) Improves the power factor
- 2) Contingency definition gives list of components outages
 - a) Which includes the contingencies with high probability of occurance
 - b) Which provide the contingency in decreasing order of severity
 - c) For outage simulation
 - d) Any of the above
- 3) What is power angle equation of synchronous machines?
 - a) An equation between electrical power generated to the angular displacement of the rotor
 - b) An equation between mechanical power generated to the angular displacement of the rotor
 - c) An equation between electrical power generated to the angular displacement of stator windings
 - d) An equation between mechanical power generated to the angular displacement of stator windings
- If a power system observes an accumulated time error, it should correct it by _____.
 - a) Increasing its own generation
 - b) Decreasing its own generation
 - c) Coordinating time error correction with other interconnected systems
 - d) Any of the above
- 5) Which among these phenomenon is/are associated with angle stability?
 - a) Imbalance between the two generator torque
 - b) Stability or synchronism is lost
 - c) Surplus energy is stored up in the rotating masses
 - d) All of these

Max. Marks: 70

- 6) Which among the following factors influence the cost of generation of electric power?
 - Generator efficiency a)
 - Transmission losses C)

b) Fuel cost

d) All of these

- 7) The most efficient unit is loaded first then the less efficient unit follow, is called
 - Priority ordering a)

- b) Dynamic Programming
- d) None of these C) Patton's Security
- 8) For economic operation, the generator with highest positive incremental transmission loss will operate at _
 - The lowest positive incremental cost of production a)
 - The lowest negative incremental cost of production b)
 - c) The highest positive incremental cost of production
 - None of the above d)
- 9) The rate of drop is frequency control inlet valve due to an increase in generation of power on prime mover is called
 - Speed regulation b) Speed efficiency a)
 - C) Governer operation
- d) None of these
- 10) How is the voltage and frequency controlled in automatic generation control?
 - By controlling the excitation a)
 - By controlling the turbine action b)
 - Turbine speed control for voltage and excitation control for frequency c)
 - Excitation control for voltage and turbine speed control for voltage d)
- 11) In dynamic programming method the cost function F_N (X) represents _____.
 - Minimum Cost in Rs/hr of N MW by X number of unit a)
 - Minimum Cost in Rs/hr of X MW by N number of unit b)
 - Minimum Cost in Rs/hr of N MW by Xth unit c)
 - Minimum Cost in Rs/hr of X MW by Nth unit d)
- 12) What is the result of frequency instability?
 - Voltage collapse a) Tripping of generating units
- b) Frequency swings
- d) Both (b) and (c)
- The real power transfer over a line depends mainly on ____ 13)
 - Power angle a)

C)

c)

- b) Sending end voltage V_s d) $V_s - V_r$
- What is the main cause of voltage instability? 14)

Receiving end voltage V_r

- Generators a)
- C) Load

- b) Transformers
- d) Line losses

SLR-FM-455

Set S

Seat No.

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

Section – I

Q.2 Solve any four:

- a) Explain the different thermal unit constrains.
- b) Explain with a mathematical formulation, optimum generation allocation including transmission losses and penalty factor.
- c) A system consist of two plants connected by tie line and load is located at Plant 2. When 125 MW is transmitted from plant 1 a loss of 12.5 MW takes place on tie line. Determine the generation schedule of both plants and power received by load when λ for system is Rs 70 per Megawatt hour and incremental fuel costs are given by equations

 $\frac{\mathrm{dF1}}{\mathrm{dP1}} = 0.25\mathrm{P}_1 + 40\mathrm{Rs/MWhr}$

 $\frac{\mathrm{dF2}}{\mathrm{dP2}} = 0.20\mathrm{P}_2 + 50\mathrm{Rs/MWhr}$

- d) What is mean by unit commitment? Explain the necessity of it.
- e) Explain speed governing system with neat sketch.

Q.3 Solve any two:

- a) What are methods of unit commitment? With a suitable example explain the priority list method of unit commitment.
- b) The fuel input per hour of plant 1& plant 2 are given as follows $F_1=0.2P_1^2+40P_1+120$ Rs/hr $F_2=0.25P_2^2+30P_2+150$ Rs/hr

Determine the economic operating schedule and corresponding cost of generation if the maximum & minimum loading on each unit is 100MW & 25MW. The shared by both units demand is 180MW and transmission losses neglected. If load is equally shared by both units, determine saving obtained by loading the units as per equal incremental production cost.

c) Explain with illustrative transfer function of the load frequency control of single area system. Draw the block diagram for single area system.

Section – II

Q.4 Solve any four:

- a) Explain the different methods of improving voltage stability.
- b) Explain specifications of load compensator.
- c) Explain the difference between voltage angle and voltage stability.
- d) Explain the necessity of reactive power compensation.
- e) Explain system state classification with neat diagram.

Max. Marks: 56

12

16



16

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Set S

12

Q.5 Solve any two

- a) Write the advantages and dis-advantages of different types of compensating equipment for transmission system.
- **b)** Explain the necessity of power system security.
- c) Explain effective counter measures to prevent voltage instability & methods of improving voltage stability.

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER SYSTEM DYNAMICS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

c) Capacitor

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

b)

- For the stable operation of interconnected system, the passive element 1) that can be used a interconnecting element is:
 - Reactor a)
- d) Resistor and capacitor

Resistor

2 p.u.

- 2) If the inertia constant H of a machine of 200 MVA is 2 p.u. its value corresponding to 400 MVA will be:
 - a) 4 p.u. b)
 - c) 1.0 p.u. d) 0.5 p.u.
- 3) If the excitation of the synchronous generator fails, it acts as a: b) Synchronous generator
 - a) Synchronous motor
 - Induction motor Induction generator c) d)
- 4) For a long uncompensated line the limit to the line loading is governed by ___ b) Voltage drop
 - a) Thermal limit Stability limit c)
 - Corona loss d)
- For any fixed degree of series compensation additional capacitive shunt 5) compensation
 - a) increases the effective length of line
 - b) increases virtual surge impedance of line
 - c) decreases virtual surge impedance loading of the line
 - d) (b) and (c)
- A synchronous generator connected to an infinite bus delivers power at a 6) log p.f. If its excitation is increased
 - a) the terminal voltage increases voltage angle δ increases b)
 - c) current delivered increases d) (b) and (c)
- Steady-state stability of a power system is improved by _____. 7)
 - a) reducing fault clearing time
 - b) using double circuit line instead of single circuit line
 - single pole switching c)
 - d) decreasing generator inertia

Set

Max. Marks: 70

Marks: 14

8) Steady state operating condition of a power system indicates

- a) a situation when the connected load is absolutely constant
- b) a situation when the generated power is absolutely constant
- c) a situation when both connected load and generated power are equal to each other and remain constant

SLR-FM-456

Set

- d) An equilibrium state around which small fluctuations in power, both in generation and load, occur all the time.
- 9) Why are the series capacitors used?
 - a) Improve the voltage
 - b) Reduce the fault level
 - c) Compensate for line inductive reactance and improve the stability of the power system
 - d) Improves the power factor
- 10) What is the range of ' δ ' for stable operation?
 - a) $0^{\circ} < \delta < 45^{\circ}$
 - b) $45^{\circ} < \delta < 90^{\circ}$
 - c) $0^{\circ} < \delta < 90^{\circ}$
 - d) $0^{\circ} < \delta < 120^{\circ}$
- 11) What is *I* are the major assumptions made in the calculation of swing equations?
 - a) Damper windings are neglected
 - b) The machine is lossless
 - c) The machine has to run at synchronous speed
 - d) Both (a) and (b)
- 12) What is the purpose of a steam turbine governing?
 - a) Controls speed b) Con
 - b) Controls flow rated) Controls discharge
- 13) The excitation system and speed of alternator has _____.
 - a) linear response

c) Controls volume

- b) exponential response
- c) Rectangular hyperbola response
- d) circular response
- 14) The use of high speed breakers can: _____.
 - a) Increase the transient stability
 - b) Decrease the transient stability
 - c) Increase the steady state stability
 - d) Decrease the steady state stability

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM DYNAMICS

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Distinguish between transient and dynamic stability.
- b) Explain with example need of reduced model in stability analysis.
- c) Derive the various basic equations governing synchronous machine.
- d) Describe shortly on Park's transformation.
- e) Explain the one axis model of the synchronous machine in detail.
- f) Classify the different type's excitation system? Explain any one.

Q.3 Attempt any two.

- a) Explain in detail importance of stability in power system operation and control.
- **b)** Write down the flux linkage and voltage equations of a synchronous machine from its model and there from formulate the electromagnetic torque equation.
- c) Explain with block diagram typical excitation system configuration.

Section – II

Q.4 Attempt any four.

- a) Describe briefly the stabilizing signals with some examples.
- b) Explain the role of auto reclosing circuit breaker in stability enhancement.
- c) Describe briefly coherent and non-coherent machines.
- d) Explain in detail function of speed governing system.
- e) Describe briefly steady state stability of two machine systems.
- f) Explain with neat sketch electrical hydraulic governor for hydro turbines.

Q.5 Attempt any two.

- a) Explain the methods of improving steady state, dynamic and transient stabilities
- **b)** Explain the mathematical modelling of governor for steam turbine.
- c) Develop the swing equation of synchronous machine with its linearization.

12

16

Max. Marks: 56

16

12

Set F

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER SYSTEM DYNAMICS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

1)

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - Steady state operating condition of a power system indicates
 - a) a situation when the connected load is absolutely constant
 - b) a situation when the generated power is absolutely constant
 - c) a situation when both connected load and generated power are equal to each other and remain constant
 - d) An equilibrium state around which small fluctuations in power, both in generation and load, occur all the time.
 - 2) Why are the series capacitors used?
 - a) Improve the voltage
 - Reduce the fault level b)
 - c) Compensate for line inductive reactance and improve the stability of the power system
 - Improves the power factor d)
 - 3) What is the range of ' δ ' for stable operation?
 - a) $0^{\circ} < \delta < 45^{\circ}$
 - b) $45^{\circ} < \delta < 90^{\circ}$
 - c) $0^{\circ} < \delta < 90^{\circ}$
 - d) $0^{\circ} < \delta < 120^{\circ}$
 - 4) What is I are the major assumptions made in the calculation of swing equations?
 - a) Damper windings are neglected
 - b) The machine is lossless
 - c) The machine has to run at synchronous speed
 - d) Both (a) and (b)
 - What is the purpose of a steam turbine governing? 5)
 - a) Controls speed Controls flow rate b) c) Controls volume
 - d) Controls discharge
 - The excitation system and speed of alternator has . 6)
 - a) linear response
 - b) exponential response
 - c) Rectangular hyperbola response
 - d) circular response



Marks: 14

Max. Marks: 70

Set Q

SLR-FM-456

- 7) The use of high speed breakers can: _____.
 - a) Increase the transient stability
 - b) Decrease the transient stability
 - c) Increase the steady state stability
 - d) Decrease the steady state stability
- 8) For the stable operation of interconnected system, the passive element that can be used a interconnecting element is:
 - a) Reactor b) Resistor
 - c) Capacitor d) Resistor and capacitor
- 9) If the inertia constant H of a machine of 200 MVA is 2 p.u. its value corresponding to 400 MVA will be:
 - a) 4 p.u. b) 2 p.u.
 - c) 1.0 p.u. d) 0.5 p.u.
- 10) If the excitation of the synchronous generator fails, it acts as a:
 - Synchronous motor b) Synchronous generator
 - c) Induction motor d) Induction generator
- 11) For a long uncompensated line the limit to the line loading is governed by _____.
 - a) Thermal limit

a)

- b) Voltage drop
- c) Stability limit
- d) Corona loss

(b) and (c)

- 12) For any fixed degree of series compensation additional capacitive shunt compensation _____.
 - a) increases the effective length of line
 - b) increases virtual surge impedance of line
 - c) decreases virtual surge impedance loading of the line
 - d) (b) and (c)
- 13) A synchronous generator connected to an infinite bus delivers power at a log p.f. If its excitation is increased _____.
 - a) the terminal voltage increases b) voltage angle δ increases
 - c) current delivered increases d)
- 14) Steady-state stability of a power system is improved by _____.
 - a) reducing fault clearing time
 - b) using double circuit line instead of single circuit line
 - c) single pole switching
 - d) decreasing generator inertia

Seat	
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B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM DYNAMICS

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Distinguish between transient and dynamic stability.
- b) Explain with example need of reduced model in stability analysis.
- c) Derive the various basic equations governing synchronous machine.
- d) Describe shortly on Park's transformation.
- e) Explain the one axis model of the synchronous machine in detail.
- f) Classify the different type's excitation system? Explain any one.

Q.3 Attempt any two.

- a) Explain in detail importance of stability in power system operation and control.
- **b)** Write down the flux linkage and voltage equations of a synchronous machine from its model and there from formulate the electromagnetic torque equation.
- c) Explain with block diagram typical excitation system configuration.

Section – II

Q.4 Attempt any four.

- a) Describe briefly the stabilizing signals with some examples.
- b) Explain the role of auto reclosing circuit breaker in stability enhancement.
- c) Describe briefly coherent and non-coherent machines.
- d) Explain in detail function of speed governing system.
- e) Describe briefly steady state stability of two machine systems.
- f) Explain with neat sketch electrical hydraulic governor for hydro turbines.

Q.5 Attempt any two.

- a) Explain the methods of improving steady state, dynamic and transient stabilities
- b) Explain the mathematical modelling of governor for steam turbine.
- c) Develop the swing equation of synchronous machine with its linearization.

12

16

Max. Marks: 56

16

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM DYNAMICS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) For any fixed degree of series compensation additional capacitive shunt compensation _____.
 - a) increases the effective length of line
 - b) increases virtual surge impedance of line
 - c) decreases virtual surge impedance loading of the line
 - d) (b) and (c)
- 2) A synchronous generator connected to an infinite bus delivers power at a log p.f. If its excitation is increased _____.
 - a) the terminal voltage increases b) voltage angle δ increases
 - c) current delivered increases d) (b) and (c)
- 3) Steady-state stability of a power system is improved by _____.
 - a) reducing fault clearing time
 - b) using double circuit line instead of single circuit line
 - c) single pole switching
 - d) decreasing generator inertia
- 4) Steady state operating condition of a power system indicates
 - a) a situation when the connected load is absolutely constant
 - b) a situation when the generated power is absolutely constant
 - c) a situation when both connected load and generated power are equal to each other and remain constant
 - d) An equilibrium state around which small fluctuations in power, both in generation and load, occur all the time.
- 5) Why are the series capacitors used?
 - a) Improve the voltage
 - b) Reduce the fault level
 - c) Compensate for line inductive reactance and improve the stability of the power system
 - d) Improves the power factor
- 6) What is the range of ' δ ' for stable operation?
 - a) $0^{\circ} < \delta < 45^{\circ}$
 - b) $45^{\circ} < \delta < 90^{\circ}$
 - c) $0^{\circ} < \delta < 90^{\circ}$
 - d) $0^{\circ} < \delta < 120^{\circ}$

Set R

Max. Marks: 70



- 7) What is *I* are the major assumptions made in the calculation of swing equations?
 - a) Damper windings are neglected
 - b) The machine is lossless
 - c) The machine has to run at synchronous speed
 - d) Both (a) and (b)
- 8) What is the purpose of a steam turbine governing?
 - a) Controls speed b) Controls flow rate
 - c) Controls volume d) Controls discharge
- 9) The excitation system and speed of alternator has _____.
 - a) linear response
 - b) exponential response
 - c) Rectangular hyperbola response
 - d) circular response
- 10) The use of high speed breakers can: _____.
 - a) Increase the transient stability
 - b) Decrease the transient stability
 - c) Increase the steady state stability
 - d) Decrease the steady state stability
- 11) For the stable operation of interconnected system, the passive element that can be used a interconnecting element is:
 - a) Reactor b) Resistor
 - c) Capacitor d) Resistor and capacitor
- 12) If the inertia constant H of a machine of 200 MVA is 2 p.u. its value corresponding to 400 MVA will be:
 - a) 4 p.u. b) 2 p.u.
 - c) 1.0 p.u. d) 0.5 p.u.
- 13) If the excitation of the synchronous generator fails, it acts as a:
 - a) Synchronous motorc) Induction motor
- b) Synchronous generatord) Induction generator

Set

- 14) For a long uncompensated line the limit to the line loading is governed by _____.
 - a) Thermal limit c) Stability limit

- b) Voltage drop
- d) Corona loss

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM DYNAMICS

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Distinguish between transient and dynamic stability.
- b) Explain with example need of reduced model in stability analysis.
- c) Derive the various basic equations governing synchronous machine.
- d) Describe shortly on Park's transformation.
- e) Explain the one axis model of the synchronous machine in detail.
- f) Classify the different type's excitation system? Explain any one.

Q.3 Attempt any two.

- a) Explain in detail importance of stability in power system operation and control.
- **b)** Write down the flux linkage and voltage equations of a synchronous machine from its model and there from formulate the electromagnetic torque equation.
- c) Explain with block diagram typical excitation system configuration.

Section – II

Q.4 Attempt any four.

- a) Describe briefly the stabilizing signals with some examples.
- b) Explain the role of auto reclosing circuit breaker in stability enhancement.
- c) Describe briefly coherent and non-coherent machines.
- d) Explain in detail function of speed governing system.
- e) Describe briefly steady state stability of two machine systems.
- f) Explain with neat sketch electrical hydraulic governor for hydro turbines.

Q.5 Attempt any two.

- a) Explain the methods of improving steady state, dynamic and transient stabilities
- b) Explain the mathematical modelling of governor for steam turbine.
- c) Develop the swing equation of synchronous machine with its linearization.

12

16

16

Max. Marks: 56

Seat No.

Duration: 30 Minutes

1)

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER SYSTEM DYNAMICS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- What is the range of ' δ ' for stable operation?
- a) $0^{\circ} < \delta < 45^{\circ}$
- b) $45^{\circ} < \delta < 90^{\circ}$
- c) $0^{\circ} < \delta < 90^{\circ}$
- d) $0^{\circ} < \delta < 120^{\circ}$
- What is I are the major assumptions made in the calculation of swing 2) equations?
 - a) Damper windings are neglected
 - b) The machine is lossless
 - c) The machine has to run at synchronous speed
 - d) Both (a) and (b)
- 3) What is the purpose of a steam turbine governing?
 - a) Controls speed Controls flow rate b)
 - c) Controls volume d) Controls discharge
- 4) The excitation system and speed of alternator has _____.
 - a) linear response
 - b) exponential response
 - c) Rectangular hyperbola response
 - d) circular response
- The use of high speed breakers can: _____. 5)
 - a) Increase the transient stability
 - b) Decrease the transient stability
 - Increase the steady state stability c)
 - d) Decrease the steady state stability
- 6) For the stable operation of interconnected system, the passive element that can be used a interconnecting element is:
 - a) Reactor b)
 - d) c) Capacitor
- 7) If the inertia constant H of a machine of 200 MVA is 2 p.u. its value corresponding to 400 MVA will be:

b)

- a) 4 p.u.
- 1.0 p.u. d) 0.5 p.u. c)
- Resistor

2 p.u.

Resistor and capacitor

Max. Marks: 70

- 8) If the excitation of the synchronous generator fails, it acts as a:
 - a) Synchronous motor
- b) Synchronous generator

Set

- c) Induction motor
- d) Induction generator
- 9) For a long uncompensated line the limit to the line loading is governed
 - by ____. a) Thermal limit

- b) Voltage drop
- c) Stability limit d) Corona loss
- 10) For any fixed degree of series compensation additional capacitive shunt compensation _____.
 - a) increases the effective length of line
 - b) increases virtual surge impedance of line
 - c) decreases virtual surge impedance loading of the line
 - d) (b) and (c)
- 11) A synchronous generator connected to an infinite bus delivers power at a log p.f. If its excitation is increased _____.
 - a) the terminal voltage increases b) voltage angle δ increases
 - c) current delivered increases d) (b) and (c)
- 12) Steady-state stability of a power system is improved by _____.
 - a) reducing fault clearing time
 - b) using double circuit line instead of single circuit line
 - c) single pole switching
 - d) decreasing generator inertia
- 13) Steady state operating condition of a power system indicates
 - a) a situation when the connected load is absolutely constant
 - b) a situation when the generated power is absolutely constant
 - c) a situation when both connected load and generated power are equal to each other and remain constant
 - d) An equilibrium state around which small fluctuations in power, both in generation and load, occur all the time.
- 14) Why are the series capacitors used?
 - a) Improve the voltage
 - b) Reduce the fault level
 - c) Compensate for line inductive reactance and improve the stability of the power system
 - d) Improves the power factor

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM DYNAMICS

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Distinguish between transient and dynamic stability.
- **b)** Explain with example need of reduced model in stability analysis.
- c) Derive the various basic equations governing synchronous machine.
- d) Describe shortly on Park's transformation.
- e) Explain the one axis model of the synchronous machine in detail.
- f) Classify the different type's excitation system? Explain any one.

Q.3 Attempt any two.

- a) Explain in detail importance of stability in power system operation and control.
- **b)** Write down the flux linkage and voltage equations of a synchronous machine from its model and there from formulate the electromagnetic torque equation.
- c) Explain with block diagram typical excitation system configuration.

Section – II

Q.4 Attempt any four.

- a) Describe briefly the stabilizing signals with some examples.
- b) Explain the role of auto reclosing circuit breaker in stability enhancement.
- c) Describe briefly coherent and non-coherent machines.
- d) Explain in detail function of speed governing system.
- e) Describe briefly steady state stability of two machine systems.
- f) Explain with neat sketch electrical hydraulic governor for hydro turbines.

Q.5 Attempt any two.

- a) Explain the methods of improving steady state, dynamic and transient stabilities
- b) Explain the mathematical modelling of governor for steam turbine.
- c) Develop the swing equation of synchronous machine with its linearization.

12

16

Max. Marks: 56

16

Seat	
No.	

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

- Assume suitable data if necessary & mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

Q.1 Choose the correct alternatives from the options and rewrite the sentence.

- 1) Liquids with solid impurities
 - have higher dielectric strength a)
 - of large size have higher dielectric strength b)
 - c) has lower dielectric strength as compared to pure liquids
 - d) none of the above
- 2) The electric field in a gas bubble which is immersed in a liquid of permittivity ε_{τ} is .
 - higher than that of the field in the liquid a)
 - lower than that of the field in the liquid b)
 - c) same as that in the liquid
 - none of the above is always true d)
- 3) In order to prevent an excessive evaporation of the aromatics during reconditioning of transformer oil using filtrations under vacuum, the vapour pressure should be _____. less than 10⁻² torr
 - less than 10⁻⁴ torr a) b) c)
 - less than 10⁻¹ torr none of the above d)
- 4) During reconditioning of transformer oil it is economical to use electrostatic filters if the water content of oil is
 - greater than 4 ppm b) greater than 2 ppm a)
 - less than 2 ppm d) electrostatic filters are never used C)
- The breakdown of solid materials is roughly given by _ 5)
 - a) $V_b t_b = \text{constant}$ b) $V_b \ln t_b = \text{constant}$
 - None of the above $t_h \ln V_h = \text{constant}$ d)
- While conducting intrinsic dielectric strength on a specimen, its shape 6) should be so prepared that
 - the electric stress is high at its centre a)
 - the electric stress is high at its corner b)
 - the electric stress is same all along the samples C)
 - d) No definite consideration

Max. Marks: 70

Marks: 14

	Set
7)	 In case of impulse thermal breakdown of solid insulating materials, the critical electric filed is a) proportional to critical absolute temperature b) proportional to square of critical absolute temperature c) proportional to square of T₀ d) None of the above is true
8)	The insulation of the modern EHV lines is designed based ona)The lightning voltageb)The switching voltagec)Coronad)RI
9)	 High voltage d.c. testing for HV machines is resorted because a) Certain conclusions regarding the continuous ageing of an insulation can be drawn b) The stress distribution is a representation of the service condition c) Standardization on the magnitude of voltage to be applied is available d) The stresses do not damage the coil and insulation
10)	The velocity of a travelling wave through a cable of relative permittivity 9 is a) 9×10^8 m/sec b) 3×10^8 m/sec c) 10^8 m/sec d) 2×10^8 m/sec
11)	Partial discharge can be detected bya) listening to hissing soundb) a high tan δ c) optical methodsd) all of the above
12)	Non-destructive testing methods require measurement ofa) Dielectric strengthb) Insulation resistancec) $\tan \delta$ d) (a) and (b)e) (b) and (c)
13)	The mechanism responsible for dielectric loss in a dielectric area)Conductionb)Polarisationc)Ionisationd)(a) and (b)e)(b) and (c)
14)	Protective resistance to be connected between the sphere gap and the test equipment is required while measuring a) power frequency and higher frequency a.c. voltage

- b)
- power frequency and impulse voltage higher frequency a.c. voltages and impulse voltage all kinds of voltages C)
- d)

Ρ

Seat	
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B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicates full marks.
- 3) Assume suitable data if necessary & mention it clearly.

Section – I

Q.2 Solve any four.

- a) Explain surge voltages and their distribution.
- b) Explain practical considerations in using gases for insulation purposes.
- c) Write a short note on conduction and breakdown in commercial liquids.
- d) Write a short note on break-down of composite insulation
- e) A steady current of 600 μ A flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μ A flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value.

Q.3 Solve any two.

a) Derive the following expression by using townsend second ionization coefficient

$$n = \frac{n_0 e^{\alpha \alpha}}{1 - v \left(e^{\alpha d} - 1\right)}$$

- **b)** State & derive Paschen's law and equation along with explanations of V and Pd.
- c) Explain electromechanical break-down and break-downs of solid dielectrics in practice.

Section – II

Q.4 Solve any four.

- a) Explain Cockcroot-Walten multiplier.
- b) Explain components of multistage impulse generator.
- c) Explain resonant transformer its principle and operation.
- d) Write a short note on grounding of impulse testing laboratories.
- e) Write a short note on CRO for impulse voltage and current.

Q.5 Solve any two.

- a) Explain Generating voltameter and Capacitance voltage Transformer.
- **b)** Discuss various methods of measuring high d.c. and a.c. voltages.
- c) Discuss the Test facilities, activity and studies in high voltage laboratories.

Max. Marks: 56

12

16

12

Seat

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

- Assume suitable data if necessary & mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - The insulation of the modern EHV lines is designed based on _____ 1)
 - The lightning voltage b) The switching voltage a) Corona d) RI C)
 - 2) High voltage d.c. testing for HV machines is resorted because _____.
 - Certain conclusions regarding the continuous ageing of an insulation a) can be drawn
 - The stress distribution is a representation of the service condition b)
 - Standardization on the magnitude of voltage to be applied is C) available
 - The stresses do not damage the coil and insulation d)

3) The velocity of a travelling wave through a cable of relative permittivity 9

- is 9×10^8 m/sec 3×10^8 m/sec b) a)
 - 2×10^8 m/sec 10^8 m/sec C) d)

4) Partial discharge can be detected by

- listening to hissing sound a) b) a high tan δ
- optical methods all of the above C) d)

5) Non-destructive testing methods require measurement of _____

- Dielectric strength Insulation resistance b) d) (a) and (b)
- c) $\tan \delta$
- e) (b) and (c)

a)

- 6) The mechanism responsible for dielectric loss in a dielectric are _____.
 - Conduction a)

b) Polarisation d) (a) and (b)

- Ionisation C) (b) and (c) e)
- 7) Protective resistance to be connected between the sphere gap and the test equipment is required while measuring
 - power frequency and higher frequency a.c. voltage a)
 - power frequency and impulse voltage b)
 - higher frequency a.c. voltages and impulse voltage c)
 - all kinds of voltages d)

Max. Marks: 70

Marks: 14

14

SLR-FM-457

- 8) Liquids with solid impurities _____
 - a) have higher dielectric strength
 - b) of large size have higher dielectric strength
 - c) has lower dielectric strength as compared to pure liquids
 - d) none of the above
- The electric field in a gas bubble which is immersed in a liquid of permittivity ε_z is _____.
 - a) higher than that of the field in the liquid
 - b) lower than that of the field in the liquid
 - c) same as that in the liquid
 - d) none of the above is always true
- 10) In order to prevent an excessive evaporation of the aromatics during reconditioning of transformer oil using filtrations under vacuum, the vapour pressure should be _____.
 - a) less than 10^{-4} torr b) less than 10^{-2} torr
 - c) less than 10⁻¹ torr d) none of the above
- 11) During reconditioning of transformer oil it is economical to use electrostatic filters if the water content of oil is _____.
 - a) greater than 4 ppm b) greater than 2 ppm
 - c) less than 2 ppm d) electrostatic filters are never used
- 12) The breakdown of solid materials is roughly given by _____.
 - $V_h t_h = \text{constant}$ b) $V_h \text{In } t_h = \text{constant}$
 - c) $t_b \ln V_b = \text{constant}$ d) None of the above
- 13) While conducting intrinsic dielectric strength on a specimen, its shape should be so prepared that _____.
 - a) the electric stress is high at its centre
 - b) the electric stress is high at its corner
 - c) the electric stress is same all along the samples
 - d) No definite consideration

a)

- 14) In case of impulse thermal breakdown of solid insulating materials, the critical electric filed is _____.
 - a) proportional to critical absolute temperature
 - b) proportional to square of critical absolute temperature
 - c) proportional to square of T_0
 - d) None of the above is true

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Set

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicates full marks.
- 3) Assume suitable data if necessary & mention it clearly.

Section – I

Q.2 Solve any four.

- a) Explain surge voltages and their distribution.
- **b)** Explain practical considerations in using gases for insulation purposes.
- c) Write a short note on conduction and breakdown in commercial liquids.
- d) Write a short note on break-down of composite insulation
- e) A steady current of 600 μ A flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μ A flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value.

Q.3 Solve any two.

a) Derive the following expression by using townsend second ionization coefficient

$$n = \frac{n_0 e^{\alpha \alpha}}{1 - v \left(e^{\alpha d} - 1\right)}$$

- **b)** State & derive Paschen's law and equation along with explanations of V and Pd.
- c) Explain electromechanical break-down and break-downs of solid dielectrics in practice.

Section – II

Q.4 Solve any four.

- a) Explain Cockcroot-Walten multiplier.
- b) Explain components of multistage impulse generator.
- c) Explain resonant transformer its principle and operation.
- d) Write a short note on grounding of impulse testing laboratories.
- e) Write a short note on CRO for impulse voltage and current.

Q.5 Solve any two.

- a) Explain Generating voltameter and Capacitance voltage Transformer.
- **b)** Discuss various methods of measuring high d.c. and a.c. voltages.
- c) Discuss the Test facilities, activity and studies in high voltage laboratories.

Max. Marks: 56

12

16

12

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

- Assume suitable data if necessary & mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - The breakdown of solid materials is roughly given by _____ 1)
 - b) $V_b \ln t_b = \text{constant}$ a) $V_h t_h = \text{constant}$
 - $t_h \ln V_h = \text{constant}$ d) None of the above C)
 - 2) While conducting intrinsic dielectric strength on a specimen, its shape should be so prepared that
 - a) the electric stress is high at its centre
 - the electric stress is high at its corner b)
 - the electric stress is same all along the samples c)
 - No definite consideration d)
 - In case of impulse thermal breakdown of solid insulating materials, the 3) critical electric filed is
 - proportional to critical absolute temperature a)
 - proportional to square of critical absolute temperature b)
 - proportional to square of T_0 C)
 - None of the above is true d)

4) The insulation of the modern EHV lines is designed based on _____. a)

- The lightning voltage b) The switching voltage
- Corona d) RI C)
- 5) High voltage d.c. testing for HV machines is resorted because ____
 - Certain conclusions regarding the continuous ageing of an insulation a) can be drawn
 - b) The stress distribution is a representation of the service condition
 - Standardization on the magnitude of voltage to be applied is c) available
 - The stresses do not damage the coil and insulation d)
- The velocity of a travelling wave through a cable of relative permittivity 9 6) is
 - 9×10^8 m/sec 3×10^8 m/sec b) a)
 - 10^8 m/sec 2×10^8 m/sec d) c)
- Partial discharge can be detected by 7) listening to hissing sound a)
 - b) a high tan δ
 - optical methods all of the above c) d)



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Max. Marks: 70

Page	8	of	12
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- 8) Non-destructive testing methods require measurement of
 - Dielectric strength a)
- b) Insulation resistance d) (a) and (b)

Set

- c) tan δ
- e) (b) and (c)
- 9) The mechanism responsible for dielectric loss in a dielectric are .
 - a) Conduction

Polarisation b)

Ionisation C) (b) and (c) e)

- d) (a) and (b)
- Protective resistance to be connected between the sphere gap and the 10) test equipment is required while measuring _
 - power frequency and higher frequency a.c. voltage a)
 - power frequency and impulse voltage b)
 - higher frequency a.c. voltages and impulse voltage C)
 - d) all kinds of voltages
- 11) Liquids with solid impurities
 - have higher dielectric strength a)
 - of large size have higher dielectric strength b)
 - has lower dielectric strength as compared to pure liquids C)
 - d) none of the above
- 12) The electric field in a gas bubble which is immersed in a liquid of permittivity ε_7 is
 - higher than that of the field in the liquid a)
 - lower than that of the field in the liquid b)
 - c) same as that in the liquid
 - d) none of the above is always true
- 13) In order to prevent an excessive evaporation of the aromatics during reconditioning of transformer oil using filtrations under vacuum, the vapour pressure should be
 - less than 10⁻⁴ torr b) a)
 - less than 10⁻¹ torr none of the above C) d)
- During reconditioning of transformer oil it is economical to use 14) electrostatic filters if the water content of oil is _____.
 - a) greater than 4 ppm b)
 - less than 2 ppm d) electrostatic filters are never used C)

less than 10⁻² torr

greater than 2 ppm

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

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Section – I

Q.2 Solve any four.

- a) Explain surge voltages and their distribution.
- **b)** Explain practical considerations in using gases for insulation purposes.
- c) Write a short note on conduction and breakdown in commercial liquids.
- d) Write a short note on break-down of composite insulation
- e) A steady current of 600 μ A flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μ A flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value.

Q.3 Solve any two.

a) Derive the following expression by using townsend second ionization coefficient

$$n = \frac{n_0 e^{\alpha \alpha}}{1 - v \left(e^{\alpha d} - 1\right)}$$

- **b)** State & derive Paschen's law and equation along with explanations of V and Pd.
- c) Explain electromechanical break-down and break-downs of solid dielectrics in practice.

Section – II

Q.4 Solve any four.

- a) Explain Cockcroot-Walten multiplier.
- b) Explain components of multistage impulse generator.
- c) Explain resonant transformer its principle and operation.
- d) Write a short note on grounding of impulse testing laboratories.
- e) Write a short note on CRO for impulse voltage and current.

Q.5 Solve any two.

- a) Explain Generating voltameter and Capacitance voltage Transformer.
- **b)** Discuss various methods of measuring high d.c. and a.c. voltages.
- c) Discuss the Test facilities, activity and studies in high voltage laboratories.

Max. Marks: 56

12

16

12

16



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Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

- Assume suitable data if necessary & mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - The velocity of a travelling wave through a cable of relative permittivity 9 1) is
 - 9×10^8 m/sec 3×10^8 m/sec b) a) 10^8 m/sec 2×10^8 m/sec c) d)

2) Partial discharge can be detected by _

- listening to hissing sound b) a high tan δ a)
 - optical methods d) all of the above c)

3) Non-destructive testing methods require measurement of b) Insulation resistance

- a) Dielectric strength d)
- $\tan \delta$ C)
- (b) and (c) e)
- 4) The mechanism responsible for dielectric loss in a dielectric are _____.
 - a) Conduction C) Ionisation

b) Polarisation d) (a) and (b)

(a) and (b)

- (b) and (c) e)
- 5) Protective resistance to be connected between the sphere gap and the test equipment is required while measuring _
 - power frequency and higher frequency a.c. voltage a)
 - power frequency and impulse voltage b)
 - higher frequency a.c. voltages and impulse voltage C)
 - all kinds of voltages d)
- Liquids with solid impurities 6)
 - have higher dielectric strength a)
 - of large size have higher dielectric strength b)
 - has lower dielectric strength as compared to pure liquids c)
 - none of the above d)
- 7) The electric field in a gas bubble which is immersed in a liquid of permittivity ε_{τ} is _
 - higher than that of the field in the liquid a)
 - lower than that of the field in the liquid b)
 - same as that in the liquid c)
 - none of the above is always true d)

Max. Marks: 70

Marks: 14



- 8) In order to prevent an excessive evaporation of the aromatics during reconditioning of transformer oil using filtrations under vacuum, the vapour pressure should be _____.
 - less than 10⁻² torr less than 10⁻⁴ torr b) a) less than 10⁻¹ torr c)
 - none of the above d)
- 9) During reconditioning of transformer oil it is economical to use electrostatic filters if the water content of oil is _ ___.
 - greater than 4 ppm a)
- greater than 2 ppm b)
- less than 2 ppm d) electrostatic filters are never used C)
- 10) The breakdown of solid materials is roughly given by _____
 - $V_h \ln t_h = \text{constant}$ a) $V_h t_h = \text{constant}$ b)
 - $t_h \ln V_h = \text{constant}$ d) None of the above C)
- While conducting intrinsic dielectric strength on a specimen, its shape 11) should be so prepared that
 - the electric stress is high at its centre a)
 - the electric stress is high at its corner b)
 - the electric stress is same all along the samples c)
 - d) No definite consideration
- 12) In case of impulse thermal breakdown of solid insulating materials, the critical electric filed is
 - proportional to critical absolute temperature a)
 - b) proportional to square of critical absolute temperature
 - C) proportional to square of T_0
 - None of the above is true d)

a)

- The insulation of the modern EHV lines is designed based on _____. 13)
 - The lightning voltage The switching voltage b)
 - Corona d) C) RI
- High voltage d.c. testing for HV machines is resorted because _____. 14)
 - Certain conclusions regarding the continuous ageing of an insulation a) can be drawn
 - b) The stress distribution is a representation of the service condition
 - Standardization on the magnitude of voltage to be applied is c) available
 - d) The stresses do not damage the coil and insulation

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicates full marks.
- 3) Assume suitable data if necessary & mention it clearly.

Section – I

Q.2 Solve any four.

- a) Explain surge voltages and their distribution.
- **b)** Explain practical considerations in using gases for insulation purposes.
- c) Write a short note on conduction and breakdown in commercial liquids.
- d) Write a short note on break-down of composite insulation
- e) A steady current of 600 μ A flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μ A flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value.

Q.3 Solve any two.

a) Derive the following expression by using townsend second ionization coefficient

$$n = \frac{n_0 e^{\alpha \alpha}}{1 - v \left(e^{\alpha d} - 1\right)}$$

- **b)** State & derive Paschen's law and equation along with explanations of V and Pd.
- c) Explain electromechanical break-down and break-downs of solid dielectrics in practice.

Section – II

Q.4 Solve any four.

- a) Explain Cockcroot-Walten multiplier.
- **b**) Explain components of multistage impulse generator.
- c) Explain resonant transformer its principle and operation.
- d) Write a short note on grounding of impulse testing laboratories.
- e) Write a short note on CRO for impulse voltage and current.

Q.5 Solve any two.

- a) Explain Generating voltameter and Capacitance voltage Transformer.
- **b)** Discuss various methods of measuring high d.c. and a.c. voltages.
- c) Discuss the Test facilities, activity and studies in high voltage laboratories.

Max. Marks: 56

12

16

12

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

RENEWABLE ENERGY SOURCES Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

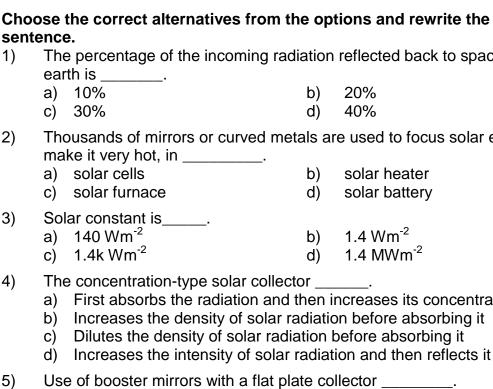
Duration: 30 Minutes

3)

- sentence. 1) The percentage of the incoming radiation reflected back to space by the earth is
 - 10% 20% a) b) 30% C)
 - 2) Thousands of mirrors or curved metals are used to focus solar energy to make it very hot, in _____
 - a) solar cells c) solar furnace
 - Solar constant is a) 140 Wm⁻² b) 1.4 Wm^{-2} c) 1.4k Wm⁻²
 - 4) The concentration-type solar collector _____
 - First absorbs the radiation and then increases its concentration a)
 - Increases the density of solar radiation before absorbing it b)
 - Dilutes the density of solar radiation before absorbing it c)
 - Increases the intensity of solar radiation and then reflects it back d)
 - 5) Use of booster mirrors with a flat plate collector
 - a) Increases the reflection to the atmosphere
 - b) Decreases the reflection to the atmosphere
 - Increases the diffused radiation component on the absorber C)
 - Increases the beam radiation component on the absorber d)
 - 6) Which of the following is a disadvantage of most of the renewable energy sources?
 - a) Highly polluting b) High waste disposal cost Unreliable supply C)
 - d) High running cost
 - The amount of energy available in the wind at any instant is proportional 7) to of the wind speed.
 - a) Square root power of two
- b) Square root power of three
- c) Square power
- Cube power d)



Set



Seat No.

Q.1

Max. Marks: 70

Marks: 14

				Set	F
8)	a)	term biomass most often refers Inorganic matter Chemicals	to b) d)	 Organic matter Ammonium compounds	
9)	a)	nass is useful to produce Chemicals Biochemicals	b) d)	Fibres Transportation fuels	
10)	so a	nergy farming, the plantation and s to s to Reduce manual labour	l harv	esting is planned & managed	
	c)	insure the sustainability of the re insure multiple harvesting per ye minimize the cost involved		e	
11)	Hot water or steam carrying geothermal energy often comes up to surface in				
	a)	New Zealand Germany	b) d)	Ice land both a and b	
12) The following is (are) the visible s in the earth's interior			(s) of	the large amount of heat lying	
		Volcanoes Hot springs	b) d)	Geysers All of the above	
13) When the water is ejected from earth's interior in the form of hot water is called		erior in the form of hot water, it			
	a)	Geyser Both a) and b)	b) d)	Hot springs None of the above	
14)	Two	-basin tidal schemes			

- a) Are more economical than single basin schemes
 b) Operate on ebb cycles in both basins
 c) Produce less uniform power
 d) Produce more uniform power

Seat	
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B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Write short note on role and potential of new and renewable sources.
- **b)** Draw and explain Flat-plat collector. What are the advantages and disadvantages of flat plate collector?
- c) With neat diagram explain solar air heater.
- d) Draw and explain wind speed- power characteristic and axial force characteristic of wind mill.
- e) Draw and describe the different types of horizontal axis wind mills.

Q.3 Attempt any two.

- a) Derive an expression for solar radiation on tilted surface.
- b) Draw and explain different zones of solar ponds? What are the applications of solar ponds? What are the required properties of salt used in solar ponds?
- c) With neat diagrams explain classification of concentrating type collectors.

Section – II

Q.4 Attempt any four

- a) Draw and explain the floating drum type biogas plant.
- **b)** What is DEC? Explain the need for DEC.
- c) With neat diagram explain tidal energy conversion techniques.
- d) Draw and describe the dry steam geothermal power plant.
- e) Explain the comparison between fixed and float drum bio digesters.

Q.5 Attempt any two.

- a) Draw and describe the working of Hybrid cycle OTEC system.
- **b)** Draw and describe the binary cycle geothermal power plant.
- c) Draw and describe the general layout of small hydro plant. What are the advantages and limitations of SHP?

Max. Marks: 56

12

16

12

Ο,	not opinigo	α)			
	When the water is ejected from earth's interior in the form of hot water, it is called				
a)	Geyser	b)	Hot springs		
c)	Both a) and b)	d)	None of the above		
a) b)	o-basin tidal schemes Are more economical than singl Operate on ebb cycles in both b Produce less uniform power Produce more uniform power				

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering RENEWABLE ENERGY SOURCES**

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - 1) The term biomass most often refers to
 - a) Inorganic matter Organic matter b)
 - c) Chemicals d) Ammonium compounds
 - 2) Biomass is useful to produce
 - a) Chemicals Fibres b) c) Biochemicals
 - d) Transportation fuels
 - In energy farming, the plantation and harvesting is planned & managed 3) so as to .
 - a) Reduce manual labour
 - b) insure the sustainability of the resource
 - c) insure multiple harvesting per year
 - d) minimize the cost involved
 - 4) Hot water or steam carrying geothermal energy often comes up to surface in
 - a) New Zealand b) Ice land both a and b
 - c) Germany d)
 - The following is (are) the visible sign(s) of the large amount of heat lying 5) in the earth's interior _____.
 - a) Volcanoes Gevsers b)
 - c) Hot springs d) All of the above
 - When the 6) is called _
 - a) Geys
 - c) Both
 - Two-basir 7)
 - a) Are m
 - b) Operation
 - c) Produ

SLR-FM-458



Max. Marks: 70

Marks: 14

Decreases the reflection to the atmosphere Which of the following is a disadvantage of most of the renewable energy b) High waste disposal cost Unreliable supply d) High running cost C) b) Square root power of three

- sources?
- a) Highly polluting

c) Square power

13)

- The amount of energy available in the wind at any instant is proportional 14)
 - to_____ of the wind speed.
 - a) Square root power of two
- Cube power d)

- 8) The percentage of the incoming radiation reflected back to space by the earth is
 - a) 10% b) 20%
 - c) 30% d) 40%
- 9) Thousands of mirrors or curved metals are used to focus solar energy to make it very hot, in _____.
 - a) solar cells
 - b) solar heater c) solar furnace d) solar battery
- 10) Solar constant is
 - a) 140 Wm⁻² b)
 - 1.4 Wm⁻² c) 1.4k Wm⁻² 1.4 MWm⁻² d)
- 11) The concentration-type solar collector _____
 - a) First absorbs the radiation and then increases its concentration
 - Increases the density of solar radiation before absorbing it b)
 - Dilutes the density of solar radiation before absorbing it C)
 - d) Increases the intensity of solar radiation and then reflects it back
- Use of booster mirrors with a flat plate collector _____ 12)
 - a) Increases the reflection to the atmosphere
 - b)
 - Increases the diffused radiation component on the absorber C)
 - d) Increases the beam radiation component on the absorber

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No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

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Section – I

Q.2 Attempt any four.

- a) Write short note on role and potential of new and renewable sources.
- **b)** Draw and explain Flat-plat collector. What are the advantages and disadvantages of flat plate collector?
- c) With neat diagram explain solar air heater.
- d) Draw and explain wind speed- power characteristic and axial force characteristic of wind mill.
- e) Draw and describe the different types of horizontal axis wind mills.

Q.3 Attempt any two.

- a) Derive an expression for solar radiation on tilted surface.
- **b)** Draw and explain different zones of solar ponds? What are the applications of solar ponds? What are the required properties of salt used in solar ponds?
- c) With neat diagrams explain classification of concentrating type collectors.

Section – II

Q.4 Attempt any four

- a) Draw and explain the floating drum type biogas plant.
- **b)** What is DEC? Explain the need for DEC.
- c) With neat diagram explain tidal energy conversion techniques.
- d) Draw and describe the dry steam geothermal power plant.
- e) Explain the comparison between fixed and float drum bio digesters.

Q.5 Attempt any two.

- a) Draw and describe the working of Hybrid cycle OTEC system.
- **b)** Draw and describe the binary cycle geothermal power plant.
- c) Draw and describe the general layout of small hydro plant. What are the advantages and limitations of SHP?

Max. Marks: 56

12

16

12

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1)	Q. No. 1 is compulsory and should be solved in first 30 minutes in answer
	book.

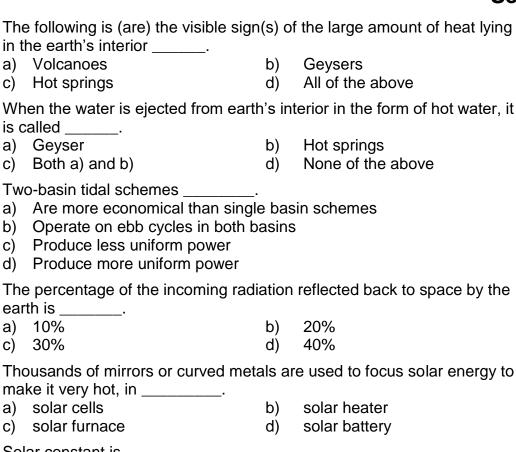
2) Figures to the right indicate full marks.

MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 Q.1 Choose the correct alternatives from the options and rewrite the 14 sentence. 1) Use of booster mirrors with a flat plate collector _____. a) Increases the reflection to the atmosphere Decreases the reflection to the atmosphere b) c) Increases the diffused radiation component on the absorber d) Increases the beam radiation component on the absorber 2) Which of the following is a disadvantage of most of the renewable energy sources? Highly polluting High waste disposal cost b) a) c) Unreliable supply d) High running cost The amount of energy available in the wind at any instant is proportional 3) to_____ of the wind speed. a) Square root power of two b) Square root power of three c) Square power Cube power d) The term biomass most often refers to 4) a) Inorganic matter Organic matter b) Ammonium compounds c) Chemicals d) 5) Biomass is useful to produce a) Chemicals b) Fibres c) Biochemicals d) Transportation fuels In energy farming, the plantation and harvesting is planned & managed 6) so as to a) Reduce manual labour b) insure the sustainability of the resource

- c) insure multiple harvesting per year
- d) minimize the cost involved
- Hot water or steam carrying geothermal energy often comes up to surface in _____.
 - a) New Zealand b) Ice land
 - c) Germany d) both a and b

Max. Marks: 70

Set R



- 13) Solar constant is a) 140 Wm⁻² 1.4 Wm⁻² b) c) 1.4k Wm⁻² $1.4 \,\mathrm{MWm^{-2}}$ d)
- The concentration-type solar collector 14)
 - a) First absorbs the radiation and then increases its concentration
 - b) Increases the density of solar radiation before absorbing it
 - c) Dilutes the density of solar radiation before absorbing it
 - d) Increases the intensity of solar radiation and then reflects it back

- Set
- 8) The following is (are) the visible sign(s) of the large amount of heat lying in the earth's interior .
 - a) Volcanoes
- 9)

10)

11)

12)

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

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Section – I

Q.2 Attempt any four.

- a) Write short note on role and potential of new and renewable sources.
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- d) Draw and explain wind speed- power characteristic and axial force characteristic of wind mill.
- e) Draw and describe the different types of horizontal axis wind mills.

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- a) Derive an expression for solar radiation on tilted surface.
- **b)** Draw and explain different zones of solar ponds? What are the applications of solar ponds? What are the required properties of salt used in solar ponds?
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Section – II

Q.4 Attempt any four

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- **b)** What is DEC? Explain the need for DEC.
- c) With neat diagram explain tidal energy conversion techniques.
- d) Draw and describe the dry steam geothermal power plant.
- e) Explain the comparison between fixed and float drum bio digesters.

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- c) Draw and describe the general layout of small hydro plant. What are the advantages and limitations of SHP?

Max. Marks: 56

12

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B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering RENEWABLE ENERGY SOURCES**

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

- Q.1 Choose the correct alternatives from the options and rewrite the sentence.
 - 1) In energy farming, the plantation and harvesting is planned & managed so as to
 - a) Reduce manual labour
 - b) insure the sustainability of the resource
 - c) insure multiple harvesting per year
 - d) minimize the cost involved
 - 2) Hot water or steam carrying geothermal energy often comes up to surface in
 - a) New Zealand b) Ice land
 - c) Germany d) both a and b
 - The following is (are) the visible sign(s) of the large amount of heat lying 3) in the earth's interior _____. b) Geysers
 - a) Volcanoes
 - All of the above c) Hot springs d)
 - 4) When the water is ejected from earth's interior in the form of hot water, it is called
 - a) Geyser
- Hot springs b)
- c) Both a) and b) None of the above d)
- Two-basin tidal schemes 5)
 - a) Are more economical than single basin schemes
 - b) Operate on ebb cycles in both basins
 - c) Produce less uniform power
 - d) Produce more uniform power
- 6) The percentage of the incoming radiation reflected back to space by the earth is _
 - a) 10% b) 20%
 - c) 30% d) 40%
- Thousands of mirrors or curved metals are used to focus solar energy to 7) make it very hot, in .
 - a) solar cells b) solar heater
 - c) solar furnace d) solar battery



Max. Marks: 70

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- Marks: 14
 - 14

Set

- 8) Solar constant is
 - a) 140 Wm⁻²

- 1.4 Wm^{-2} b) 1.4 MWm⁻²
- 1.4k Wm⁻² C) d)
- 9) The concentration-type solar collector _____
 - a) First absorbs the radiation and then increases its concentration
 - Increases the density of solar radiation before absorbing it b)
 - Dilutes the density of solar radiation before absorbing it c)
 - d) Increases the intensity of solar radiation and then reflects it back
- 10) Use of booster mirrors with a flat plate collector ____
 - a) Increases the reflection to the atmosphere
 - b) Decreases the reflection to the atmosphere
 - Increases the diffused radiation component on the absorber c)
 - Increases the beam radiation component on the absorber d)
- 11) Which of the following is a disadvantage of most of the renewable energy sources?
 - a) Highly polluting b)
 - c) Unreliable supply d)
- High waste disposal cost High running cost
- The amount of energy available in the wind at any instant is proportional 12) to of the wind speed.
 - a) Square root power of two
- b) Square root power of three
- c) Square power d) Cube power
- 13) The term biomass most often refers to
 - a) Inorganic matter Organic matter b)
 - c) Chemicals Ammonium compounds d)
- 14) Biomass is useful to produce_
 - Chemicals a) **Biochemicals**

C)

- b) **Fibres**
- d) Transportation fuels

Seat	
No.	

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Write short note on role and potential of new and renewable sources.
- **b)** Draw and explain Flat-plat collector. What are the advantages and disadvantages of flat plate collector?
- c) With neat diagram explain solar air heater.
- d) Draw and explain wind speed- power characteristic and axial force characteristic of wind mill.
- e) Draw and describe the different types of horizontal axis wind mills.

Q.3 Attempt any two.

- a) Derive an expression for solar radiation on tilted surface.
- **b)** Draw and explain different zones of solar ponds? What are the applications of solar ponds? What are the required properties of salt used in solar ponds?
- c) With neat diagrams explain classification of concentrating type collectors.

Section – II

Q.4 Attempt any four

- a) Draw and explain the floating drum type biogas plant.
- **b)** What is DEC? Explain the need for DEC.
- c) With neat diagram explain tidal energy conversion techniques.
- d) Draw and describe the dry steam geothermal power plant.
- e) Explain the comparison between fixed and float drum bio digesters.

Q.5 Attempt any two.

- a) Draw and describe the working of Hybrid cycle OTEC system.
- **b)** Draw and describe the binary cycle geothermal power plant.
- c) Draw and describe the general layout of small hydro plant. What are the advantages and limitations of SHP?

Max. Marks: 56

12

16

12

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER QUALITY

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer
book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

a)

Q.1

sentence. 1) Which one of the following device is used for improving the power factor of the system?

Choose the correct alternatives from the options and rewrite the

- Shunt reactor a) b) Synchronous phase modifier
- Series reactor C)
- 2) Shunt compensation in EHV line is resorted to _____
 - Improve voltage profile b) Reduce fault current a) Increase current
 - Improve stability d) c)

The main reason for generation of harmonics in a transformer could be _____. 3)

d)

- a) fluctuating load b) poor insulation c) mechanical vibrations saturation of core d)
- 4) Which fractional pitch will eliminate the seventh harmonic from the
 - voltage waveform of an alternator? a) 6/7 b) 7/8
 - 5/6 None of the above d) c)
- What is the actuating quantity for the relays? 5)
 - Magnitude Frequency b)
 - All of these Phase angle d) c)
- Active filters are generally made up of 6) **RL** circuits a) L circuits b)
 - **RLC** circuits **RC** circuits c) d)
- 7) Ability of circuit to respond to a certain frequency and discriminate against all other frequencies is called
 - a) Resonance b) Discrimination
 - c) Selectivity d) Quality
- Harmonics cause which of the following _ 8)
 - Nuisance Tripping a) All the Options are Correct b)
 - c) Capacitor Failure d) Heating in windings
- 9) Voltage dips cannot be caused by which of the following
 - Local and Remote faults a) Switching on of Large Loads C)
- Inductive Loading b)

Asynchronous reactor

Capacitive Switching d)



Max. Marks: 70

Marks: 14



- 10) Which of the following is not considered as good power quality voltage?
 - a) Supplied at Constant Velocity
 - b) Having a Constant sine wave with fundamental component
 - c) Power Supply is more compared to demand
 - d) Has a constant RMS Value unchanged with time
- 11) Which one of the following cannot be possible with voltage surges?
 - a) Flicker in Incandescent Lamps

All the options are correct

- b) Tripping Of Sensitive Equipment
- c) Damaging to insulation
- d) Damage to electronic components
- 12) Which of the following is long-term (hours-long) voltage sags caused by system overload?
 - a) Brown out

- b) Black out
- c) Voltage surge d) Voltage dip
- 13) Which one of the following is waveform distortion?
 - a) Notching

- b) Electrical noised) DC offset
- 14) Continuous and rapid variations in the load current magnitude which causes voltage variations.
 - a) Flicker

C)

c) Harmonics

- b) Voltage distortion
- d) Voltage sag

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER QUALITY

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Explain different methods of preventing fault.
- **b)** Explain power quality susceptibility criteria.
- c) With neat waveform, explain how voltage sag is produced during starting of induction motor.
- d) Explain various causes of transient overvoltage in a power system.
- e) What is mean by static transfer switches?

Q.3 Attempt any two.

- a) Explain with neat diagram transients produced by:
 - 1) Single capacitor switching
 - 2) Back to back capacitor switching
- **b)** Define, explain the causes and effects of the following power quality problems :
 - 1) Voltage sag
 - 2) Flicker
- c) With the help of flow chart explain the procedure of power quality problem evaluation.

Section – II

Q.4 Attempt any four

- a) Define and write equation of following harmonic indices
 - 1) Individual Harmonic Distortion
 - 2) Total Harmonic Distortion
 - 3) Total Demand Distortion
- **b)** Define power quality monitoring. Enlist various power quality monitoring equipment's.
- c) Explain with block diagram power quality monitoring system along with compensating equipment.
- d) Explain with neat circuit diagram and phasor diagram; principle of power factor correction.
- e) Explain various effects of harmonics in a power system

Q.5 Attempt any two.

- a) Define grounding. Explain reasons of grounding. Explain different problems associated with wiring and grounding.
- **b)** Explain with neat diagram operation of shunt active filter and series passive filter used for harmonic mitigation.
- c) Explain with neat diagram following grounding systems:
 - 1) Properly grounded electrical system
 - 2) Isolated grounded electrical system

Set

Max. Marks: 56

16

12

16

2) Figures to the right indicate full marks.								
	MCQ/Objective Type Questions							
Duration: 30 Minutes								
Q.1	Q.1 Choose the correct alternatives from the options and rewrite the sentence.							
	1)	Harmonics cause which of the followinga) All the Options are Correctb) Nuisance Trippingc) Capacitor Failured) Heating in windings						
	2)	Voltage dips cannot be caused by which of the following a) Local and Remote faults b) Inductive Loading c) Switching on of Large Loads d) Capacitive Switching						
	3)	 Which of the following is not considered as good power quality voltage? a) Supplied at Constant Velocity b) Having a Constant sine wave with fundamental component c) Power Supply is more compared to demand d) Has a constant RMS Value unchanged with time 						
	4)	 Which one of the following cannot be possible with voltage surges? a) Flicker in Incandescent Lamps b) Tripping Of Sensitive Equipment c) Damaging to insulation d) Damage to electronic components 						
	5)	Which of the following is long-term (hours-long) voltage sags caused bysystem overload?a) Brown outb) Black outc) Voltage surged) Voltage dip						
	6)	Which one of the following is waveform distortion?a) Notchingb) Electrical noisec) All the options are correctd) DC offset						
	7)	Continuous and rapid variations in the load current magnitude which causes voltage variations.a) Flickerb) Voltage distortion d) Voltage sag						
	8)	 Which one of the following device is used for improving the power factor of the system? a) Shunt reactor b) Synchronous phase modifier c) Series reactor d) Asynchronous reactor 						

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER QUALITY

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Seat

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Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

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Set

Max. Marks: 70

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14

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9)	Shunt compensation in EHV line isa) Improve voltage profilec) Improve stability	b)	
10)		b)	nics in a transformer could be poor insulation saturation of core
11)	Which fractional pitch will eliminate voltage waveform of an alternator?a) 6/7c) 5/6	the se b) d)	7/8
12)	What is the actuating quantity for th a) Magnitude c) Phase angle	e rela b) d)	Frequency
13)	Active filters are generally made up a) L circuits c) RLC circuits		RL circuits
14)	Ability of circuit to respond to a certa all other frequencies is called a) Resonance		equency and discriminate against Discrimination

a) Resonance b) Discrimits c) Selectivity d) Quality **SLR-FM-459**

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER QUALITY

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Explain different methods of preventing fault.
- **b)** Explain power quality susceptibility criteria.
- c) With neat waveform, explain how voltage sag is produced during starting of induction motor.
- d) Explain various causes of transient overvoltage in a power system.
- e) What is mean by static transfer switches?

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- a) Explain with neat diagram transients produced by:
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 - 1) Voltage sag
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- c) With the help of flow chart explain the procedure of power quality problem evaluation.

Section – II

Q.4 Attempt any four

- a) Define and write equation of following harmonic indices
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- **b)** Define power quality monitoring. Enlist various power quality monitoring equipment's.
- c) Explain with block diagram power quality monitoring system along with compensating equipment.
- d) Explain with neat circuit diagram and phasor diagram; principle of power factor correction.
- e) Explain various effects of harmonics in a power system

Q.5 Attempt any two.

- a) Define grounding. Explain reasons of grounding. Explain different problems associated with wiring and grounding.
- **b)** Explain with neat diagram operation of shunt active filter and series passive filter used for harmonic mitigation.
- c) Explain with neat diagram following grounding systems:
 - 1) Properly grounded electrical system
 - 2) Isolated grounded electrical system

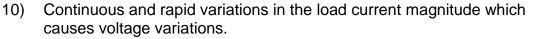
Max. Marks: 56

12

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B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER QUALITY							
		esday,26-11-201 To 05:30 PM	-			Mark	s: 70
Instruc		book.			be solved in first 30 minutes	in ans	swer
	Z) Figures to the I					
Duratio	on: 30 Mir		Objective T	ype (Questions	Mark	o. 11
			nativas from t	ha an	tions and rowrite the	Mark	5. 14 14
	sentence		natives nom ti	ne op	tions and rewrite the		14
1	́a)	at is the actuatin Magnitude Phase angle	g quantity for th	e rela b) d)	ys? Frequency All of these		
2	a)	ve filters are ger L circuits RLC circuits	nerally made up	of b) d)	RL circuits RC circuits		
3	all o a)	ity of circuit to re ther frequencies Resonance Selectivity		ain fre b) d)	equency and discriminate ag Discrimination Quality	ainst	
4	́a)	monics cause w All the Options a Capacitor Failur	are Correct	wing _ b) d)	Nuisance Tripping Heating in windings		
5	́a)	age dips cannot Local and Remo Switching on of	ote faults	b)	of the following Inductive Loading Capacitive Switching		
6	a) b) c)	Supplied at Cor	istant Velocity ant sine wave w s more compare	vith fui ed to d		e?	
7	a) b) c)	ch one of the fol Flicker in Incand Tripping Of Sen Damaging to ins Damage to elec	descent Lamps sitive Equipmer sulation	nt	sible with voltage surges?		
8	syst a)	ch of the followir em overload? Brown out Voltage surge	ng is long-term	(hours b) d)	-long) voltage sags caused Black out Voltage dip	by	
g	́a)	ch one of the fol Notching All the options a	C	orm d b) d)	istortion? Electrical noise DC offset	_	



a) Flicker c) Harmonics

a) Shunt reactor

- b) Voltage distortion
- d) Voltage sag
- 11) Which one of the following device is used for improving the power factor of the system?
 - b) Synchronous phase modifier

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Set R

- c) Series reactor d) Asynchronous reactor
- 12) Shunt compensation in EHV line is resorted to _____
 - a) Improve voltage profile
- b) Reduce fault current
- c) Improve stability d) Increase current
- 13) The main reason for generation of harmonics in a transformer could be _____.a) fluctuating load b) poor insulation
 - a) fluctuating loadc) mechanical vibrations
- d) saturation of core
- 14) Which fractional pitch will eliminate the seventh harmonic from the voltage waveform of an alternator?
 - a) 6/7

b) 7/8

c) 5/6

d) None of the above

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER QUALITY

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Explain different methods of preventing fault.
- **b)** Explain power quality susceptibility criteria.
- c) With neat waveform, explain how voltage sag is produced during starting of induction motor.
- d) Explain various causes of transient overvoltage in a power system.
- e) What is mean by static transfer switches?

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- **b)** Define, explain the causes and effects of the following power quality problems :
 - 1) Voltage sag
 - 2) Flicker
- c) With the help of flow chart explain the procedure of power quality problem evaluation.

Section – II

Q.4 Attempt any four

- a) Define and write equation of following harmonic indices
 - 1) Individual Harmonic Distortion
 - 2) Total Harmonic Distortion
 - 3) Total Demand Distortion
- **b)** Define power quality monitoring. Enlist various power quality monitoring equipment's.
- c) Explain with block diagram power quality monitoring system along with compensating equipment.
- d) Explain with neat circuit diagram and phasor diagram; principle of power factor correction.
- e) Explain various effects of harmonics in a power system

Q.5 Attempt any two.

- a) Define grounding. Explain reasons of grounding. Explain different problems associated with wiring and grounding.
- **b)** Explain with neat diagram operation of shunt active filter and series passive filter used for harmonic mitigation.
- c) Explain with neat diagram following grounding systems:
 - 1) Properly grounded electrical system
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Max. Marks: 56

12

16

16

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER QUALITY

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat No.

Q.1

sentence. Which of the following is not considered as good power quality voltage? 1)

Choose the correct alternatives from the options and rewrite the

- a) Supplied at Constant Velocity
- b) Having a Constant sine wave with fundamental component
- c) Power Supply is more compared to demand
- d) Has a constant RMS Value unchanged with time
- 2) Which one of the following cannot be possible with voltage surges?
 - a) Flicker in Incandescent Lamps
 - b) Tripping Of Sensitive Equipment
 - c) Damaging to insulation
 - d) Damage to electronic components
- Which of the following is long-term (hours-long) voltage sags caused by 3) system overload?
 - Brown out b) Black out a)
 - c) Voltage surge d) Voltage dip
- Which one of the following is waveform distortion? 4)
 - a) Notching b) Electrical noise
 - All the options are correct d) DC offset c)
- 5) Continuous and rapid variations in the load current magnitude which causes voltage variations.
 - Flicker Voltage distortion a) b)
 - d) Harmonics Voltage sag C)
- 6) Which one of the following device is used for improving the power factor of the system?
 - a) Shunt reactor
 - c) Series reactor d) Asynchronous reactor
- Shunt compensation in EHV line is resorted to _____ 7)
 - a) Improve voltage profile
- b) Reduce fault current
- d) Increase current

poor insulation

8) The main reason for generation of harmonics in a transformer could be _____.

b)

a) fluctuating load

c) Improve stability

mechanical vibrations saturation of core c) d)

Marks: 14

14

Max. Marks: 70

- 2) Figures to the right indicate full marks.

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- Synchronous phase modifier b)

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9)	Which fractional pitch will eliminate voltage waveform of an alternator?	the s	eventh harmonic from the
	a) 6/7 c) 5/6	b) d)	7/8 None of the above
10)	What is the actuating quantity for th a) Magnitude c) Phase angle	e rela b) d)	nys? Frequency All of these
11)	Active filters are generally made up a) L circuits c) RLC circuits	of b) d)	RL circuits RC circuits
12)	Ability of circuit to respond to a cert all other frequencies is called a) Resonance	ain fre b)	equency and discriminate against Discrimination
	c) Selectivity	d)	Quality
13)	Harmonics cause which of the folloa) All the Options are Correctc) Capacitor Failure	- U	Nuisance Tripping Heating in windings
14)	Voltage dips cannot be caused by v a) Local and Remote faults c) Switching on of Large Loads	b)	Inductive Loading

Seat No.

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER QUALITY

Day & Date: Tuesday,26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Explain different methods of preventing fault.
- **b)** Explain power quality susceptibility criteria.
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- e) What is mean by static transfer switches?

Q.3 Attempt any two.

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- **b)** Define, explain the causes and effects of the following power quality problems :
 - 1) Voltage sag
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- c) With the help of flow chart explain the procedure of power quality problem evaluation.

Section – II

Q.4 Attempt any four

- a) Define and write equation of following harmonic indices
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 - 2) Total Harmonic Distortion
 - 3) Total Demand Distortion
- **b)** Define power quality monitoring. Enlist various power quality monitoring equipment's.
- c) Explain with block diagram power quality monitoring system along with compensating equipment.
- d) Explain with neat circuit diagram and phasor diagram; principle of power factor correction.
- e) Explain various effects of harmonics in a power system

Q.5 Attempt any two.

- a) Define grounding. Explain reasons of grounding. Explain different problems associated with wiring and grounding.
- **b)** Explain with neat diagram operation of shunt active filter and series passive filter used for harmonic mitigation.
- c) Explain with neat diagram following grounding systems:
 - 1) Properly grounded electrical system
 - 2) Isolated grounded electrical system

Max. Marks: 56

12

16

16

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1

No.

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ENGINEERING MATHEMATICS - III**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Use of Non programmable Calculator is allowed

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MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14 The value of $\frac{1}{r^2}e^{2x}$ is 1)

a)
$$\frac{e^{2x}}{4}$$

b) $\frac{e^{2x}}{3}$
c) $\frac{e^{2x}}{2}$
d) $\frac{e^{2x}}{9}$
2) The complimentary function of $(D^3 + 8)y = 0$ is _____
a) $c_1e^{2x} + e^x[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x]$
b) $c_1e^{-2x} + e^x[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x]$
c) $c_1e^x + e^{2x}[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x]$
d) $c_1e^{-x} + e^{2x}[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x]$

3) The value of
$$\frac{1}{f(D)}e^{ax}V = is$$
 _____.
a) $e^{ax}\frac{1}{f(D+a)}V$ b) $V\frac{1}{f(D+a)}e^{ax}$
c) $\frac{1}{f(D+a)}e^{ax}$ d) $e^{ax}V\frac{1}{f(D+a)}$
4) The Particular Integral of $(x^2D^2 + 2xD)y = \frac{1}{x^2}$ is _____.

4 a) $c_1 + c_2 x^2$ b)

c)
$$\frac{1}{x^2}$$

5)

c)
$$\frac{1}{x^2}$$
 d) $\frac{1}{2x^2}$
The solution of $\sqrt{p} + \sqrt{q} = 1$ is _____.

a) z = ax + a, y + cc) $z = ax + a^2y + c$

6) If
$$Z \{1\} =$$
____.
a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$
c) $\frac{1}{z+1}$ d) $\frac{z}{z+1}$



Max. Marks: 70

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7)	Inverse Z Transform of $\frac{1}{z-a}$ $k \ge 1$	z	> a
	a) a^{k-1}	b)	a ^{k+1}
	c) $-a^{k+1}$	d)	$-a^{-k-1}$
8)	$L^{-1}\left\{\frac{1}{(s+3)^5}\right\}$ is		
	a) $e^{-3t} \frac{t^4}{4!}$ c) $e^{-3t} \frac{t^5}{5!}$	b)	$e^{+3t} \frac{t^6}{6!}$ $e^{3t} \frac{t^6}{5!}$
	c) $e^{-3t} \frac{t^5}{5!}$	d)	$e^{3t}\frac{t^6}{5!}$
9)	Inverse Laplace transform of $\frac{1}{s^2-25}$ is	5	
	a) 5 sinh 5t	b)	$\frac{1}{5}$ sinh 5t
	c) $\frac{1}{5}$ cosh 5t	d)	5 cosh 5t
10)	The value of curl (grad f), where f =	$= 2x^{2}$	$-3y^2 + 4z^2$ is
	a) $4x - 6y + 8z$ c) 0	b) d)	4xi – 6yj + 8z k 3
11)	The directional derivative of $\psi(x, y, z)$ a) Magnitude of $\psi(x, y, z)$ along \bar{r} b) Magnitude of $\nabla^2 \psi(x, y, z)$ along \bar{r} c) Magnitude of $\nabla \psi(x, y, z)$ along \bar{r} d) Magnitude of $\nabla . \psi(x, y, z)$ along	r -	lirection of \bar{r} is
12)	Fourier series of $f(x) = 1 - x^2$ in (0 a) Only sine terms b) Only cosine terms c) Both sine and cosine terms d) Neither sine terms nor cosine terms		ontains
13)	In the internal $(0, \pi)$ the constant ter	m in t	the sine series of $f(x) = x$ is
	 a) π/2	b)	π
	c) π/4	d)	0
14)	The directional derivative of $\phi = x + $ vector	y + z	at (1,1,1) is maximum along the
	a) $i + 2j + 2k$	b)	2i + 2j - k

c) i + j + k d) None of these

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No.	

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ENGINEERING MATHEMATICS-III**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Q.5 is compulsory and attempt any two questions from the section – I.

2) Q.9 is compulsory and attempt any two questions from section - II.

- 3) Figures to the right indicate full marks.
- 4) Use of non programmable calculator is allowed.

Section – I

a) Solve $(D^2 + 3D + 2)y = e^{e^x}$. b) Solve $(D^2 - 2D + 1)y = e^{3x}x^2$ 03 Q.2 03

c) Solve
$$x^3 \frac{d^3y}{dx^3} + 2x^2 \frac{d^2y}{dx^2} = x^4$$
 03

Q.3 a) Solve
$$yp - x^2q = x^2y$$
.
b) Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
O3

c) Solve
$$p^2 + q^2 = \frac{3a^2}{z^2}$$
. **03**

Q.4 a) Find
$$Z \{x_k\}$$
, where
 $\{x_k\} = c^k \cos \alpha k, \ k \ge 0$

b) Find the inverse z-transform of
$$\frac{z}{(z-a)}$$
, $|z| > a$ 03

c) Find inverse Z transform of
$$f(z) = \frac{z}{(z-1)(z-2)}$$
 for $|z| > 2$ 03

Q.5 a) An uncharged condenser of the capacity c is charged by applying an emf 04 of E sin nt through the leads of an inductance L and resistance. The charge Q on the plate of the condenser satisfies the Differential equation

$$\frac{d^2Q}{dt^2} + \frac{Q}{Lc} = \frac{E}{L}\sin nt$$

Then show that charge at any time t is given by

$$Q = \frac{E}{2n^2L} [\sin nt - nt \cos nt] \quad \text{Where } n^2 = \frac{1}{Lc}$$

c) Solve the P.D.E.
$$\frac{\partial z}{\partial x} - k \frac{\partial u}{\partial y} = 0.$$
 03

d) Find inverse Z transform of
$$\frac{1}{(z-2)(z-3)}$$
 for $|z| > 3$. **03**

Section – II

Q.6

- 03 Find Inverse Laplace Transform of log $\sqrt{\frac{s^2+4}{s^2}}$ a)
- Find the laplace transform of $e^t \left(\int_0^t \frac{\sin(t)}{t} dt \right)$ 03 b)
- Find the laplace transform of $te^{3t} \sin 2t$ 03 C)
- Q.7 a) 05 04
- Find the fourier series for f(x) in $(-\pi, \pi)f(x) = 3x^3$ Obtain half range cosine series for $f(x) = \begin{cases} 1 & \text{if } 0 < x < l/2 \\ -1 & \text{if } l/2 < x < l \end{cases}$ b)

Set P

Q.8	a)	Find the constants a, b, c if $\vec{F} = (axy + bz^3)i + (3x^2 - cz)j + (3xz^2 - y)k$ is irrotational.	03
	b)	Find the tangential and normal components of acceleration of a particle moving on the curve $x = e^t \cos t + 10$, $y = e^t \sin t - 10$ at t=0.	03
	C)	Find the value of n such that $r^n \vec{r}$ is solenoidal.	03
Q.9	a) b)	Find the fourier series of $f(x) = e^x$ in $(0,2\pi)$ Attempt any one of the following questions.	06 04
		1) Find the inverse laplace transform of $\frac{1}{s^2(s+1)}$	
		2) Evaluate by using laplace transform $\int_{0}^{\infty} e^{-2t} \left(\frac{\sin t + \sin 3t}{t}\right) dt$	

Seat No. S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019

ENGINEERING MATHEMATICS - III Day & Date: Saturday, 07-12-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

Electrical Engineering

2) Use of Non programmable Calculator is allowed

MCQ/Objective Type Questions

Duration: 30 Minutes

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - $L^{-1}\left\{\frac{1}{(s+3)^5}\right\} \text{ is } ___.$ a) $e^{-3t}\frac{t^4}{4!}$ 1) b) $e^{+3t} \frac{t^6}{6!}$ d) $e^{3t} \frac{t^6}{5!}$ c) $e^{-3t} \frac{t^5}{5!}$ Inverse Laplace transform of $\frac{1}{s^2-25}$ is _____ 2) b) $\frac{1}{5}$ sinh 5t a) 5 sinh 5t d) 5 cosh 5t c) $\frac{1}{r} \cosh 5t$ The value of curl (grad *f*), where $f = 2x^2 - 3y^2 + 4z^2$ is _____. a) 4x - 6y + 8z b) 4xi - 6yj + 8z k c) 0 d) 3 3) 4) The directional derivative of $\psi(x, y, z)$ in direction of \bar{r} is . a) Magnitude of $\psi(x, y, z)$ along \bar{r} b) Magnitude of $\nabla^2 \psi(x, y, z)$ along \bar{r}
 - c) Magnitude of $\nabla \psi(x, y, z)$ along \bar{r}
 - d) Magnitude of ∇ . $\psi(x, y, z)$ along \bar{r}

Fourier series of $f(x) = 1 - x^2$ in (0,1) contains . 5)

- Only sine terms a)
- Only cosine terms b)
- c) Both sine and cosine terms
- d) Neither sine terms nor cosine terms
- 6) In the internal $(0, \pi)$ the constant term in the sine series of f(x) = x is
 - a) π/2 b) π
 - c) π/4 d) 0

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Marks: 14

Max. Marks: 70

Set Q 7) The directional derivative of $\phi = x + y + z$ at (1,1,1) is maximum along the vector ____ a) i + 2j + 2k b) 2i + 2j - k $c) \quad i+j+k$ d) None of these The value of $\frac{1}{D^2}e^{2x}$ is _____. 8) b) $\frac{e^{2x}}{3}$ d) $\frac{e^{2x}}{9}$ a) $\frac{e^{2x}}{4}$ c) $\frac{e^{2x}}{2}$ The complimentary function of $(D^3 + 8)y = 0$ is _____. 9) a) $c_1 e^{2x} + e^x [c_2 \cos \sqrt{3}x + c_3 \sin \sqrt{3}x]$ b) $c_1 e^{-2x} + e^x [c_2 \cos \sqrt{3}x + c_3 \sin \sqrt{3}x]$ c) $c_1 e^x + e^{2x} [c_2 \cos \sqrt{3}x + c_3 \sin \sqrt{3}x]$ d) $c_1 e^{-x} + e^{2x} [c_2 \cos \sqrt{3}x + c_3 \sin \sqrt{3}x]$ The value of $\frac{1}{f(D)}e^{ax}V =$ is _____. 10) b) $V \frac{1}{f(D+a)} e^{ax}$ a) $e^{ax} \frac{1}{f(D+a)}V$ c) $\frac{1}{f(D+a)}e^{ax}$ d) $e^{ax}V\frac{1}{f(D+a)}$ The Particular Integral of $(x^2D^2 + 2xD)y = \frac{1}{x^2}$ is _____. 11) a) $c_1 + c_2 x^2$ b) $x - \frac{1}{r^2}$ c) $\frac{1}{r^2}$ d) $\frac{1}{2r^2}$ x^2 The solution of $\sqrt{p} + \sqrt{q} = 1$ is _____. $z = ax + (1 - \sqrt{a})^2 y + c$ None of these 12) If $Z \{1\} =$ _____. a) $\frac{z}{z-1}$ 13) b) $\frac{1}{7-1}$ d) $\frac{z}{z+1}$ c) $\frac{1}{z+1}$ Inverse Z Transform of $\frac{1}{z-a}$ $k \ge 1$ |z| > a _____. a) a^{k-1} b) a^{k+1} 14) d) $-a^{-k-1}$ c) $-a^{k+1}$

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Set

Seat	
No.	

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENGINEERING MATHEMATICS-III

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Q.5 is compulsory and attempt any two questions from the section -I.

2) Q.9 is compulsory and attempt any two questions from section - II.

- 3) Figures to the right indicate full marks.
- 4) Use of non programmable calculator is allowed.

Section – I

Q.2 a) Solve $(D^2 + 3D + 2)y = e^{e^x}$. **b)** Solve $(D^2 - 2D + 1)y = e^{3x}x^2$ **03**

c) Solve
$$x^3 \frac{d^3y}{dx^3} + 2x^2 \frac{d^2y}{dx^2} = x^4$$
 03

Q.3 a) Solve
$$yp - x^2q = x^2y$$
.
b) Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
03

c) Solve
$$p^2 + q^2 = \frac{3a^2}{z^2}$$
. **03**

Q.4 a) Find
$$Z \{x_k\}$$
, where
 $\{x_k\} = c^k \cos \alpha k, \ k \ge 0$

b) Find the inverse z-transform of
$$\frac{z}{(z-a)}$$
, $|z| > a$ 03

c) Find inverse Z transform of
$$f(z) = \frac{z}{(z-1)(z-2)}$$
 for $|z| > 2$ 03

Q.5 a) An uncharged condenser of the capacity c is charged by applying an emf of E sin nt through the leads of an inductance L and resistance. The charge Q on the plate of the condenser satisfies the Differential equation

$$\frac{d^2Q}{dt^2} + \frac{Q}{Lc} = \frac{E}{L}\sin nt$$

Then show that charge at any time t is given by

$$Q = \frac{E}{2n^2L} [\sin nt - nt \cos nt] \quad \text{Where } n^2 = \frac{1}{Lc}$$

c) Solve the P.D.E.
$$\frac{\partial z}{\partial x} - k \frac{\partial u}{\partial y} = 0.$$

d) Find inverse Z transform of
$$\frac{1}{(z-2)(z-3)}$$
 for $|z| > 3$. **03**

Section – II

Q.6

a) Find Inverse Laplace Transform of log
$$\sqrt{\frac{s^2+4}{s^2}}$$

b) Find the laplace transform of
$$e^t \left(\int_0^t \frac{\sin(t)}{t} dt \right)$$

c) Find the laplace transform of
$$te^{3t} \sin 2t$$
 03

Q.7 a) Find the fourier series for
$$f(x)$$
 in $(-\pi, \pi)f(x) = 3x^3$ **05**
(1) of $x < l/2$ **04**

b) Obtain half range cosine series for
$$f(x) = \begin{cases} 1 & l \neq 0 < x < l/2 \\ -1 & if l/2 < x < l \end{cases}$$

Set Q

Q.8	a)	Find the constants a, b, c if $\vec{F} = (axy + bz^3)i + (3x^2 - cz)j + (3xz^2 - y)k$ is irrotational.	03
	b)	Find the tangential and normal components of acceleration of a particle moving on the curve $x = e^t \cos t + 10$, $y = e^t \sin t - 10$ at t=0.	03
	c)	Find the value of n such that $r^n \vec{r}$ is solenoidal.	03
Q.9	a) b)	Find the fourier series of $f(x) = e^x$ in $(0,2\pi)$ Attempt any one of the following questions.	06 04
		1) Find the inverse laplace transform of $\frac{1}{s^2(s+1)}$	
		2) Evaluate by using laplace transform $\int_{0}^{\infty} e^{-2t} \left(\frac{\sin t + \sin 3t}{t}\right) dt$	

S.E. (Part – I) (Old) (CGPA) Exa Electrical Engi ENGINEERING MATH	neering
Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM	Max. Marks: 70
Instructions: 1) Q. No. 1 is compulsory and shou Book. 2) Use of Non programmable Calcu	
MCQ/Objective Typ	e Questions
Duration: 30 Minutes	Marks: 14
Q.1 Choose the correct alternatives from the 1) The solution of $\sqrt{p} + \sqrt{q} = 1$ is a) $z = ax + a, y + c$ b c) $z = ax + a^2y + c$ correct) $z = ax + (1 - \sqrt{a})^2 y + c$

 $x + (1 - \sqrt{a})^2 y + c$ of these If $Z \{1\} = _$. a) $\frac{z}{z-1}$. 2) b) $\frac{1}{z-1}$ d) $\frac{z}{z+1}$ c) $\frac{1}{z+1}$

Inverse Z Transform of $\frac{1}{z-a}$ $k \ge 1$ |z| > a _____. 3)

a)
$$a^{k-1}$$
 b) a^{k+1}
c) $-a^{k+1}$ d) $-a^{-k-1}$
4) $L^{-1}\left\{\frac{1}{(s+3)^5}\right\}$ is _____.
a) $e^{-3t}\frac{t^4}{4!}$ b) $e^{+3t}\frac{t^6}{6!}$
c) $e^{-3t}\frac{t^5}{5!}$ d) $e^{3t}\frac{t^6}{5!}$
5) Inverse Laplace transform of $\frac{1}{s^2-25}$ is _____.
a) $5\sinh 5t$ b) $\frac{1}{5}\sinh 5t$
c) $\frac{1}{5}\cosh 5t$ d) $5\cosh 5t$
6) The value of curl (grad f), where $f = 2x^2 - 3y^2 + 4z^2$ is _____.

b) 4xi - 6yj + 8z ka) 4x - 6y + 8zd) 3 c) 0

7) The directional derivative of $\psi(x, y, z)$ in direction of \bar{r} is _____.

a) Magnitude of $\psi(x, y, z)$ along \bar{r}

- b) Magnitude of $\nabla^2 \psi(\mathbf{x}, \mathbf{y}, \mathbf{z})$ along \bar{r}
- c) Magnitude of $\nabla \psi(x, y, z)$ along \bar{r}
- d) Magnitude of ∇ . $\psi(x, y, z)$ along \bar{r}

n Nov/Dec-2019 CS - III

Seat

No.

Set R

SLR-FM-720

Max. Marks: 70

Set | R Fourier series of $f(x) = 1 - x^2$ in (0,1) contains _____. 8) a) Only sine terms b) Only cosine terms c) Both sine and cosine terms Neither sine terms nor cosine terms In the internal $(0, \pi)$ the constant term in the sine series of f(x) = x is 9) a) π/2 b) π c) $\pi/4$ d) 0 10) The directional derivative of $\phi = x + y + z$ at (1,1,1) is maximum along the vector _____. a) i + 2j + 2kb) 2i + 2j - kc) i+j+kd) None of these The value of $\frac{1}{D^2}e^{2x}$ is _____. 11) a) $\frac{e^{2x}}{4}$ b) $\frac{e^{2x}}{3}$ d) $\frac{e^{2x}}{3}$ c) $\frac{e^{2x}}{2}$ The complimentary function of $(D^3 + 8)y = 0$ is _____. 12) a) $c_1 e^{2x} + e^x [c_2 \cos \sqrt{3}x + c_3 \sin \sqrt{3}x]$ b) $c_1 e^{-2x} + e^x [c_2 \cos \sqrt{3}x + c_3 \sin \sqrt{3}x]$ C) $c_1 e^x + e^{2x} [c_2 cos \sqrt{3}x + c_3 sin \sqrt{3}x]$ d) $c_1 e^{-x} + e^{2x} [c_2 \cos \sqrt{3}x + c_3 \sin \sqrt{3}x]$ The value of $\frac{1}{f(D)}e^{ax}V =$ is _____. 13) a) $e^{ax} \frac{1}{f(D+a)}V$ b) $V \frac{1}{f(D+a)} e^{ax}$ d) $e^{ax}V\frac{1}{f(D+a)}$ c) $\frac{1}{f(D+a)}e^{ax}$ The Particular Integral of $(x^2D^2 + 2xD)y = \frac{1}{x^2}$ is _____. 14) a) $c_1 + c_2 x^2$ b) $x - \frac{1}{r^2}$ c) $\frac{1}{x^2}$ d) $\frac{1}{2r^2}$

SLR-FM-720

Seat	
No.	

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ENGINEERING MATHEMATICS-III**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Q.5 is compulsory and attempt any two questions from the section – I.

2) Q.9 is compulsory and attempt any two questions from section - II.

- 3) Figures to the right indicate full marks.
- 4) Use of non programmable calculator is allowed.

Section – I

a) Solve $(D^2 + 3D + 2)y = e^{e^x}$. b) Solve $(D^2 - 2D + 1)y = e^{3x}x^2$ 03 Q.2 03

c) Solve
$$x^3 \frac{d^3y}{dx^3} + 2x^2 \frac{d^2y}{dx^2} = x^4$$
 03

Q.3 a) Solve
$$yp - x^2q = x^2y$$
.
b) Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
O3

c) Solve
$$p^2 + q^2 = \frac{3a^2}{z^2}$$
. **03**

Q.4 a) Find
$$Z \{x_k\}$$
, where
 $\{x_k\} = c^k \cos \alpha k, \ k \ge 0$

b) Find the inverse z-transform of
$$\frac{z}{(z-a)}$$
, $|z| > a$ 03

c) Find inverse Z transform of
$$f(z) = \frac{z}{(z-1)(z-2)}$$
 for $|z| > 2$ 03

Q.5 a) An uncharged condenser of the capacity c is charged by applying an emf 04 of E sin nt through the leads of an inductance L and resistance. The charge Q on the plate of the condenser satisfies the Differential equation

$$\frac{d^2Q}{dt^2} + \frac{Q}{Lc} = \frac{E}{L}\sin nt$$

Then show that charge at any time t is given by

$$Q = \frac{E}{2n^2L} [\sin nt - nt \cos nt] \quad \text{Where } n^2 = \frac{1}{Lc}$$

c) Solve the P.D.E.
$$\frac{\partial z}{\partial x} - k \frac{\partial u}{\partial y} = 0.$$

d) Find inverse Z transform of
$$\frac{1}{(z-2)(z-3)}$$
 for $|z| > 3$. **03**

Section – II

Q.6

- 03 Find Inverse Laplace Transform of log $\sqrt{\frac{s^2+4}{s^2}}$ a)
- 03 Find the laplace transform of $e^t \left(\int_0^t \frac{\sin(t)}{t} dt \right)$ b)
- Find the laplace transform of $te^{3t} \sin 2t$ 03 C)
- Q.7 a) 05 04
- Find the fourier series for f(x) in $(-\pi, \pi)f(x) = 3x^3$ Obtain half range cosine series for $f(x) = \begin{cases} 1 & \text{if } 0 < x < l/2 \\ -1 & \text{if } l/2 < x < l \end{cases}$ b)

Set R

Q.8	a)	Find the constants a, b, c if $\vec{F} = (axy + bz^3)i + (3x^2 - cz)j + (3xz^2 - y)k$ is irrotational.	03
	b)	Find the tangential and normal components of acceleration of a particle moving on the curve $x = e^t \cos t + 10$, $y = e^t \sin t - 10$ at t=0.	03
	c)	Find the value of n such that $r^n \vec{r}$ is solenoidal.	03
Q.9	a) b)	Find the fourier series of $f(x) = e^x$ in $(0,2\pi)$ Attempt any one of the following questions.	06 04
		1) Find the inverse laplace transform of $\frac{1}{s^2(s+1)}$	
		2) Evaluate by using laplace transform $\int_{0}^{\infty} e^{-2t} \left(\frac{\sin t + \sin 3t}{t}\right) dt$	

No.								Set	S
		S.E	E. (Part – I)	• • •	•		ination Nov/Dec-20	19	
			FN	Electric GINEERIN	-		ering MATICS - III		
			turday, 07-1. 1 To 01:00 P	2-2019				Max. Marks	5: 70
Instru	iction	is: 1		compulsory a	and show	uld b	e solved in first 30 minu	utes in ansv	ver
		2	Book. 2) Use of Nor	n programmal	ble Calc	ulato	or is allowed		
D (1)		. . .		CQ/Object	ive Ty	pe (Questions		
Durati								Marks	
	Choc 1)			l (grad <i>f</i>), wh	here $f =$	$2x^2$	tions and rewrite the s $-3y^2 + 4z^2$ is 4xi - 6yj + 8z k 3	sentence.	14
	2)	a)	Magnitude o Magnitude o Magnitude o	derivative of ψ of $\psi(x, y, z)$ all of $\nabla^2 \psi(x, y, z)$ of $\nabla \psi(x, y, z)$ of $\nabla \psi(x, y, z)$	long \bar{r} along \bar{r} along \bar{r}		lirection of \bar{r} is		
	3)	Fou a) b) c) d)	Only sine te Only cosine Both sine a	rms	ns		ontains		
	4)	In tl	he internal ((), π) the const	tant tern	n in 1	the sine series of $f(x)$ =	= x is	
		a)	 π/2			b)	π		
		c)	π/4			d)	0		
	5)		e directional o tor	derivative of q	$\phi = x + y$	y + z	at (1,1,1) is maximum a	along the	
		a)	i + 2j + 2k			,	2i + 2j - k		
	C)	,	i + j + k	2		d)	None of these		
	6)	The	e value of $\frac{1}{D^2}$	e^{2x} is			ρ^{2x}		
		a)	$\frac{e^{2x}}{4}$			b)	$\frac{3}{3}$		
		c)	$\frac{e^{2x}}{2}$			d)	$\frac{e^{2x}}{3}\\\frac{e^{2x}}{9}$		
	7)			ary function $c_2 cos \sqrt{3}x + c_3$			= 0 is		
		b)	$c_1 e^{-2x} + e^x$	$[c_2 cos\sqrt{3}x + c$	c₃sin√3:	x]			
		c)	$c_1 e^x + e^{2x} [a$	$c_2 cos \sqrt{3}x + c_3$	$sin\sqrt{3}x$]			

c) $c_1 e^x + e^{2x} [c_2 cos \sqrt{3x} + c_3 sin \sqrt{3x}]$ d) $c_1 e^{-x} + e^{2x} [c_2 cos \sqrt{3x} + c_3 sin \sqrt{3x}]$

SLR-FM-720

Seat

Set S

The value of $\frac{1}{f(D)}e^{ax}V =$ is _____. 8) b) $V \frac{1}{f(D+a)} e^{ax}$ a) $e^{ax} \frac{1}{f(D+a)}V$ c) $\frac{1}{f(D+a)}e^{ax}$ d) $e^{ax}V\frac{1}{f(D+a)}$ The Particular Integral of $(x^2D^2 + 2xD)y = \frac{1}{x^2}$ is _____. 9) a) $c_1 + c_2 x^2$ b) $x - \frac{1}{x^2}$ c) $\frac{1}{r^2}$ d) $\frac{1}{2r^2}$ x^{2} The solution of $\sqrt{p} + \sqrt{q} = 1$ is _____. a) z = ax + a, y + c b) $z = ax + (1 - \sqrt{a})^{2}y + c$ $x = a^{2}x + c$ d) None of these 10) 11) If $Z \{1\} =$ ____. a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$ d) $\frac{z}{z+1}$ c) $\frac{1}{z+1}$ 12) Inverse Z Transform of $\frac{1}{z-a}$ $k \ge 1$ |z| > a _____. a) a^{k-1} b) a^{k+1} c) $-a^{k+1}$ d) $-a^{-k-1}$ 13) $L^{-1}\left\{\frac{1}{(s+3)^5}\right\}$ is _____. a) $e^{-3t}\frac{t^4}{4!}$ b) $e^{+3t} \frac{t^6}{6t}$ d) $e^{3t} \frac{t^6}{5!}$ c) $e^{-3t} \frac{t^5}{5!}$ 14) Inverse Laplace transform of $\frac{1}{s^2-25}$ is _____. b) $\frac{1}{5}$ sinh 5t a) 5 sinh 5t d) 5 cosh 5t c) $\frac{1}{5}$ cosh 5t

SLR-FM-720

Set S

Seat	
No.	

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ENGINEERING MATHEMATICS-III**

Day & Date: Saturday, 07-12-2019 Time: 10:00 AM To 01:00 PM

Max. Marks: 56

Instructions: 1) Q.5 is compulsory and attempt any two questions from the section – I.

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- 3) Figures to the right indicate full marks.
- 4) Use of non programmable calculator is allowed.

Section – I

a) Solve $(D^2 + 3D + 2)y = e^{e^x}$. b) Solve $(D^2 - 2D + 1)y = e^{3x}x^2$ 03 Q.2 03

c) Solve
$$x^3 \frac{d^3y}{dx^3} + 2x^2 \frac{d^2y}{dx^2} = x^4$$
 03

Q.3 a) Solve
$$yp - x^2q = x^2y$$
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b) Solve $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
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, $|z| > a$ 03

c) Find inverse Z transform of
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 for $|z| > 2$ 03

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Then show that charge at any time t is given by

$$Q = \frac{E}{2n^2L} [\sin nt - nt \cos nt] \quad \text{Where } n^2 = \frac{1}{Lc}$$

c) Solve the P.D.E.
$$\frac{\partial z}{\partial x} - k \frac{\partial u}{\partial y} = 0.$$

d) Find inverse Z transform of
$$\frac{1}{(z-2)(z-3)}$$
 for $|z| > 3$. **03**

Section – II

Q.6

- 03 Find Inverse Laplace Transform of log $\sqrt{\frac{s^2+4}{s^2}}$ a)
- 03 Find the laplace transform of $e^t \left(\int_0^t \frac{\sin(t)}{t} dt \right)$ b)
- Find the laplace transform of $te^{3t} \sin 2t$ 03 C)
- Q.7 a) 05 04
- Find the fourier series for f(x) in $(-\pi, \pi)f(x) = 3x^3$ Obtain half range cosine series for $f(x) = \begin{cases} 1 & \text{if } 0 < x < l/2 \\ -1 & \text{if } l/2 < x < l \end{cases}$ b)

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Q.8	a)	Find the constants a, b, c if $\vec{F} = (axy + bz^3)i + (3x^2 - cz)j + (3xz^2 - y)k$ is irrotational.	03
	b)	Find the tangential and normal components of acceleration of a particle moving on the curve $x = e^t \cos t + 10$, $y = e^t \sin t - 10$ at t=0.	03
	C)	Find the value of n such that $r^n \vec{r}$ is solenoidal.	03
Q.9	a) b)	Find the fourier series of $f(x) = e^x$ in $(0,2\pi)$ Attempt any one of the following questions.	06 04
		1) Find the inverse laplace transform of $\frac{1}{s^2(s+1)}$	
		2) Evaluate by using laplace transform $\int_{0}^{\infty} e^{-2t} \left(\frac{\sin t + \sin 3t}{t} \right) dt$	

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S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – I**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory, and should be solved in first 30 minutes in answer book.

- 2) Assume suitable data if necessary.
- 3) Figure to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- Starters are used with D.C. motors because _____. 1)
 - a) these motors have high starting torque
 - b) these motors are not self-starting
 - c) backe.m.f. of these motors is zero initially
 - d) to restrict armature current as there is no back e.m.f. while starting
- In case of D.C. shunt motors the speed is dependent on back e.m.f. only 2) because
 - a) back e.m.f. is equal to armature drop
 - b) armature drop is negligible
 - c) flux is proportional to armature current
 - d) flux is practically constant in D.C. shunt motors
- No-load speed of which of the follow mg motor will be highest? 3)
 - a) Shunt motor b) Series motor
 - c) Cumulative compound motor d) Differentiate compound motor
- 4) In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be
 - a) almost negligible
- b) rated full-load current
- c) less than full-load current d) more than full-load current
- 5) According to Fleming's left-hand rule, when the fore finger points in the direction of the field or flux, the middle finger will point in the direction of
 - a) current in the conductor c) resultant force on conductor
 - b) voltage of conductor d) none of the above
- 6) Three point starter can be used for _____.
 - series motor only a)
 - b) shunt motor only
 - c) compound motor only
 - d) both shunt and compound motor



Max. Marks: 70

Marks: 14

Set | P 7) The current drawn by the armature of D.C. motor is directly proportional to a) the torque required b) the speed of the motor c) the voltage across the terminals d) none of the above 8) A transformer core is laminated to ____ a) reduce hysteresis loss b) reduce eddy current losses c) reduce copper losses d) reduce all above lasses 9) In a step-down transformer, there is a change of 15 A in the load current. This results in change of supply current of. less than 15 A b) more than 15 A a) d) none of the above 15 A C) The efficiencies of transformers compared with that of electric motors of 10) the same power are. a) about the same b) much smaller d) somewhat smaller c) much higher In the case of lap winding resultant pitch is _ 11) a) multiplication of front and back pitches b) division of front pitch by back pitch c) sum of front and back pitches d) difference of front and bock pitches A shunt generator delivers 195A at 250V. Ra=0.02 Ω and Rsh=50 Ω . What 12) is the value of generated emf? a) 246V b) 270V c) 254V d) 282V 13) Interpole flux should be sufficient to a) neutralise the commutating self induced e.m.f b) neutralise the armature reaction flux c) neutralise both the armature reaction flux as well as commutating e.m.f. induced in the coil d) perform none of the above functions 14) In a D.C. generator the number of mechanical degrees and electrical degrees will be the same when ____ a) r.p.m. is more than 300 b) r.p.m. is less than 300 c) number of poles is 4 d) number of poles is 2

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Seat No.

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – I**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Assume the suitable data whenever necessary.
- 3) Figures to right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.
- The wave wound armature of a 6-pole DC generator has 51 slots. Each slot b) contains 20 conductors. The voltage to be generated is 250V. Calculate the speed of the coupled prime mover, if the flux/pole is 0.07 wb. The armature is rewound as lap machine and run by the same prime mover. Calculate the generated voltage.
- c) An armature of 6-pole machine 75cm in diameter has 664 conductors each having an effective length of 30cm and carrying a current of 100A. if 70% of total conductors lie simultaneously in the field of average flux density 0.85wb/m2, calculate
 - armature torque 1)
 - horse power output at 250 rpm 2)
- d) With neat circuit diagram explain Swinburne's test and how efficiency of generator and motor are computed with this test. Write the advantages of this test.
- e) A 6 pole lap would dc generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate
 - the speed at which the generator must be run to generate 300 V 1)
 - 2) what would be speed if the generator is wave wound?
- A 4 pole generator has a wave would armature with 772 conductors and it **f**) delivers 100A on full load. If the brush leads 80, calculate the armature demagnetizing and cross magnetizing amper-turn per pole.

Q.3 Solve any two.

- a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?
- b) A 100 H.P, 500V shunt motor has 4 pole and a 2 circuit wave winding with 492 armature conductor. The flax is 50m Wb per pole and the full load efficiency 92%. The armature and commutating field winding have a total resistance of 0.1Ω . The shunt field resistance is 250Ω . Calculate for full load.
 - 1) the speed
 - 2) the useful torque
- c) With the help of neat sketch explain the speed control methods of D.C. series motor.

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Max. Marks: 56

Section – II

Q.4 Solve any four

- a) With neat sketch explain open circuit and short circuit test of transformer. How equivalent circuit parameters and efficiency of a transformer are computed?
- **b)** Explain with phasor diagram a practical transformer on load condition.
- c) A 3- phase, 50 Hz transformer has a delta-connected primary and starconnected secondary, the line voltages being 22000V and 400V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?
- d) Derive the expression for saving of copper in autotransformer.
- e) A 230/2300V transformer take a no load current of 6.5 A and absorbs 187W. if the resistance of the primary is 0.6 Ω . Find
 - 1) The core loss
 - 2) No load power factor
 - 3) Active component of current
 - 4) Magnetizing current
- **f)** A 1-phase transformer delivers 10A, 220V to a resistive load while the primary draws 6A at 0.9 lagging power factor from 450V, 50Hz supply. The turns ratio of the transformer is 2. Calculate efficiency and regulation under the condition.

Q.5 Solve any two.

- a) With the help of neat diagram explain Scott connection of three phase transformer.
- b) A 5 kVA distribution transformer has a full load efficiency of 95% at which copper loss equal to iron loss. Transformer is loaded for 24 hrs as under:no load for 10 hrs, one forth full load for 7 hrs, half full load for 5 hrs and full load for 2 hrs. Calculate the all-day efficiency of the transformer. Assume unity power factor.
- c) A single phase, 220/110V, 5kVA, transformer has an efficiency of 96% on full load at unity power factor and 95% on half load at unity power factor. Determine for full load condition, iron loss and copper loss of the transformer. Also determine efficiency on full load at 0.8 power factor lagging.



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S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

ELECTRICAL MACHINE - I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory, and should be solved in first 30 minutes in answer book.

- 2) Assume suitable data if necessary.
- 3) Figure to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

1) A transformer core is laminated to _____

a) reduce hysteresis loss

- b) reduce eddy current losses
- c) reduce copper losses d) reduce all above lasses
- 2) In a step-down transformer, there is a change of 15 A in the load current. This results in change of supply current of.
 - a) less than 15 A
 - c) 15 A d) none of the above
- 3) The efficiencies of transformers compared with that of electric motors of the same power are.
 - a) about the same
- b) much smallerd) somewhat smaller

b) more than 15 A

- c) much higher
 d) somewhat
 4) In the case of lap winding resultant pitch is _____
 - a) multiplication of front and back pitches
 - b) division of front pitch by back pitch
 - c) sum of front and back pitches
 - d) difference of front and bock pitches
- 5) A shunt generator delivers 195A at 250V. Ra=0.02 Ω and Rsh=50 Ω . What is the value of generated emf?
 - a) 246V b) 270V c) 254V d) 282V
- 6) Interpole flux should be sufficient to _____
 - a) neutralise the commutating self induced e.m.f
 - b) neutralise the armature reaction flux
 - c) neutralise both the armature reaction flux as well as commutating e.m.f. induced in the coil
 - d) perform none of the above functions
- 7) In a D.C. generator the number of mechanical degrees and electrical degrees will be the same when _____.
 - a) r.p.m. is more than 300 b) r.p.m. is less than 300
 - c) number of poles is 4 d) number of poles is 2

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Marks: 14

Max. Marks: 70

- 8) Starters are used with D.C. motors because _____.
 - a) these motors have high starting torque
 - b) these motors are not self-starting
 - c) backe.m.f. of these motors is zero initially
 - d) to restrict armature current as there is no back e.m.f. while starting
- In case of D.C. shunt motors the speed is dependent on back e.m.f. only 9) because ___
 - a) back e.m.f. is equal to armature drop
 - b) armature drop is negligible
 - c) flux is proportional to armature current
 - d) flux is practically constant in D.C. shunt motors
- No-load speed of which of the follow mg motor will be highest? 10)
 - a) Shunt motor b) Series motor
 - c) Cumulative compound motor d) Differentiate compound motor
- In a D.C. shunt motor, under the conditions of maximum power, the 11) current in the armature will be
 - a) almost negligible
- b) rated full-load current

Set C

- c) less than full-load current
 - d) more than full-load current
- According to Fleming's left-hand rule, when the fore finger points in the 12) direction of the field or flux, the middle finger will point in the direction of _____.
 - a) current in the conductor
- b) voltage of conductor
- c) resultant force on conductor d) none of the above
- 13) Three point starter can be used for _____.
 - a) series motor only
 - b) shunt motor only
 - c) compound motor only
 - d) both shunt and compound motor
- 14) The current drawn by the armature of D.C. motor is directly proportional
 - to .
 - a) the torque required
 - b) the speed of the motor
 - c) the voltage across the terminals
 - d) none of the above

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Seat No.

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – I**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Assume the suitable data whenever necessary.
- 3) Figures to right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.
- The wave wound armature of a 6-pole DC generator has 51 slots. Each slot b) contains 20 conductors. The voltage to be generated is 250V. Calculate the speed of the coupled prime mover, if the flux/pole is 0.07 wb. The armature is rewound as lap machine and run by the same prime mover. Calculate the generated voltage.
- c) An armature of 6-pole machine 75cm in diameter has 664 conductors each having an effective length of 30cm and carrying a current of 100A. if 70% of total conductors lie simultaneously in the field of average flux density 0.85wb/m2, calculate
 - armature torque 1)
 - horse power output at 250 rpm 2)
- d) With neat circuit diagram explain Swinburne's test and how efficiency of generator and motor are computed with this test. Write the advantages of this test.
- e) A 6 pole lap would dc generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate
 - the speed at which the generator must be run to generate 300 V 1)
 - 2) what would be speed if the generator is wave wound?
- A 4 pole generator has a wave would armature with 772 conductors and it **f**) delivers 100A on full load. If the brush leads 80, calculate the armature demagnetizing and cross magnetizing amper-turn per pole.

Q.3 Solve any two.

- a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?
- b) A 100 H.P, 500V shunt motor has 4 pole and a 2 circuit wave winding with 492 armature conductor. The flax is 50m Wb per pole and the full load efficiency 92%. The armature and commutating field winding have a total resistance of 0.1Ω . The shunt field resistance is 250Ω . Calculate for full load.
 - 1) the speed
 - 2) the useful torque
- c) With the help of neat sketch explain the speed control methods of D.C. series motor.

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Max. Marks: 56

Section – II

Q.4 Solve any four

- a) With neat sketch explain open circuit and short circuit test of transformer. How equivalent circuit parameters and efficiency of a transformer are computed?
- **b)** Explain with phasor diagram a practical transformer on load condition.
- c) A 3- phase, 50 Hz transformer has a delta-connected primary and starconnected secondary, the line voltages being 22000V and 400V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?
- d) Derive the expression for saving of copper in autotransformer.
- e) A 230/2300V transformer take a no load current of 6.5 A and absorbs 187W. if the resistance of the primary is 0.6 Ω . Find
 - 1) The core loss
 - 2) No load power factor
 - 3) Active component of current
 - 4) Magnetizing current
- f) A 1-phase transformer delivers 10A, 220V to a resistive load while the primary draws 6A at 0.9 lagging power factor from 450V, 50Hz supply. The turns ratio of the transformer is 2. Calculate efficiency and regulation under the condition.

Q.5 Solve any two.

- a) With the help of neat diagram explain Scott connection of three phase transformer.
- b) A 5 kVA distribution transformer has a full load efficiency of 95% at which copper loss equal to iron loss. Transformer is loaded for 24 hrs as under:no load for 10 hrs, one forth full load for 7 hrs, half full load for 5 hrs and full load for 2 hrs. Calculate the all-day efficiency of the transformer. Assume unity power factor.
- c) A single phase, 220/110V, 5kVA, transformer has an efficiency of 96% on full load at unity power factor and 95% on half load at unity power factor. Determine for full load condition, iron loss and copper loss of the transformer. Also determine efficiency on full load at 0.8 power factor lagging.



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S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – I**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory, and should be solved in first 30 minutes in answer book.

- 2) Assume suitable data if necessary.
- 3) Figure to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- According to Fleming's left-hand rule, when the fore finger points in the 1) direction of the field or flux, the middle finger will point in the direction of
 - a) current in the conductor
- b) voltage of conductor d) none of the above
- 2) Three point starter can be used for _____.

c) resultant force on conductor

- a) series motor only
- b) shunt motor only
- c) compound motor only
- d) both shunt and compound motor
- 3) The current drawn by the armature of D.C. motor is directly proportional to _
 - a) the torque required
 - b) the speed of the motor
 - c) the voltage across the terminals
 - d) none of the above

A transformer core is laminated to _____ 4)

- reduce hysteresis loss b) reduce eddy current losses a) reduce copper losses c)
 - d) reduce all above lasses
- 5) In a step-down transformer, there is a change of 15 A in the load current. This results in change of supply current of.
 - a) less than 15 A
- b) more than 15 A
- c) 15 A d) none of the above
- The efficiencies of transformers compared with that of electric motors of 6) the same power are.
 - a) about the same
- b) much smaller

c) much higher

- d) somewhat smaller

Max. Marks: 70

7) In the case of lap winding resultant pitch is

- a) multiplication of front and back pitches
- b) division of front pitch by back pitch
- c) sum of front and back pitches
- d) difference of front and bock pitches
- 8) A shunt generator delivers 195A at 250V. Ra=0.02 Ω and Rsh=50 Ω . What is the value of generated emf?
 - a) 246V b) 270V
 - c) 254V d) 282V
- 9) Interpole flux should be sufficient to _____
 - a) neutralise the commutating self induced e.m.f
 - neutralise the armature reaction flux b)
 - c) neutralise both the armature reaction flux as well as commutating e.m.f. induced in the coil
 - d) perform none of the above functions
- 10) In a D.C. generator the number of mechanical degrees and electrical degrees will be the same when ____
 - a) r.p.m. is more than 300 b) r.p.m. is less than 300
 - c) number of poles is 4
- d) number of poles is 2

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- 11) Starters are used with D.C. motors because _____.
 - a) these motors have high starting torque
 - b) these motors are not self-starting
 - c) backe.m.f. of these motors is zero initially
 - d) to restrict armature current as there is no back e.m.f. while starting
- 12) In case of D.C. shunt motors the speed is dependent on back e.m.f. only because
 - a) back e.m.f. is equal to armature drop
 - b) armature drop is negligible
 - c) flux is proportional to armature current
 - d) flux is practically constant in D.C. shunt motors
- No-load speed of which of the follow mg motor will be highest? 13)
 - a) Shunt motor c) Cumulative compound motor
- b) Series motor d) Differentiate compound motor
- 14) In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be
 - a) almost negligible
- b) rated full-load current
- c) less than full-load current
- d) more than full-load current

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Seat

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – I**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Assume the suitable data whenever necessary.
- 3) Figures to right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.
- The wave wound armature of a 6-pole DC generator has 51 slots. Each slot b) contains 20 conductors. The voltage to be generated is 250V. Calculate the speed of the coupled prime mover, if the flux/pole is 0.07 wb. The armature is rewound as lap machine and run by the same prime mover. Calculate the generated voltage.
- c) An armature of 6-pole machine 75cm in diameter has 664 conductors each having an effective length of 30cm and carrying a current of 100A. if 70% of total conductors lie simultaneously in the field of average flux density 0.85wb/m2, calculate
 - armature torque 1)
 - horse power output at 250 rpm 2)
- d) With neat circuit diagram explain Swinburne's test and how efficiency of generator and motor are computed with this test. Write the advantages of this test.
- e) A 6 pole lap would dc generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate
 - the speed at which the generator must be run to generate 300 V 1)
 - 2) what would be speed if the generator is wave wound?
- A 4 pole generator has a wave would armature with 772 conductors and it **f**) delivers 100A on full load. If the brush leads 80, calculate the armature demagnetizing and cross magnetizing amper-turn per pole.

Q.3 Solve any two.

- a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?
- b) A 100 H.P, 500V shunt motor has 4 pole and a 2 circuit wave winding with 492 armature conductor. The flax is 50m Wb per pole and the full load efficiency 92%. The armature and commutating field winding have a total resistance of 0.1Ω . The shunt field resistance is 250Ω . Calculate for full load.
 - 1) the speed
 - 2) the useful torque
- c) With the help of neat sketch explain the speed control methods of D.C. series motor.

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Max. Marks: 56

No.

Q.4 Solve any four

- a) With neat sketch explain open circuit and short circuit test of transformer. How equivalent circuit parameters and efficiency of a transformer are computed?
- **b)** Explain with phasor diagram a practical transformer on load condition.
- c) A 3- phase, 50 Hz transformer has a delta-connected primary and starconnected secondary, the line voltages being 22000V and 400V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?
- d) Derive the expression for saving of copper in autotransformer.
- e) A 230/2300V transformer take a no load current of 6.5 A and absorbs 187W. if the resistance of the primary is 0.6 Ω . Find
 - 1) The core loss
 - 2) No load power factor
 - 3) Active component of current
 - 4) Magnetizing current
- **f)** A 1-phase transformer delivers 10A, 220V to a resistive load while the primary draws 6A at 0.9 lagging power factor from 450V, 50Hz supply. The turns ratio of the transformer is 2. Calculate efficiency and regulation under the condition.

Q.5 Solve any two.

- a) With the help of neat diagram explain Scott connection of three phase transformer.
- b) A 5 kVA distribution transformer has a full load efficiency of 95% at which copper loss equal to iron loss. Transformer is loaded for 24 hrs as under:no load for 10 hrs, one forth full load for 7 hrs, half full load for 5 hrs and full load for 2 hrs. Calculate the all-day efficiency of the transformer. Assume unity power factor.
- c) A single phase, 220/110V, 5kVA, transformer has an efficiency of 96% on full load at unity power factor and 95% on half load at unity power factor. Determine for full load condition, iron loss and copper loss of the transformer. Also determine efficiency on full load at 0.8 power factor lagging.

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S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – I**

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No.1 is compulsory, and should be solved in first 30 minutes in answer book.

- 2) Assume suitable data if necessary.
- 3) Figure to right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The efficiencies of transformers compared with that of electric motors of the same power are.
 - a) about the same

c) much higher

- b) much smaller
- d) somewhat smaller
- 2) In the case of lap winding resultant pitch is _
 - a) multiplication of front and back pitches
 - b) division of front pitch by back pitch
 - c) sum of front and back pitches
 - d) difference of front and bock pitches
- 3) A shunt generator delivers 195A at 250V. Ra=0.02 Ω and Rsh=50 Ω . What is the value of generated emf?
 - a) 246V b) 270V
 - c) d) 282V 254V
- 4) Interpole flux should be sufficient to
 - a) neutralise the commutating self induced e.m.f
 - b) neutralise the armature reaction flux
 - c) neutralise both the armature reaction flux as well as commutating e.m.f. induced in the coil
 - d) perform none of the above functions
- 5) In a D.C. generator the number of mechanical degrees and electrical degrees will be the same when ____
 - a) r.p.m. is more than 300 b) r.p.m. is less than 300
 - c) number of poles is 4 d) number of poles is 2
- Starters are used with D.C. motors because _____. 6)
 - a) these motors have high starting torque
 - b) these motors are not self-starting
 - c) backe.m.f. of these motors is zero initially
 - d) to restrict armature current as there is no back e.m.f. while starting



Marks: 14

Max. Marks: 70

- In case of D.C. shunt motors the speed is dependent on back e.m.f. only because _____.
 - a) back e.m.f. is equal to armature drop
 - b) armature drop is negligible
 - c) flux is proportional to armature current
 - d) flux is practically constant in D.C. shunt motors
- 8) No-load speed of which of the follow mg motor will be highest?
 - a) Shunt motor

- b) Series motor
- c) Cumulative compound motor d) Differentiate compound motor
- In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be
 - a) almost negligible
- b) rated full-load current
- c) less than full-load current
- d) more than full-load current

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- 10) According to Fleming's left-hand rule, when the fore finger points in the direction of the field or flux, the middle finger will point in the direction of
 - a) current in the conductor
- b) voltage of conductor
- c) resultant force on conductor d) none of the above
- 11) Three point starter can be used for _____.
 - a) series motor only
 - b) shunt motor only
 - c) compound motor only
 - d) both shunt and compound motor
- 12) The current drawn by the armature of D.C. motor is directly proportional to _____.
 - a) the torque required
 - b) the speed of the motor
 - c) the voltage across the terminals
 - d) none of the above
- 13) A transformer core is laminated to _____
 - a) reduce hysteresis loss b) reduce eddy current losses
 - c) reduce copper losses d) reduce all above lasses
- 14) In a step-down transformer, there is a change of 15 A in the load current. This results in change of supply current of.
 - a) less than 15 A b) more than 15 A
 - c) 15 A d) none of the above

Seat No.

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Assume the suitable data whenever necessary.
- 3) Figures to right indicate full marks.

Section – I

Q.2 Solve any four.

- a) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.
- b) The wave wound armature of a 6-pole DC generator has 51 slots. Each slot contains 20 conductors. The voltage to be generated is 250V. Calculate the speed of the coupled prime mover, if the flux/pole is 0.07 wb. The armature is rewound as lap machine and run by the same prime mover. Calculate the generated voltage.
- c) An armature of 6-pole machine 75cm in diameter has 664 conductors each having an effective length of 30cm and carrying a current of 100A. if 70% of total conductors lie simultaneously in the field of average flux density 0.85wb/m2, calculate
 - 1) armature torque
 - 2) horse power output at 250 rpm
- d) With neat circuit diagram explain Swinburne's test and how efficiency of generator and motor are computed with this test. Write the advantages of this test.
- e) A 6 pole lap would dc generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate
 - 1) the speed at which the generator must be run to generate 300 V
 - 2) what would be speed if the generator is wave wound?
- **f)** A 4 pole generator has a wave would armature with 772 conductors and it delivers 100A on full load. If the brush leads 80, calculate the armature demagnetizing and cross magnetizing amper-turn per pole.

Q.3 Solve any two.

- a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?
- **b)** A 100 H.P, 500V shunt motor has 4 pole and a 2 circuit wave winding with 492 armature conductor. The flax is 50m Wb per pole and the full load efficiency 92%. The armature and commutating field winding have a total resistance of 0.1Ω . The shunt field resistance is 250 Ω . Calculate for full load.
 - 1) the speed
 - 2) the useful torque
- c) With the help of neat sketch explain the speed control methods of D.C. series motor.

16



Max. Marks: 56

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12

500

Q.4 Solve any four

- a) With neat sketch explain open circuit and short circuit test of transformer. How equivalent circuit parameters and efficiency of a transformer are computed?
- **b)** Explain with phasor diagram a practical transformer on load condition.
- c) A 3- phase, 50 Hz transformer has a delta-connected primary and starconnected secondary, the line voltages being 22000V and 400V respectively. The secondary has a star-connected balanced load at 0.8 power factor lagging. The line current on the primary side is 5A. Determine the current in each coil of the primary and in each secondary line. What is the output of the transformer in kW?
- d) Derive the expression for saving of copper in autotransformer.
- e) A 230/2300V transformer take a no load current of 6.5 A and absorbs 187W. if the resistance of the primary is 0.6 Ω . Find
 - 1) The core loss
 - 2) No load power factor
 - 3) Active component of current
 - 4) Magnetizing current
- f) A 1-phase transformer delivers 10A, 220V to a resistive load while the primary draws 6A at 0.9 lagging power factor from 450V, 50Hz supply. The turns ratio of the transformer is 2. Calculate efficiency and regulation under the condition.

Q.5 Solve any two.

- a) With the help of neat diagram explain Scott connection of three phase transformer.
- b) A 5 kVA distribution transformer has a full load efficiency of 95% at which copper loss equal to iron loss. Transformer is loaded for 24 hrs as under:no load for 10 hrs, one forth full load for 7 hrs, half full load for 5 hrs and full load for 2 hrs. Calculate the all-day efficiency of the transformer. Assume unity power factor.
- c) A single phase, 220/110V, 5kVA, transformer has an efficiency of 96% on full load at unity power factor and 95% on half load at unity power factor. Determine for full load condition, iron loss and copper loss of the transformer. Also determine efficiency on full load at 0.8 power factor lagging.

16

12

Set S

SLR-FM-721

Seat No.

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The largest change in the measured variable which produces no instrument response is known
 - Threshold b) a) Dynamic error
 - Dead zone d) None of these c)
- 2) In measurement systems, which of the following static characteristics are desirable?
 - a) Accuracy b)
 - All of the above c) Reproducibility d)
- Moving iron type of instruments can be used as 3)
 - a) Standard instruments for calibration of other instruments
 - b) Transfer type instruments
 - Indicator type instruments as on panels c)
 - d) All of the above

C)

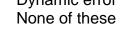
- Power consumption of PMMC instruments is typically about _____. 4)
 - a) 0.25W to 2W b)
 - 25µW to 200µW None of the above d)
- 5) In an electrodynamometer type of wattmeters .
 - a) The current coil is made fixed
 - b) The pressure coil is made fixed
 - Any of the two coils i.e current or pressure coil can be made fixed C)
 - d) Both the coils should be movable
- 6) A megger is used for measurement of .
 - Low valued resistances a)
 - b) Medium valued resistances
 - c) High valued resistances, particularly insulation resistance
 - d) All of the above

Max. Marks: 70

Marks: 14

0.25mW to 2mW





Sensitivity

Set

7) The ratio of transformation in the case of potential transformers

- Increase with increase in power factor of secondary burden a)
- b) Remains constant irrespective of the power factor of secondary burden
- Decreases with increase in power factor of secondary burden C)
- None of the above d)
- 8) The ratio and phase angle errors in potential transformers may be reduced by _
 - Increasing the exciting current a)
 - Increasing the resistance and leakage reactance in the transformer b)
 - Not employing turns compensation C)
 - d) None of the above
- 9) Nominal ratio of a current transformer is ____
 - a) Primary winding current/secondary winding current
 - Rated Primary winding current/ Rated secondary winding current b)
 - Number of secondary winding turns/number of primary winding turns c)
 - d) All of the above
- 10) Standardization of potentiometers is done in order that, they become
 - a) Accurate b) Precise
 - c) Accurate and direct reading d) Accurate and Precise
- 11) In a Kelvin's double bridge two sets of readings are taken when measuring a low resistance, one with the current in one direction and the other with direction of current reversed. This done to
 - Eliminate the effect of contact resistance a)
 - Eliminate the effect of resistance of leads b)
 - Correct for changes in battery voltage c)
 - Eliminate the effect of thermo-electric emfs d)
- 12) Maxwell's inductance-capacitance bridge is used for measurement of inductance of
 - a) Low Q coils b)
 - c) High Q coils

- Medium Q coils
- d) Low and medium Q coils
- 13) An aquadag is used in a CRO to collect _____.
 - **Primary electrons** a)
 - b) Secondary emission electrons
 - Both Primary and Secondary emission electrons
 - d) None of the above
- 14) Source of emission of electrons in a CRT is _____.
 - a) PN junction diode
 - b) A barium and strontium oxide coated cathode
 - c) Accelerating anodes
 - d) Post-accelerating

SLR-FM-722

Set P

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Attempt any four. Q.2

- a) Explain the following terms:
 - repeatability 1) 2) dead zone 3) resolution 4) static error Write a short on synchroscope.
- b)
- Explain with neat diagram, working of three phase electrodynamometer c) power factor meter.
- Explain essential forces required in analog instruments. d)
- Explain neat diagram and working of MI instruments. e)
- Inductance of 25A EMMC ammeter changes uniformly at the rate of **f**) 0.0035 µH/degree. The spring constant is 10⁻⁶Nm/degree. Determine angular deflection at full scale.

Q.3 Attempt any two.

- Explain Maxwell inductance capacitance bridge for the measurement of a) inductance and also draw the phasor diagram at balance condition.
- Explain construction and working of Crompton's potentiometer. b)
- The inductance of moving iron ammeter with a full scale deflection of 90⁰ C) at 1.5 A. is given by the expression L=(200+ 400 - 40²- θ^3) μ H where θ is deflection in radian from zero position. Estimate angular deflection of pointer for a current of 1.0A.

Section – II

Attempt any four. Q.4

- Explain the following terms for Instrument transformers: a)
 - 1) **Transformation Ratio**
 - 2) Nominal Ratio
 - 3) **Turns Ratio**
 - RCE 4)
- b) Explain digital Multimeter with block diagram.
- C) Write the features of Cathode Ray Tube.
- Describe the working of integrating type digital voltmeter. d)
- Explain working of digital frequency meter with block diagram e)
- Explain turns compensation technique for current transformer. **f**)

Q.5 Attempt any two.

- Draw the phasor diagram and equivalent circuit diagram of PT. Also derive a) the expression for actual ratio and phase angle error.
- b) Explain with neat diagram, working of ramp type digital voltmeter.
- Explain Electronic counter and its mode of operation. c)

12

12

16

16

Set

Max. Marks: 56

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The ratio and phase angle errors in potential transformers may be 1) reduced by
 - a) Increasing the exciting current
 - b) Increasing the resistance and leakage reactance in the transformer
 - Not employing turns compensation c)
 - d) None of the above

2) Nominal ratio of a current transformer is _____

- Primary winding current/secondary winding current a)
- Rated Primary winding current/ Rated secondary winding current b)
- c) Number of secondary winding turns/number of primary winding turns
- d) All of the above
- 3) Standardization of potentiometers is done in order that, they become
 - a) Accurate Precise b)
 - c) Accurate and direct reading d) Accurate and Precise

4) In a Kelvin's double bridge two sets of readings are taken when measuring a low resistance, one with the current in one direction and the other with direction of current reversed. This done to

- a) Eliminate the effect of contact resistance
- b) Eliminate the effect of resistance of leads
- Correct for changes in battery voltage c)
- d) Eliminate the effect of thermo-electric emfs
- Maxwell's inductance-capacitance bridge is used for measurement of 5) inductance of
 - a) Low Q coils
- b) Medium Q coils
- c) High Q coils
- Low and medium Q coils d)
- An aquadag is used in a CRO to collect _____. 6)
 - a) Primary electrons
 - b) Secondary emission electrons
 - c) Both Primary and Secondary emission electrons
 - d) None of the above

Seat

Max. Marks: 70

Marks: 14

Set

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Set Q 7) Source of emission of electrons in a CRT is _____. a) PN junction diode b) A barium and strontium oxide coated cathode c) Accelerating anodes d) Post-accelerating 8) The largest change in the measured variable which produces no instrument response is known _ Threshold b) Dynamic error a) c) Dead zone d) None of these In measurement systems, which of the following static characteristics are 9) desirable? a) Accuracy Sensitivity b) c) Reproducibility d) All of the above 10) Moving iron type of instruments can be used as a) Standard instruments for calibration of other instruments b) Transfer type instruments c) Indicator type instruments as on panels d) All of the above 11) Power consumption of PMMC instruments is typically about _____. a) 0.25W to 2W b) 0.25mW to 2mW c) 25µW to 200µW None of the above d) 12) In an electrodynamometer type of wattmeters _____ The current coil is made fixed b) The pressure coil is made fixed c) Any of the two coils i.e current or pressure coil can be made fixed d) Both the coils should be movable 13) A megger is used for measurement of . a) Low valued resistances b) Medium valued resistances c) High valued resistances, particularly insulation resistance d) All of the above 14) The ratio of transformation in the case of potential transformers . Increase with increase in power factor of secondary burden a) b) Remains constant irrespective of the power factor of secondary burden Decreases with increase in power factor of secondary burden c) d) None of the above

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S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) Explain the following terms:
 - repeatability
 dead zone
 resolution
 static error
 Write a short on synchroscope.
- b) Write a short on synchroscope.
 c) Explain with peat diagram, working of the
- c) Explain with neat diagram, working of three phase electrodynamometer power factor meter.
- d) Explain essential forces required in analog instruments.
- e) Explain neat diagram and working of MI instruments.
- f) Inductance of 25A EMMC ammeter changes uniformly at the rate of 0.0035 µH/degree. The spring constant is 10⁻⁶Nm/degree. Determine angular deflection at full scale.

Q.3 Attempt any two.

- a) Explain Maxwell inductance capacitance bridge for the measurement of inductance and also draw the phasor diagram at balance condition.
- **b)** Explain construction and working of Crompton's potentiometer.
- c) The inductance of moving iron ammeter with a full scale deflection of 90° at 1.5 A. is given by the expression L=(200+ 400 40²- 0³) µH where 0 is deflection in radian from zero position. Estimate angular deflection of pointer for a current of 1.0A.

Section – II

Q.4 Attempt any four.

- a) Explain the following terms for Instrument transformers:
 - 1) Transformation Ratio
 - 2) Nominal Ratio
 - 3) Turns Ratio
 - 4) RCE
- **b)** Explain digital Multimeter with block diagram.
- c) Write the features of Cathode Ray Tube.
- d) Describe the working of integrating type digital voltmeter.
- e) Explain working of digital frequency meter with block diagram
- f) Explain turns compensation technique for current transformer.

Q.5 Attempt any two.

- a) Draw the phasor diagram and equivalent circuit diagram of PT. Also derive the expression for actual ratio and phase angle error.
- b) Explain with neat diagram, working of ramp type digital voltmeter.
- c) Explain Electronic counter and its mode of operation.

12

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16

16

Max. Marks: 56

Seat No.

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) In an electrodynamometer type of wattmeters .
 - The current coil is made fixed a)
 - The pressure coil is made fixed b)
 - c) Any of the two coils i.e current or pressure coil can be made fixed
 - d) Both the coils should be movable
- 2) A megger is used for measurement of _____.
 - a) Low valued resistances
 - b) Medium valued resistances
 - c) High valued resistances, particularly insulation resistance
 - d) All of the above
- 3) The ratio of transformation in the case of potential transformers _____.
 - Increase with increase in power factor of secondary burden a)
 - Remains constant irrespective of the power factor of secondary b) burden
 - Decreases with increase in power factor of secondary burden C)
 - d) None of the above
- 4) The ratio and phase angle errors in potential transformers may be reduced by
 - Increasing the exciting current a)
 - Increasing the resistance and leakage reactance in the transformer b)
 - c) Not employing turns compensation
 - d) None of the above
- Nominal ratio of a current transformer is ____ 5)
 - Primary winding current/secondary winding current a)
 - Rated Primary winding current/ Rated secondary winding current b)
 - Number of secondary winding turns/number of primary winding turns c)
 - d) All of the above
- Standardization of potentiometers is done in order that, they become 6) Precise
 - a) Accurate b)
 - c) Accurate and direct reading d) Accurate and Precise



Max. Marks: 70

7) In a Kelvin's double bridge two sets of readings are taken when measuring a low resistance, one with the current in one direction and the other with direction of current reversed. This done to _____.

- a) Eliminate the effect of contact resistance
- b) Eliminate the effect of resistance of leads
- c) Correct for changes in battery voltage
- d) Eliminate the effect of thermo-electric emfs
- Maxwell's inductance-capacitance bridge is used for measurement of inductance of _____.
 - a) Low Q coils
- b) Medium Q coils

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Set

- c) High Q coils d) Low and medium Q coils
- An aquadag is used in a CRO to collect _____.
- a) Primary electrons

9)

- b) Secondary emission electrons
- c) Both Primary and Secondary emission electrons
- d) None of the above
- 10) Source of emission of electrons in a CRT is _____.
 - a) PN junction diode
 - b) A barium and strontium oxide coated cathode
 - c) Accelerating anodes
 - d) Post-accelerating
- 11) The largest change in the measured variable which produces no instrument response is known _____.
 - a) Threshold b) Dynamic error
 - c) Dead zone d) None of these
- 12) In measurement systems, which of the following static characteristics are desirable?
 - a) Accuracy

- b) Sensitivity
- c) Reproducibility d) All of the above
- 13) Moving iron type of instruments can be used as _____
 - a) Standard instruments for calibration of other instruments
 - b) Transfer type instruments
 - c) Indicator type instruments as on panels
 - d) All of the above
- 14) Power consumption of PMMC instruments is typically about _____.
 - a) 0.25W to 2W

- b) 0.25mW to 2mW
- c) 25µW to 200µW
- d) None of the above

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday,12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) Explain the following terms:
 - repeatability
 dead zone
 resolution
 static error
 Write a short on synchroscope.
- b) Write a short on synchroscope.
 c) Explain with peat diagram, working of the
- c) Explain with neat diagram, working of three phase electrodynamometer power factor meter.
- d) Explain essential forces required in analog instruments.
- e) Explain neat diagram and working of MI instruments.
- f) Inductance of 25A EMMC ammeter changes uniformly at the rate of 0.0035 µH/degree. The spring constant is 10⁻⁶Nm/degree. Determine angular deflection at full scale.

Q.3 Attempt any two.

- a) Explain Maxwell inductance capacitance bridge for the measurement of inductance and also draw the phasor diagram at balance condition.
- b) Explain construction and working of Crompton's potentiometer.
- c) The inductance of moving iron ammeter with a full scale deflection of 90° at 1.5 A. is given by the expression L=(200+ 400 40²- 0³) µH where 0 is deflection in radian from zero position. Estimate angular deflection of pointer for a current of 1.0A.

Section – II

Q.4 Attempt any four.

- a) Explain the following terms for Instrument transformers:
 - 1) Transformation Ratio
 - 2) Nominal Ratio
 - 3) Turns Ratio
 - 4) RCE
- **b)** Explain digital Multimeter with block diagram.
- c) Write the features of Cathode Ray Tube.
- d) Describe the working of integrating type digital voltmeter.
- e) Explain working of digital frequency meter with block diagram
- f) Explain turns compensation technique for current transformer.

Q.5 Attempt any two.

- a) Draw the phasor diagram and equivalent circuit diagram of PT. Also derive the expression for actual ratio and phase angle error.
- b) Explain with neat diagram, working of ramp type digital voltmeter.
- c) Explain Electronic counter and its mode of operation.

12

12

16

Max. Marks: 56

Set

Seat No.

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Standardization of potentiometers is done in order that, they become
 - a) Accurate Precise b)
 - c) Accurate and direct reading d) Accurate and Precise
- 2) In a Kelvin's double bridge two sets of readings are taken when measuring a low resistance, one with the current in one direction and the other with direction of current reversed. This done to
 - a) Eliminate the effect of contact resistance
 - b) Eliminate the effect of resistance of leads
 - Correct for changes in battery voltage C)
 - d) Eliminate the effect of thermo-electric emfs
- 3) Maxwell's inductance-capacitance bridge is used for measurement of inductance of
 - a) Low Q coils b) Medium Q coils
 - c) High Q coils Low and medium Q coils d)
- 4) An aquadag is used in a CRO to collect _____.
 - a) Primary electrons
 - b) Secondary emission electrons
 - Both Primary and Secondary emission electrons c)
 - d) None of the above
- 5) Source of emission of electrons in a CRT is .
 - a) PN junction diode
 - b) A barium and strontium oxide coated cathode
 - c) Accelerating anodes
 - d) Post-accelerating
- The largest change in the measured variable which produces no 6) instrument response is known
 - Threshold b) Dynamic error a) None of these c) Dead zone d)
- 7) In measurement systems, which of the following static characteristics are desirable?

Sensitivity

- a) Accuracy b)
- c) Reproducibility d) All of the above

Max. Marks: 70

Marks: 14

- 8) Moving iron type of instruments can be used as _____
 - a) Standard instruments for calibration of other instruments
 - b) Transfer type instruments
 - c) Indicator type instruments as on panels
 - d) All of the above
- 9) Power consumption of PMMC instruments is typically about _____.
 - a) 0.25W to 2W b) 0.25mW to 2mW
 - c) $25\mu W$ to $200\mu W$ d) None of the above
- 10) In an electrodynamometer type of wattmeters _____.
 - a) The current coil is made fixed
 - b) The pressure coil is made fixed
 - c) Any of the two coils i.e current or pressure coil can be made fixed
 - d) Both the coils should be movable
- 11) A megger is used for measurement of _____.
 - a) Low valued resistances
 - b) Medium valued resistances
 - c) High valued resistances, particularly insulation resistance
 - d) All of the above
- 12) The ratio of transformation in the case of potential transformers _____.
 - a) Increase with increase in power factor of secondary burden
 - b) Remains constant irrespective of the power factor of secondary burden
 - c) Decreases with increase in power factor of secondary burden
 - d) None of the above
- 13) The ratio and phase angle errors in potential transformers may be reduced by _____.
 - a) Increasing the exciting current
 - b) Increasing the resistance and leakage reactance in the transformer
 - c) Not employing turns compensation
 - d) None of the above
- 14) Nominal ratio of a current transformer is _____.
 - a) Primary winding current/secondary winding current
 - b) Rated Primary winding current/ Rated secondary winding current
 - c) Number of secondary winding turns/number of primary winding turns
 - d) All of the above

Set S

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day & Date: Thursday, 12-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) Explain the following terms:
 - repeatability 1) 2) dead zone 3) resolution 4) static error Write a short on synchroscope.
- b)
- Explain with neat diagram, working of three phase electrodynamometer c) power factor meter.
- Explain essential forces required in analog instruments. d)
- Explain neat diagram and working of MI instruments. e)
- Inductance of 25A EMMC ammeter changes uniformly at the rate of **f**) 0.0035 µH/degree. The spring constant is 10⁻⁶Nm/degree. Determine angular deflection at full scale.

Q.3 Attempt any two.

- Explain Maxwell inductance capacitance bridge for the measurement of a) inductance and also draw the phasor diagram at balance condition.
- Explain construction and working of Crompton's potentiometer. b)
- The inductance of moving iron ammeter with a full scale deflection of 90⁰ C) at 1.5 A. is given by the expression L=(200+ 400 - 40²- θ^3) μ H where θ is deflection in radian from zero position. Estimate angular deflection of pointer for a current of 1.0A.

Section – II

Q.4 Attempt any four.

- Explain the following terms for Instrument transformers: a)
 - 1) **Transformation Ratio**
 - 2) Nominal Ratio
 - 3) **Turns Ratio**
 - RCE 4)
- b) Explain digital Multimeter with block diagram.
- C) Write the features of Cathode Ray Tube.
- Describe the working of integrating type digital voltmeter. d)
- Explain working of digital frequency meter with block diagram e)
- Explain turns compensation technique for current transformer. **f**)

Q.5 Attempt any two.

- Draw the phasor diagram and equivalent circuit diagram of PT. Also derive a) the expression for actual ratio and phase angle error.
- b) Explain with neat diagram, working of ramp type digital voltmeter.
- Explain Electronic counter and its mode of operation. C)

12

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16



Max. Marks: 56

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER PLANT ENGINEERING

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The equipment installed in power plants to reduce air pollution due to 1) smoke is **De-super heaters** b)
 - a) Induced draft fans c)
 - **Re-heaters** Electrostatic precipitators d)
- 2) Which of the following enters the super heater of a boiler?
 - Cold water Hot water b) a)
 - c) Wet steam d) Super-heated steam

For high head and minimum discharge, the hydraulic turbine used is . 3)

- a) Kaplan turbine Francis turbine b)
- c) Pelton wheel None of the above d)

4) Which auxiliary of gas turbine consumes most of the power?

- a) Compressor Combustion chamber b)
- c) Burner d) Fuel pump
- A Thermalpower plant works on _____ 5)
 - Carnot cycle b) Brayton cycle a) Rankine cycle Dual cycle c) d)

Diesel engines for power plants are usually 6)

- Horizontal Supercharged b) a)
- Air cooled c) Slow speed d)
- 7) A surge tank is provided near ____
 - a) Penstock b) Trash rack c) Spillway
- Running cost of which plant is least? 8)
 - a) Hydroelectric plant b)
 - c) Nuclear power plant d)
- 9) Water is supplied to a boiler
 - at atmospheric pressure a)
 - at slightly more than atmospheric pressure b)
 - at 100 cm/ kg² c)
 - d) at more than the steam pressure on the boiler

SLR-FM-723

Set

Max. Marks: 70

Marks: 14

- Turbine d)
- Thermal power plant
- Gas turbine plant

- 10) The function of reflector in a nuclear reactor is to .
 - Bounce back most of the neutrons that escape from the fuel core a)
 - Reduce the speed of the neutrons b)
 - Stop the chain reaction C)
 - d) None of the above

11) In a steam turbine cycle, the lowest pressure occurs in _____.

- a) turbine inlet b) condenser super heater
- c) boiler d)
- A graphical representation of the discharge and time is known as: _____. 12)
 - a) Load curve

SLR-FM-723

Set P

- Load-duration curve b)
- d) Hydrograph c) Monograph
- 13) In a steam power plant water is used for cooling purposes in _____.
 - boiler a)

economizer b)

c) condenser

- super-heaters d)
- Dam: Hydro plant:: _____. 14)
 - a) Chimney : Gases
 - c) Gas turbine : Steam turbine
- b) Coal : Steam plant
- d) Reactor : Nuclear plant

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER PLANT ENGINEERING

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section 2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four

- a) Draw typical layout of thermal power plant.
- b) Explain radioactive decay and half-life of radioactive material.
- c) Explain hydrograph & flow duration curve.
- **d)** Discuss the harmful effect of emission and steps taken for their impact in thermal power plant.
- e) Write short note on current power generation scenario in India.
- f) State advantages and disadvantages of nuclear power plant.

Q.3 Solve any two

- a) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
- **b)** Write short note on
 - 1) Coal handling plant
 - 2) boiler
 - 3) turbine
- c) Draw and explain neat labeled diagram of BWR and PWR in nuclear power plant.

Section – II

Q.4 Solve any four

- a) Explain in brief any three types of tariff.
- b) What are the advantages and disadvantages of wind power plant?
- c) The thermal power plant of 210MW capacity has maximum demand of 160MW. Its annual load factor is 0.6. The coal consumption is 1kg/kWh of energy generated and cost of coal is Rs.450/tonne. Calculate annual Revenue earned if energy is sold at Rs. 1/kWh. Also find capacity factor.
- d) Write short note on Cost of electricity generation.
- e) Define the following.

Diversity factor, Demand factor, Average load, connected load.

f) With brief layout explain open loop gas power plant.



12

16

16

SLR-FM-723



SLR-FM-723 Set P

Q.5 Solve any two

- a) With brief layout explain solar thermal power plant.
- A consumer takes steady load of 250K W at power factor of 0.8 lagging for 10 hours per day and 300 days per annum. Estimate the annual payment under each of the following tariffs
 - 1) Rs. 1.20/KWh + Rs. 1200/KVA/annum
 - 2) Rs. 1.20/KWh + Rs. 1200/KW/annum + Rs. 0.25/KVARh
- c) Draw typical layout of Diesel power plant & explain it briefly.

Seat					
No.					
		_	(

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER PLANT ENGINEERING

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Running cost of which plant is least?
 - a) Hydroelectric plant
 - c) Nuclear power plant
- b) Thermal power plant Gas turbine plant d)
- 2) Water is supplied to a boiler
 - at atmospheric pressure a)
 - at slightly more than atmospheric pressure b)
 - c) at 100 cm/ kg²
 - d) at more than the steam pressure on the boiler
- 3) The function of reflector in a nuclear reactor is to _____
 - a) Bounce back most of the neutrons that escape from the fuel core
 - b) Reduce the speed of the neutrons
 - c) Stop the chain reaction
 - d) None of the above
- 4) In a steam turbine cycle, the lowest pressure occurs in _____.
 - a) turbine inlet b) condenser
 - c) boiler d) super heater
- 5) A graphical representation of the discharge and time is known as: _____.
 - a) Load curve b) Load-duration curve
 - c) Monograph d) Hydrograph
- 6) In a steam power plant water is used for cooling purposes in _____.
 - a) boiler c) condenser
- economizer b)
- super-heaters d)
- 7) Dam: Hydro plant:: ___
 - a) Chimney : Gases
 - c) Gas turbine : Steam turbine
- 8) The equipment installed in power plants to reduce air pollution due to smoke is .
 - a) Induced draft fans b)
 - c) Electrostatic precipitators d)
- Which of the following enters the super heater of a boiler? 9)
 - a) Cold water
 - c) Wet steam

- b) Coal : Steam plant
- d) Reactor : Nuclear plant
- **De-super heaters**
- **Re-heaters**
 - b) Hot water
 - d) Super-heated steam

Max. Marks: 70

Marks: 14

- Set Q
- 10) For high head and minimum discharge, the hydraulic turbine used is _____.
 - a) Kaplan turbine

a) Compressor

a) Horizontal

- b) Francis turbine
- c) Pelton wheel d) None of the above
- 11) Which auxiliary of gas turbine consumes most of the power?
 - b) Combustion chamber
 - c) Burner d) Fuel pump
- 12) A Thermalpower plant works on _____.
 - a) Carnot cycle b) Brayton cycle
 - c) Dual cycle d) Rankine cycle
- 13) Diesel engines for power plants are usually _____
 - b) Supercharged
 - c) Slow speed d) Air cooled
- 14) A surge tank is provided near _____.
 - a) Penstock c) Spillway d) Turbine

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER PLANT ENGINEERING

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section 2) Figures to the right indicate full marks.

Section – I

Solve any four Q.2

- a) Draw typical layout of thermal power plant.
- Explain radioactive decay and half-life of radioactive material. b)
- c) Explain hydrograph & flow duration curve.
- Discuss the harmful effect of emission and steps taken for their impact in d) thermal power plant.
- Write short note on current power generation scenario in India. e)
- State advantages and disadvantages of nuclear power plant. **f**)

Q.3 Solve any two

- Draw a neat schematic diagram of a Hydro Power Plant and explain the a) function of various components.
- Write short note on b)
 - 1) Coal handling plant
 - 2) boiler
 - 3) turbine
- Draw and explain neat labeled diagram of BWR and PWR in nuclear c) power plant.

Section – II

Q.4 Solve any four

- Explain in brief any three types of tariff. a)
- What are the advantages and disadvantages of wind power plant? b)
- The thermal power plant of 210MW capacity has maximum demand of c) 160MW. Its annual load factor is 0.6. The coal consumption is 1kg/kWh of energy generated and cost of coal is Rs.450/tonne. Calculate annual Revenue earned if energy is sold at Rs. 1/kWh. Also find capacity factor.
- Write short note on Cost of electricity generation. d)
- Define the following. e)

Diversity factor, Demand factor, Average load, connected load.

With brief layout explain open loop gas power plant. **f**)

Max. Marks: 56

12

16

16



SLR-FM-723

SLR-FM-723 Set Q

Q.5 Solve any two

- a) With brief layout explain solar thermal power plant.
- A consumer takes steady load of 250K W at power factor of 0.8 lagging for 10 hours per day and 300 days per annum. Estimate the annual payment under each of the following tariffs
 - 1) Rs. 1.20/KWh + Rs. 1200/KVA/annum
 - 2) Rs. 1.20/KWh + Rs. 1200/KW/annum + Rs. 0.25/KVARh
- c) Draw typical layout of Diesel power plant & explain it briefly.

Seat No.			Set R
	ę	S.E. (Part – I) (Old) (CGPA) Examinat Electrical Engineerin POWER PLANT ENGINEE	g
		Saturday,14-12-2019 AM To 01:00 PM	Max. Marks: 70
Instru	ctions	 : 1) Q. No. 1 is compulsory and should be so book. 2) Assume suitable data if necessary. 	lved in first 30 minutes in answer
		,	ationa
Duratio	on: 30	MCQ/Objective Type Que Minutes	Marks: 14
		se the correct alternatives from the options	
		A Thermalpower plant works on	and rewrite the sentence. 14
			yton cycle nkine cycle
		Diesel engines for power plants are usually	
		, , , ,	percharged cooled
,		A surge tank is provided near	
,			sh rack
	C	c) Spillway d) Tur	bine
4	•	Running cost of which plant is least?	
			ermal power plant s turbine plant
ţ	5) \ a b	Water is supplied to a boiler a) at atmospheric pressure b) at slightly more than atmospheric pressur c) at 100 cm/ kg ² d) at more than the steam pressure on the b	e
(é k c	 The function of reflector in a nuclear reactor is a) Bounce back most of the neutrons that es b) Reduce the speed of the neutrons c) Stop the chain reaction d) None of the above 	
-	7) I	n a steam turbine cycle, the lowest pressure	occurs in
		/ /	idenser ber heater
8	8) A	A graphical representation of the discharge ar	nd time is known as:
		, , , , , , , , , , , , , , , , , , , ,	ad-duration curve
			drograph
Ç	•	n a steam power plant water is used for cooli a) boiler b) ecc	ng purposes in pnomizer
		, , , , , , , , , , , , , , , , , , , ,	per-heaters

d) c) condenser super-heaters SLR-FM-723

Seat No.

- 10) Dam: Hydro plant:: _____.
 - a) Chimney : Gases
 - c) Gas turbine : Steam turbine
- b) Coal : Steam plant
- Reactor : Nuclear plant d)

Set R

- The equipment installed in power plants to reduce air pollution due to 11) smoke is ___ .
 - Induced draft fans a)
 - Electrostatic precipitators C)
- b) **De-super heaters**
- d) **Re-heaters**
- Which of the following enters the super heater of a boiler? 12) a) Cold water
 - b) Hot water
 - c) Wet steam d) Super-heated steam
- For high head and minimum discharge, the hydraulic turbine used is _____. 13)
 - a) Kaplan turbine c) Pelton wheel
- Francis turbine b) None of the above d)
- Which auxiliary of gas turbine consumes most of the power? 14)
 - Combustion chamber b)

c) Burner

a) Compressor

d) Fuel pump

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section 2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four

- a) Draw typical layout of thermal power plant.
- b) Explain radioactive decay and half-life of radioactive material.
- c) Explain hydrograph & flow duration curve.
- **d)** Discuss the harmful effect of emission and steps taken for their impact in thermal power plant.
- e) Write short note on current power generation scenario in India.
- f) State advantages and disadvantages of nuclear power plant.

Q.3 Solve any two

- a) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
- **b)** Write short note on
 - 1) Coal handling plant
 - 2) boiler
 - 3) turbine
- c) Draw and explain neat labeled diagram of BWR and PWR in nuclear power plant.

Section – II

Q.4 Solve any four

- a) Explain in brief any three types of tariff.
- b) What are the advantages and disadvantages of wind power plant?
- c) The thermal power plant of 210MW capacity has maximum demand of 160MW. Its annual load factor is 0.6. The coal consumption is 1kg/kWh of energy generated and cost of coal is Rs.450/tonne. Calculate annual Revenue earned if energy is sold at Rs. 1/kWh. Also find capacity factor.
- d) Write short note on Cost of electricity generation.
- e) Define the following.

Diversity factor, Demand factor, Average load, connected load.

f) With brief layout explain open loop gas power plant.

Max. Marks: 56

R

SLR-FM-723

12

16

SLR-FM-723 Set R

Q.5 Solve any two

- a) With brief layout explain solar thermal power plant.
- A consumer takes steady load of 250K W at power factor of 0.8 lagging for 10 hours per day and 300 days per annum. Estimate the annual payment under each of the following tariffs
 - 1) Rs. 1.20/KWh + Rs. 1200/KVA/annum
 - 2) Rs. 1.20/KWh + Rs. 1200/KW/annum + Rs. 0.25/KVARh
- c) Draw typical layout of Diesel power plant & explain it briefly.

Set

Max. Marks: 70

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER PLANT ENGINEERING

Day & Date: Saturday, 14-12-2019 Time: 10:00 AM To 01:00 PM

Duration: 30 Minutes

5)

Seat

No.

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Assume suitable data if necessary.

MCQ/Objective Type Questions

Marks: 14

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The function of reflector in a nuclear reactor is to _ 1)
 - a) Bounce back most of the neutrons that escape from the fuel core
 - b) Reduce the speed of the neutrons
 - Stop the chain reaction c)
 - d) None of the above
- 2) In a steam turbine cycle, the lowest pressure occurs in _____.
 - a) turbine inlet b) condenser
 - c) boiler d) super heater
- 3) A graphical representation of the discharge and time is known as:
 - a) Load curve Load-duration curve b)
 - c) Monograph Hydrograph d)
- 4) In a steam power plant water is used for cooling purposes in _____.
 - a) boiler

- economizer b)
- c) condenser

Dam: Hydro plant:: _____.

a) Chimney : Gases

super-heaters

b) Coal : Steam plant d) Reactor : Nuclear plant

d)

- c) Gas turbine : Steam turbine
- The equipment installed in power plants to reduce air pollution due to 6) smoke is
 - a) Induced draft fans b) **De-super heaters**
 - Electrostatic precipitators d) **Re-heaters** c)
- 7) Which of the following enters the super heater of a boiler?
 - a) Cold water Hot water b)
 - c) Wet steam d) Super-heated steam
- For high head and minimum discharge, the hydraulic turbine used is . 8)
 - a) Kaplan turbine b) Francis turbine c) Pelton wheel d) None of the above
- Which auxiliary of gas turbine consumes most of the power? 9)
 - a) Compressor b)
 - c) Burner
- Combustion chamber
- Fuel pump d)

SLR-FM-723 Set S

- 10) A Thermalpower plant works on _____.
 - a) Carnot cycle b) Brayton cycle
 - c) Dual cycle d) Rankine cycle
- 11) Diesel engines for power plants are usually _
 - Supercharged a) Horizontal b)
 - c) Slow speed Air cooled d)
- A surge tank is provided near _____. 12)
 - b) a) Penstock Trash rack Turbine
 - c) Spillway d)
- 13) Running cost of which plant is least?
 - a) Hydroelectric plant
- Thermal power plant b) d) Gas turbine plant

.

- c) Nuclear power plant
- Water is supplied to a boiler _____. 14)
 - a) at atmospheric pressure
 - b) at slightly more than atmospheric pressure
 - c) at 100 cm/ kg^2
 - d) at more than the steam pressure on the boiler

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER PLANT ENGINEERING

Day & Date: Saturday,14-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) Solve any two questions from each section 2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four

- a) Draw typical layout of thermal power plant.
- b) Explain radioactive decay and half-life of radioactive material.
- c) Explain hydrograph & flow duration curve.
- **d)** Discuss the harmful effect of emission and steps taken for their impact in thermal power plant.
- e) Write short note on current power generation scenario in India.
- f) State advantages and disadvantages of nuclear power plant.

Q.3 Solve any two

- a) Draw a neat schematic diagram of a Hydro Power Plant and explain the function of various components.
- **b)** Write short note on
 - 1) Coal handling plant
 - 2) boiler
 - 3) turbine
- c) Draw and explain neat labeled diagram of BWR and PWR in nuclear power plant.

Section – II

Q.4 Solve any four

- a) Explain in brief any three types of tariff.
- b) What are the advantages and disadvantages of wind power plant?
- c) The thermal power plant of 210MW capacity has maximum demand of 160MW. Its annual load factor is 0.6. The coal consumption is 1kg/kWh of energy generated and cost of coal is Rs.450/tonne. Calculate annual Revenue earned if energy is sold at Rs. 1/kWh. Also find capacity factor.
- d) Write short note on Cost of electricity generation.
- e) Define the following.

Diversity factor, Demand factor, Average load, connected load.

f) With brief layout explain open loop gas power plant.



SLR-FM-723

Max. Marks: 56

12

16

SLR-FM-723 Set S

Q.5 Solve any two

- a) With brief layout explain solar thermal power plant.
- A consumer takes steady load of 250K W at power factor of 0.8 lagging for 10 hours per day and 300 days per annum. Estimate the annual payment under each of the following tariffs
 - 1) Rs. 1.20/KWh + Rs. 1200/KVA/annum
 - 2) Rs. 1.20/KWh + Rs. 1200/KW/annum + Rs. 0.25/KVARh
- c) Draw typical layout of Diesel power plant & explain it briefly.

Set

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Duration: 30 Minutes

Seat

No.

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book Page No.3

- 2) Assume suitable data if required.
- 3) Figures to the right indicate full mark.

MCQ/Objective Type Questions

Q.1 Choose the correct alternatives from the options.

- 1) In a bipolar junction transistor the base region is made very thin so that
 - a) electric field gradient in base is high
 - b) base can be easily fabricated
 - c) base can be easily biased
 - d) recombination in base region is minimum
- 2) The biasing circuit that gives best stability to Q point is _____.
 - voltage divider biasing a)
 - base resistance biasing b)
 - emitter resistor biasing C)
 - feedback resistor biasing d)
- 3) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
 - True False a) b)
- 4) The unit of h_{ie} parameter is _____.
 - b) Farad a) Mho
 - Ohm d) Unitless c)
- Which of the following statements is/are correct? 5) I- Enhancement type MOSFET is normally ON device II- Depeltion type MOSFET is normally OFF device III- JFET is normally OFF device.
 - a) Only II 11 & 11 b)
 - c) Only I d) None of these
- An FET is _____. 6) a) Bipolar transistor b) Unipolar transistor
 - c) Tri-polar transistor d)

The ideal value of input impedance of JFET is 7)

a) Zero c) Non zero

None of these

- Infinite b)
- d) None of these

SLR-FM-724

Max. Marks: 70

Marks: 14

SLR-FM-724 Set P

8 to 11: Match the correct pairs

I	
Group A	Group B
8. Class AB Amplifier	a) Ri = 0 & Ro = 0
9. Class B Amplifier	b) Q at middle of DC loadline
10.Voltage Amplifier	c) $Ri = \infty \& Ro = \infty$
11.Transconductance Amplifier	d) Q at Cut off point
	e) Q in between middle of DC load line & cut
	off point
	f) Ri = ∞ & Ro = 0

- 12) In a full wave rectifier, the current in each diode flows for _____.
 - a) whole cycle of the input signal
 - b) half cycle of the input signal
 - c) more than half cycle of the input signal
 - d) none of these
- 13) The input impedance of voltage series feedback amplifier, with negative feedback _____.
 - a) Decreases

- b) Becomes zero
- c) Increases
- d) Is unchanged
- 14) An oscillator employs _____ feedback.
 - a) Positive
 - b) Negative
 - c) Neither positive nor negative
 - d) Data insufficient

Page 3 of 16

SLR-FM-724

Seat	
No.	

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

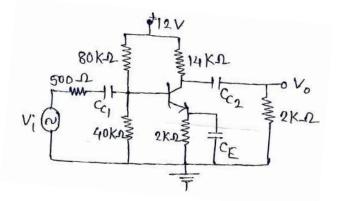
Q.2 Solve any four

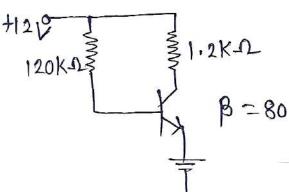
- a) Derive expression for current gain and input impedance for amplifier in terms of h-parameters.
- **b)** Calculate operating point voltage, current and stability factor for given fixed bias circuit.

- c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.
- d) Explain Darlington pair configuration with neat diagram.
- e) Define the following small signal parameters of JFET
 - 1) AC drain resistance
 - 2) Amplification factor
 - 3) DC drain resistance
 - 4) Transconductance

Q.3 Solve any Two

a) Determine the amplifier parameters current gain, voltage gain, input impedance and output impendence and output for the given CE amplifier, has $h_{ie}=5$ Kohm, $h_{re}=3*10^{-4}$, $h_{fe}=140$ $h_{oe}=8.8*10^{-5}$ A/V.





Max. Marks: 56

16

Set

Set

- **b)** Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.
- c) Design a single stage RC coupled CE amplifier for a given requirement of Q(5V, 8mA), Voltage gain of 200, S=3, Rs= 50Ohm, h_{fe} =250, V_{BE} =0.6V, R_L=1Kohm, supply voltage V_{cc}=15V. Assume input signal frequency from 20Hz to 20KHz

Section - II

Q.4 Solve any four

- a) Explain the characteristics of UJT.
- **b)** Differentiate between positive & negative feedback amplifiers.
- c) Explain crossover distortion in power amplifier with suitable diagram.
- d) Derive the expression of ripple factor of L filter.
- e) In single stage voltage amplifier, voltage gain without feedback is 110, input resistance Ri=1.2 KΩ, output resistance Ro is 12 KΩ. Determine Voltage gain, input resistance & output resistance of the negative feedback amplifier if 25% output voltage is feedback in series with input?

Q.5 Solve any two.

- a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at $2K\Omega$ with ripple factor not exceeding 4%. Assume supply frequency of 50Hz & Use 2 diode FWR.
- **b)** Explain the effect of negative feedback on the gain, input resistance & output resistance of voltage series feedback amplifier.
- c) Define & determine overall efficiency and collector efficiency of RC coupled class A power amplifier with neat diagram.



16

No.						Set	Q
	S.E.		Electrica	Engine	-	.019	
				VICES A	ND CIRCUITS		
•		sday,17-12 To 01:00 P				Max. Marks	: 70
Instru	2)	Book Page Assume su		quired.	solved in first 30 Min	utes in answe	er
_			ICQ/Objectiv	е Туре С	Questions		
	on: 30 Min			_	_	Marks	
			alternatives fro arameter is	-	ions.		14
	a)	Mho Ohm		 b) d)	Farad Unitless		
:	2) Whic I- Enl II- De III- JF a)	h of the foll hancement epeltion typ	owing statemer type MOSFET e MOSFET is n nally OFF device	nts is/are c is normally ormally OF	orrect? / ON device		
:	́а)	ET is Bipolar trai Tri-polar tr		b) d)	Unipolar transistor None of these		
	a)	deal value Zero Non zero	of input impeda	nce of JFE b) d)	T is Infinite None of these		
:	5) In a b	oipolar junc	tion transistor th	ne base reg	gion is made very thir	n so that	
	a) b) c) d)	base can b base can b	d gradient in ba be easily fabrica be easily biased tion in base reg	ted	mum		
	a) b) c)	voltage div base resist emitter res	uit that gives be ider biasing tance biasing istor biasing esistor biasing	est stability	to Q point is		
	•	• •	esponse of BJT decrease in frec		n low frequency regio	n	
	a)	True		b)	False		

Set Q

Seat	
No.	

8 to 11: Match the correct pairs

Group A	Group B
8. Class AB Amplifier	a) Ri = 0 & Ro = 0
9. Class B Amplifier	b) Q at middle of DC loadline
10.Voltage Amplifier	c) Ri = ∞ & Ro = ∞
11.Transconductance Amplifier	d) Q at Cut off point
	e) Q in between middle of DC load line & cut
	off point
	f) Ri = ∞ & Ro = 0

- 12) The input impedance of voltage series feedback amplifier, with negative feedback _____.
 - a) Decreases
- b) Becomes zerod) Is unchanged
- c) Increases d) Is
- 13) An oscillator employs _____ feedback.
 - a) Positive
 - b) Negative
 - c) Neither positive nor negative
 - d) Data insufficient
- 14) In a full wave rectifier, the current in each diode flows for _____.
 - a) whole cycle of the input signal
 - b) half cycle of the input signal
 - c) more than half cycle of the input signal
 - d) none of these

Seat	
No.	

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

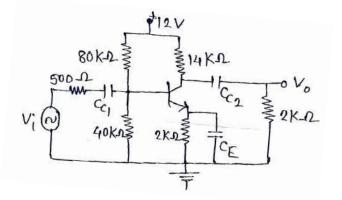
Q.2 Solve any four

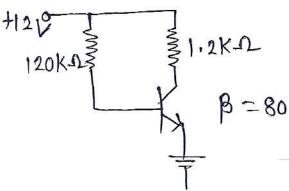
- a) Derive expression for current gain and input impedance for amplifier in terms of h-parameters.
- **b)** Calculate operating point voltage, current and stability factor for given fixed bias circuit.

- c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.
- d) Explain Darlington pair configuration with neat diagram.
- e) Define the following small signal parameters of JFET
 - 1) AC drain resistance
 - 2) Amplification factor
 - 3) DC drain resistance
 - 4) Transconductance

Q.3 Solve any Two

a) Determine the amplifier parameters current gain, voltage gain, input impedance and output impendence and output for the given CE amplifier, has h_{ie} =5 Kohm, h_{re} =3*10⁻⁴, h_{fe} =140 h_{oe} =8.8*10⁻⁵ A/V.







Max. Marks: 56

16

- SLR-FM-724
 - Set | Q
- **b)** Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.
- c) Design a single stage RC coupled CE amplifier for a given requirement of Q(5V, 8mA), Voltage gain of 200, S=3, Rs= 50Ohm, h_{fe} =250, V_{BE} =0.6V, R_L=1Kohm, supply voltage V_{cc}=15V. Assume input signal frequency from 20Hz to 20KHz

Section - II

Q.4 Solve any four

- a) Explain the characteristics of UJT.
- b) Differentiate between positive & negative feedback amplifiers.
- c) Explain crossover distortion in power amplifier with suitable diagram.
- d) Derive the expression of ripple factor of L filter.
- e) In single stage voltage amplifier, voltage gain without feedback is 110, input resistance Ri=1.2 KΩ, output resistance Ro is 12 KΩ. Determine Voltage gain, input resistance & output resistance of the negative feedback amplifier if 25% output voltage is feedback in series with input?

Q.5 Solve any two.

- a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at $2K\Omega$ with ripple factor not exceeding 4%. Assume supply frequency of 50Hz & Use 2 diode FWR.
- **b)** Explain the effect of negative feedback on the gain, input resistance & output resistance of voltage series feedback amplifier.
- c) Define & determine overall efficiency and collector efficiency of RC coupled class A power amplifier with neat diagram.



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Seat No. S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019

Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019

Time: 10:00 AM To 01:00 PM

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer Book Page No.3

- 2) Assume suitable data if required.
- 3) Figures to the right indicate full mark.

MCQ/Objective Type Questions

b)

Unipolar transistor

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- 1) An FET is
 - a) Bipolar transistor
 - c) Tri-polar transistor d) None of these
- The ideal value of input impedance of JFET is 2)
 - a) Zero b) Infinite
 - c) Non zero d) None of these
- In a bipolar junction transistor the base region is made very thin so that 3)
 - a) electric field gradient in base is high
 - base can be easily fabricated b)
 - base can be easily biased c)
 - recombination in base region is minimum d)
- The biasing circuit that gives best stability to Q point is . 4)
 - voltage divider biasing a)
 - base resistance biasing b)
 - emitter resistor biasing c)
 - feedback resistor biasing d)
- 5) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
 - True False a) b)
- 6) The unit of h_{ie} parameter is _____.
 - b) Farad Mho a)
 - Ohm d) Unitless c)
- 7) Which of the following statements is/are correct? I- Enhancement type MOSFET is normally ON device II- Depeltion type MOSFET is normally OFF device III- JFET is normally OFF device.
 - a) Only II
 - c) Only I

Max. Marks: 70



Marks: 14

Set R

8 to 11: Match the correct pairs

Group A	Group B		
8. Class AB Amplifier	a) Ri = 0 & Ro = 0		
9. Class B Amplifier	b) Q at middle of DC loadline		
10.Voltage Amplifier	c) $Ri = \infty \& Ro = \infty$		
11.Transconductance Amplifier	d) Q at Cut off point		
	 e) Q in between middle of DC load line & cut off point 		
	f) Ri = ∞ & Ro = 0		

- 12) An oscillator employs _____ feedback.
 - a) Positive
 - b) Negative
 - c) Neither positive nor negative
 - d) Data insufficient
- 13) In a full wave rectifier, the current in each diode flows for _____.
 - a) whole cycle of the input signal
 - b) half cycle of the input signal
 - c) more than half cycle of the input signal
 - d) none of these
- 14) The input impedance of voltage series feedback amplifier, with negative feedback _____.
 - a) Decreases

b) Becomes zero

c) Increases

d) Is unchanged

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Seat	
No.	

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday,17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

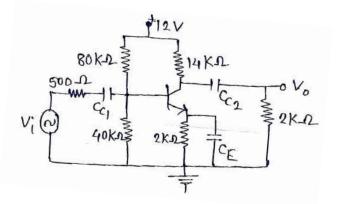
Q.2 Solve any four

- a) Derive expression for current gain and input impedance for amplifier in terms of h-parameters.
- **b)** Calculate operating point voltage, current and stability factor for given fixed bias circuit.

- c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.
- d) Explain Darlington pair configuration with neat diagram.
- e) Define the following small signal parameters of JFET
 - 1) AC drain resistance
 - 2) Amplification factor
 - 3) DC drain resistance
 - 4) Transconductance

Q.3 Solve any Two

a) Determine the amplifier parameters current gain, voltage gain, input impedance and output impendence and output for the given CE amplifier, has h_{ie} =5 Kohm, h_{re} =3*10⁻⁴, h_{fe} =140 h_{oe} =8.8*10⁻⁵ A/V.



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16



- **b)** Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.
- c) Design a single stage RC coupled CE amplifier for a given requirement of Q(5V, 8mA), Voltage gain of 200, S=3, Rs= 50Ohm, h_{fe} =250, V_{BE} =0.6V, R_L =1Kohm, supply voltage V_{cc} =15V. Assume input signal frequency from 20Hz to 20KHz

Section - II

Q.4 Solve any four

- a) Explain the characteristics of UJT.
- b) Differentiate between positive & negative feedback amplifiers.
- c) Explain crossover distortion in power amplifier with suitable diagram.
- d) Derive the expression of ripple factor of L filter.
- e) In single stage voltage amplifier, voltage gain without feedback is 110, input resistance Ri=1.2 KΩ, output resistance Ro is 12 KΩ. Determine Voltage gain, input resistance & output resistance of the negative feedback amplifier if 25% output voltage is feedback in series with input?

Q.5 Solve any two.

- a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at $2K\Omega$ with ripple factor not exceeding 4%. Assume supply frequency of 50Hz & Use 2 diode FWR.
- **b)** Explain the effect of negative feedback on the gain, input resistance & output resistance of voltage series feedback amplifier.
- c) Define & determine overall efficiency and collector efficiency of RC coupled class A power amplifier with neat diagram.



16

a) c)	Ohm	b) d)	Farad Unitless					
Which of the following statements is/are correct? I- Enhancement type MOSFET is normally ON device II- Depeltion type MOSFET is normally OFF device III- JFET is normally OFF device.								
	Only II Only I	b) d)	II & III None of these					
a)	ET is Bipolar transistor Tri-polar transistor	b) d)	Unipolar transistor None of these					
The i a) c)	ideal value of input impedance o Zero Non zero	f JFE b) d)	T is Infinite None of these					
In a l	bipolar junction transistor the bas	se reg	jion is made very thin so that					
a) b) c) d)	electric field gradient in base is base can be easily fabricated base can be easily biased recombination in base region is	-	num					

d) feedback resistor biasing

2) The frequency response of BJT amplifier in low frequency region

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Instructions: 1) Q.No.1 is compulsory and should be solved in first 30 Minutes in answer

MCQ/Objective Type Questions

- The biasing circuit that gives best stability to Q point is _____. 1) voltage divider biasing a) b) base resistance biasing

Book Page No.3

2) Assume suitable data if required. 3) Figures to the right indicate full mark.

Choose the correct alternatives from the options.

Day & Date: Tuesday, 17-12-2019

Time: 10:00 AM To 01:00 PM

Duration: 30 Minutes

Seat

No.

Q.1

- emitter resistor biasing C)
- - decreases with decrease in frequency. True a) b) False
- 3) The unit of h_{ie} parameter is _____.
 - h) Farad Mho a)
 - С
- 4) ۷ ŀ I L

5) A

6) Т

- 7)
 - а
 - b
 - С
 - d

SLR-FM-724

Set

S

Max. Marks: 70

Marks: 14

Set S

8 to 11: Match the correct pairs

Group A	Group B
8. Class AB Amplifier	a) Ri = 0 & Ro = 0
9. Class B Amplifier	b) Q at middle of DC loadline
10.Voltage Amplifier	c) $Ri = \infty \& Ro = \infty$
11.Transconductance Amplifier	d) Q at Cut off point
	 e) Q in between middle of DC load line & cut off point
	f) $Ri = \infty \& Ro = 0$

- 12) In a full wave rectifier, the current in each diode flows for _____.
 - a) whole cycle of the input signal
 - b) half cycle of the input signal
 - c) more than half cycle of the input signal
 - d) none of these
- 13) The input impedance of voltage series feedback amplifier, with negative feedback _____.
 - a) Decreases

b) Becomes zero

c) Increases

- d) Is unchanged
- 14) An oscillator employs _____ feedback.
 - a) Positive
 - b) Negative
 - c) Neither positive nor negative
 - d) Data insufficient

16

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Seat No.

S.E. (Part - I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTRONIC DEVICES AND CIRCUITS

Day & Date: Tuesday, 17-12-2019 Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

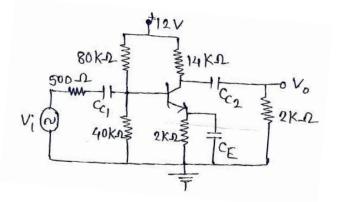
Solve any four Q.2

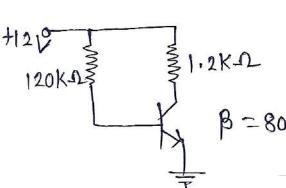
- Derive expression for current gain and input impedance for amplifier in a) terms of h-parameters.
- b) Calculate operating point voltage, current and stability factor for given fixed bias circuit.

- Explain drain & transfer characteristics of p channel enhancement type C) MOSFET with neat diagram.
- Explain Darlington pair configuration with neat diagram. d)
- Define the following small signal parameters of JFET e)
 - 1) AC drain resistance
 - 2) Amplification factor
 - 3) DC drain resistance
 - 4) Transconductance

Q.3 Solve any Two

Determine the amplifier parameters current gain, voltage gain, input a) impedance and output impendence and output for the given CE amplifier, has $h_{ie}=5$ Kohm, $h_{re}=3*10^{-4}$, $h_{fe}=140$ $h_{oe}=8.8*10^{-5}$ A/V.





Max. Marks: 56

Set

- **b)** Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.
- c) Design a single stage RC coupled CE amplifier for a given requirement of Q(5V, 8mA), Voltage gain of 200, S=3, Rs= 50Ohm, h_{fe} =250, V_{BE} =0.6V, R_L =1Kohm, supply voltage V_{cc} =15V. Assume input signal frequency from 20Hz to 20KHz

Section - II

Q.4 Solve any four

- a) Explain the characteristics of UJT.
- b) Differentiate between positive & negative feedback amplifiers.
- c) Explain crossover distortion in power amplifier with suitable diagram.
- d) Derive the expression of ripple factor of L filter.
- e) In single stage voltage amplifier, voltage gain without feedback is 110, input resistance Ri=1.2 KΩ, output resistance Ro is 12 KΩ. Determine Voltage gain, input resistance & output resistance of the negative feedback amplifier if 25% output voltage is feedback in series with input?

Q.5 Solve any two.

- a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at $2K\Omega$ with ripple factor not exceeding 4%. Assume supply frequency of 50Hz & Use 2 diode FWR.
- **b)** Explain the effect of negative feedback on the gain, input resistance & output resistance of voltage series feedback amplifier.
- c) Define & determine overall efficiency and collector efficiency of RC coupled class A power amplifier with neat diagram.



16

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS & COMPUTER PROGRAMMING Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM **Instructions:** 1) Q.1 is compulsory; it should be solved in first 30 minutes in Answer book. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. MCQ/Objective Type Questions **Duration: 30 Minutes** Choose the correct alternatives from the options and rewrite the sentence. Modification of ______ is called Romberg's method. a) Trapezoidal Rule b) Simson's (1/3)rd Rule c) Simpson's (3/8)th Rule Weddles Rule d) The degree of y(x) in Trapezoidal Rule is 1 a) b)

c) 3 d)

The method used to find the dominant Eigen value is 3)

- Newton's Method a) Gauss Method b)
 - c) Euler's Method d) Power Method
- 4) Newton-Raphson method has a ____ ____ convergence.
 - linear b) quadratic a) c) cubic bi quadratic d)
- 5) The root of the equation $e^{x}=4x$ lies between (1, 2)a) (0,1) b)
 - c) (2, 3) d) (3, 4)
- The most popular Runge-Kutta method is _ 6)
 - a) First order b) Second order
 - c) Third order d) Fourth order

The modification of Gauss Elimination Method is 7)

a) Gauss Jordan Gauss Jacobi b) c) Gauss Elimination d) Gauss Seidel

In Euler's method: Given initial value 8) problem y' = dy/dx = f(x, y) with y(x0) = y0, then approximation is given by _____. a) $y_{n+1} = y_n + hf(x_n - 1, y_{n-1})$ b) $y_{n+1} = y_n + hf(x_n, y_n)$ d) c) $y_{n+1} = y_n + hf(xn - 1, y_n)$ $y_{n+1} = y_n + hf(x_n, y_{n-1})$ The order of Euler method is ____ 9) h² b) a) h

c) h^3 h^4 d)

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Set

Seat No.

Q.1

1)

2)

Max. Marks: 70

Marks: 14

14

2

Lagrange's interpolation formula is used to compute the values for _____ 10) intervals.

a) equal

unequal b)

SLR-FM-725

Set P

- d) closed c) open
- 11) Gauss Elimination Method & Gauss Jordan Methods are _____ methods.
 - a) direct b) indirect c) self correcting
 - d) step by step
- Newton-Raphson method is applicable the solution of _____. 12)
 - both algebraic and transcendental equations a)
 - b) both algebraic and transcendental and also used when the roots are complex
 - c) algebraic equations only
 - d) transcendental equations only

Simpson's 1/3rd rule is applicable only when _____ 13)

- n is a multiple of 3 b)
- c) n is a multiple of 8 d) n is a multiple of 24
- The forward difference operator is denoted by the symbol _____. 14)
 - a) ⊿

a) n is a multiple of 2

c) ∂

b) Ω d) ∞

Seat No.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Section – I Q.No.5 is compulsory. Solve any two from the remaining auestions.

- 2) Section II Q.No.9 is compulsory. Solve any two from the remaining questions.
- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary.

Section – I

Solve the following. Q.2

Find a real root of the equation $x \log_{10} x = 1.2$ by regula falsi method 03 a) correct to four decimal places. (Take (2, 3) as search interval). Using Newton's iterative method, find the real root of $x \log_{10} x = 1.2$ 03 b) correct to four decimal places taking $x_0 = 2$ as initial approximation. Find the positive real root of the equation $4x_3 - 2x - 6 = 0$ correct to three 03 C) decimal places by using bisection method. (Perform four iterations only) Solve the following. 03

Q.3

- Solve the following system of equations by Gauss- elimination method. a) x + y + z = 9; 2x - 3y + 4z = 13; 3x + 4y + 5z = 40
- Solve the following system of equations by L-U decomposition method. 06 b) x + y + z = 1; 4x + 3y - z = 6; 3x + 5y + 3z = 4

Q.4 Solve the following.

a)	Fit parabola of the form $y = a + bx + cx^2$ to the data given below.							03
	X:	0	1	2	3	4		

Χ.	0	Ι	2	5	4		
y:	1	1.8	1.3	2.5	6.3		
Using Learning r_{i} formula of integral time find $f(0, \Gamma)$ given							

Using Lagrange's formula of interpolation find f(9.5) given. b)

Х	7	8	9	10
у	3	1	1	9

Find $\frac{dy}{dx}$ at x = 9 from the following table by using Newton's divided C) difference formula.

X:	5	7	11	13	17
y:	150	392	1452	2366	5202

Q.5 Solve the following.

Obtain cubic spline for the following data a)

Х	0	1	2	3
У	1	2	33	244

b) Solve the following system of equations by using Jacobi's method. 27x + 6y - z = 85; x + y + 54z = 110; 6x + 15y + 2z = 72

Max. Marks: 56

04

06

03

Section – II

Q.6	Sol a)	ve the following. Use Romberg's method to compute $\int_0^1 \frac{1}{1+x^2} dx$ (Take h = 0.5, 0.25).				
	b)	Evaluate $\int_0^1 \frac{1}{1+x} dx$ taking 7 ordinates by applying Simpson's rule.	04			
Q.7	Sol a)	ve the following. Determine the largest eigen value and corresponding eigen vector of the matrix. $\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ Using power method	05			
	b)	Taking $\begin{bmatrix} 1, 0, 0 \end{bmatrix}^{T}$ as an initial eigen vector. Using Jacobi's Method, find all eigen values and eigen vectors. $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$	04			
Q.8	Sol a) b)	ve the following. Solve the equation $\bigvee^2 u = 0$ for the following mesh by using Leibmann's method. (Perform Four Iterations): $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	05 04			
Q.9	Sol a) b)	ve the following. Find first derivative for the following data at $x = 900$. x 0 300 600 900 1200 1500 1800 y 135 149 157 183 201 205 193 Compute $\int_0^6 \frac{1}{1+x^2} dx$ by using Trapezoidal rule.	05 05			
	,	Compute $\int_0^{1+x^2} dx$ by using mapezoidal fulle.				

Seat	
No.	

Q.1

2)

Electrical Engineering NUMERICAL METHODS & COMPUTER PROGRAMMING Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM **Instructions:** 1) Q.1 is compulsory; it should be solved in first 30 minutes in Answer book. 2) Figures to the right indicate full marks. 3) Assume suitable data if necessary. **MCQ/Objective Type Questions Duration: 30 Minutes** Marks: 14 Choose the correct alternatives from the options and rewrite the sentence. In Euler's method: Given initial value 1) problem y' = dy/dx = f(x, y) with y(x0) = y0, then approximation is given by _____.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019

- a) $y_{n+1} = y_n + hf(x_n 1, y_{n-1})$ b) $y_{n+1} = y_n + hf(x_n, y_n)$ c) $y_{n+1} = y_n + hf(x_n 1, y_n)$ d) $y_{n+1} = y_n + hf(x_n, y_n)$ d) $y_{n+1} = y_n + hf(x_n, y_{n-1})$
 - The order of Euler method is _____ b) a) h c) h^3
- 3) Lagrange's interpolation formula is used to compute the values for _____ intervals.
 - a) equal b)
- d) closed c) open Gauss Elimination Method & Gauss Jordan Methods are _____ methods. 4)
 - a) direct b) indirect
 - d) c) self correcting
- 5) Newton-Raphson method is applicable the solution of _____.
 - both algebraic and transcendental equations a)
 - both algebraic and transcendental and also used when the roots are b) complex
 - c) algebraic equations only
 - d) transcendental equations only

Simpson's 1/3rd rule is applicable only when ____ 6)

- a) n is a multiple of 2 n is a multiple of 3 b)
- c) n is a multiple of 8 n is a multiple of 24 d)

The forward difference operator is denoted by the symbol _____. 7)

- a) ⊿ b) Ω d) c) ∂ ∞
- Modification of ______ is called Romberg's method. 8)
 - a) Trapezoidal Rule Simson's (1/3)rd Rule b) Weddles Rule
 - c) Simpson's (3/8)th Rule d)
- 9) The degree of y(x) in Trapezoidal Rule is _
 - 1 2 a) b) d) 6
 - 3 c)

Max. Marks: 70

14

Set



- step by step

h² h⁴ d)

10)	The method used to find the domina	ant Ei	gen value is
	a) Gauss Method	b)	Newton's Method
	c) Euler's Method	d)	Power Method
11)	Newton-Raphson method has a a) linear c) cubic	b) d)	•
12)	The root of the equation e ^x =4x lies k a) (0,1) c) (2, 3)	betwe b) d)	· · · · ·
13)	The most popular Runge-Kutta met	hod is	S
	a) First order	b)	Second order
	c) Third order	d)	Fourth order
14)	The modification of Gauss Eliminati	on Me	ethod is
	a) Gauss Jordan	b)	Gauss Jacobi
	c) Gauss Elimination	d)	Gauss Seidel

Set Q

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering NUMERICAL METHODS & COMPUTER PROGRAMMING**

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Section – I Q.No.5 is compulsory. Solve any two from the remaining auestions.

- 2) Section II Q.No.9 is compulsory. Solve any two from the remaining questions.
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- Assume suitable data if necessary.

Section – I

Solve the following. Q.2

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Q.3

- Solve the following system of equations by Gauss- elimination method. x + y + z = 9; 2x - 3y + 4z = 13; 3x + 4y + 5z = 40
- Solve the following system of equations by L-U decomposition method. 06 b) x + y + z = 1; 4x + 3y - z = 6; 3x + 5y + 3z = 4

Q.4 Solve the following.

a)	Fit parabola of the form $y = a + bx + cx^2$ to the data given below							03
	X:	0	1	2	3	4		

Χ.	0	Ι	2	5	4
y:	1	1.8	1.3	2.5	6.3
		f			• • • • • • •

Using Lagrange's formula of interpolation find f(9.5) given. b)

Х	7	8	9	10
у	3	1	1	9

Find $\frac{dy}{dx}$ at x = 9 from the following table by using Newton's divided C) difference formula.

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Solve the following. Q.5

Obtain cubic spline for the following data a)

Х	0	1	2	3
У	1	2	33	244

b) Solve the following system of equations by using Jacobi's method. 27x + 6y - z = 85; x + y + 54z = 110; 6x + 15y + 2z = 72

Max. Marks: 56

04

06

03

Section – II

Q.6	Sol a)	ve the following. Use Romberg's method to compute $\int_0^1 \frac{1}{1+x^2} dx$ (Take h = 0.5, 0.25).	05
	b)	Evaluate $\int_0^1 \frac{1}{1+x} dx$ taking 7 ordinates by applying Simpson's rule.	04
Q.7	Sol a)	ve the following. Determine the largest eigen value and corresponding eigen vector of the matrix. $\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ Using power method	05
	b)	Taking $\begin{bmatrix} 1, 0, 0 \end{bmatrix}^{T}$ as an initial eigen vector. Using Jacobi's Method, find all eigen values and eigen vectors. $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$	04
Q.8	Sol a) b)	ve the following. Solve the equation $\bigvee^2 u = 0$ for the following mesh by using Leibmann's method. (Perform Four Iterations): $\begin{array}{c} 0 & 500 & 1000 & 500 & 0 \\ \hline 1000 & 2000 & 1000 & 2000 \\ \hline 1000 & 2000 & 1000 & 2000 \\ \hline 1000 & 2000 & 1000 \\ \hline 1000$	05 04
Q.9	Sol a) b)	ve the following. Find first derivative for the following data at $x = 900$. x 0 300 600 900 1200 1500 1800 y 135 149 157 183 201 205 193 Compute $\int_0^6 \frac{1}{1+x^2} dx$ by using Trapezoidal rule.	05 05
		~ 174	

Seat No.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q.1 is compulsory; it should be solved in first 30 minutes in Answer book. 2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

2)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- The root of the equation e^x=4x lies between _ 1)
 - a) (0,1) b) c) (2, 3) (3, 4)d) The most popular Runge-Kutta method is _
 - Second order a) First order b) c) Third order Fourth order d)

3) The modification of Gauss Elimination Method is

- a) Gauss Jordan Gauss Jacobi b) c) Gauss Elimination d) Gauss Seidel
- 4) In Euler's method: Given initial value problem y' = dy/dx = f(x, y) with y(x0) = y0, then approximation is given by _____.
 - a) $y_{n+1} = y_n + hf(x_n 1, y_{n-1})$ b) $y_{n+1} = y_n + hf(x_n, y_n)$
 - c) $y_{n+1} = y_n + hf(xn 1, y_n)$ d) $y_{n+1} = y_n + hf(x_n, y_{n-1})$
- The order of Euler method is _____ 5) h² b) a) h c) h³ h^4 d)
- Lagrange's interpolation formula is used to compute the values for _____ 6) intervals.
 - a) equal b) unequal d) closed c) open
- 7) Gauss Elimination Method & Gauss Jordan Methods are _____ methods.
 - a) direct b) indirect
 - c) self correcting d) step by step
- Newton-Raphson method is applicable the solution of _____. 8)
 - a) both algebraic and transcendental equations
 - b) both algebraic and transcendental and also used when the roots are complex
 - algebraic equations only c)
 - d) transcendental equations only

Set

Max. Marks: 70

Marks: 14



		Set	R
9)	Simpson's 1/3rd rule is applicable only when a) n is a multiple of 2 b) n is a multiple of 3 c) n is a multiple of 8 d) n is a multiple of 24		
10)	The forward difference operator is denoted by the symbol a) Δ b) Ω c) ∂ d) ∞	_•	
11)	Modification of is called Romberg's method.a) Trapezoidal Ruleb) Simson's (1/3)rd Rulec) Simpson's (3/8)th Ruled) Weddles Rule		
12)	The degree of y(x) in Trapezoidal Rule isa) 1b) 2c) 3d) 6		
13)	The method used to find the dominant Eigen value isa) Gauss Methodb) Newton's Methodc) Euler's Methodd) Power Method		
14)	Newton-Raphson method has aconvergence.a) linearb) quadraticc) cubicd) bi quadratic		

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Section – I Q.No.5 is compulsory. Solve any two from the remaining auestions.

- 2) Section II Q.No.9 is compulsory. Solve any two from the remaining questions.
- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary.

Section – I

Q.2 Solve the following.

Find a real root of the equation $x \log_{10} x = 1.2$ by regula falsi method 03 a) correct to four decimal places. (Take (2, 3) as search interval). Using Newton's iterative method, find the real root of $x \log_{10} x = 1.2$ 03 b) correct to four decimal places taking $x_0 = 2$ as initial approximation. Find the positive real root of the equation $4x_3 - 2x - 6 = 0$ correct to three 03 C) decimal places by using bisection method. (Perform four iterations only) Solve the following.

Q.3

- Solve the following system of equations by Gauss- elimination method. 03 a) x + y + z = 9; 2x - 3y + 4z = 13; 3x + 4y + 5z = 40
- Solve the following system of equations by L-U decomposition method. 06 b) x + y + z = 1; 4x + 3y - z = 6; 3x + 5y + 3z = 4

Q.4 Solve the following.

a)	Fit parab	ola of the	e form $y =$	a + bx + cx	x^2 to the da	ita given be	elow.	03
	X:	0	1	2	3	4		

х.	0	I	2	3	4
y:	1	1.8	1.3	2.5	6.3
l la incar la a		f			• • • • • • •

Using Lagrange's formula of interpolation find f(9.5) given. b)

Х	7	8	9	10
у	3	1	1	9

Find $\frac{dy}{dx}$ at x = 9 from the following table by using Newton's divided C) difference formula.

X:	5	7	11	13	17
y:	150	392	1452	2366	5202

Q.5 Solve the following.

Obtain cubic spline for the following data a)

х	0	1	2	3
У	1	2	33	244

b) Solve the following system of equations by using Jacobi's method. 27x + 6y - z = 85; x + y + 54z = 110; 6x + 15y + 2z = 72

Max. Marks: 56

04

06

03

Section – II

Q.6	Sol a)	The following. Use Romberg's method to compute $\int_0^1 \frac{1}{1+x^2} dx$ (Take h = 0.5, 0.25).	5
	b)	Evaluate $\int_0^1 \frac{1}{1+x} dx$ taking 7 ordinates by applying Simpson's rule. 0 4	4
Q.7	Sol a)	The the following. Determine the largest eigen value and corresponding eigen vector of the matrix. $ \begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix} $ Using power method	5
	b)	Taking $\begin{bmatrix} 1, 0, 0 \end{bmatrix}^T$ as an initial eigen vector. Using Jacobi's Method, find all eigen values and eigen vectors. $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$	4
Q.8	Sol a) b)	The the following. Solve the equation $\nabla^2 u = 0$ for the following mesh by using Leibmann's method. (Perform Four Iterations): 0 500 1000 500 0 1000 2000 1000 500 0 1000 2000 1000 500 0 Apply Runge Kutta Method to find approximate value of y for x = 0.1 in 04	
	5,	steps of 0.1, if $\frac{dy}{dx} = \frac{y-x}{y+x}$ given that $y = 1$ where $x = 0$.	Ŧ
Q.9	Sol a)	re the following.Find first derivative for the following data at $x = 900$.05 \mathbf{x} 0300600900120015001800	5
	b)	y 135 149 157 183 201 205 193 Compute $\int_0^6 \frac{1}{1+x^2} dx$ by using Trapezoidal rule.	5

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Duration: 30 Minutes

Instructions: 1) Q.1 is compulsory; it should be solved in first 30 minutes in Answer book. 2) Figures to the right indicate full marks.

3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Lagrange's interpolation formula is used to compute the values for _____ intervals.
 - equal unequal a) b)
 - closed d) c) open
- Gauss Elimination Method & Gauss Jordan Methods are methods. 2)
 - indirect a) direct b) c) self correcting d) step by step

Newton-Raphson method is applicable the solution of . 3)

- both algebraic and transcendental equations a)
- both algebraic and transcendental and also used when the roots are b) complex
- c) algebraic equations only
- d) transcendental equations only
- Simpson's 1/3rd rule is applicable only when _____ 4)
 - a) n is a multiple of 2 n is a multiple of 3 b)
 - c) n is a multiple of 8 d) n is a multiple of 24

The forward difference operator is denoted by the symbol _____. 5)

- a) ∆ b) Ω c) ∂ d) ∞
- Modification of ______ is called Romberg's method. 6)
 - a) Trapezoidal Rule Simson's (1/3)rd Rule b)
 - c) Simpson's (3/8)th Rule Weddles Rule d)
- 7) The degree of y(x) in Trapezoidal Rule is _
 - a) 1 2 b) d) 6
 - c) 3
- 8) The method used to find the dominant Eigen value is
 - Newton's Method a) Gauss Method b) c) Euler's Method d) Power Method
- 9) Newton-Raphson method has a ____ ____ convergence.
 - a) linear b)
 - quadratic c) cubic d) bi quadratic

Set

Max. Marks: 70

Marks: 14

Set S The root of the equation e^x=4x lies between ____ 10) a) (0,1) (1, 2)b) c) (2, 3) d) (3, 4) The most popular Runge-Kutta method is _____ 11) a) First order b) Second order c) Third order d) Fourth order The modification of Gauss Elimination Method is 12) a) Gauss Jordan Gauss Jacobi b) c) Gauss Elimination **Gauss Seidel** d) In Euler's method: Given initial value 13) problem y' = dy/dx = f(x, y) with y(x0) = y0, then approximation is given by _____. a) $y_{n+1} = y_n + hf(x_n - 1, y_{n-1})$ b) $y_{n+1} = y_n + hf(x_n, y_n)$ c) $y_{n+1} = y_n + hf(xn - 1, y_n)$ d) $y_{n+1} = y_n + hf(x_n, y_{n-1})$ The order of Euler method is ____ 14) h² b) a) h c) h³ h^4 d)

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Seat No.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Section – I Q.No.5 is compulsory. Solve any two from the remaining auestions.

- 2) Section II Q.No.9 is compulsory. Solve any two from the remaining questions.
- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary.

Section – I

Q.2 Solve the following.

Find a real root of the equation $x \log_{10} x = 1.2$ by regula falsi method 03 a) correct to four decimal places. (Take (2, 3) as search interval). Using Newton's iterative method, find the real root of $x \log_{10} x = 1.2$ 03 b) correct to four decimal places taking $x_0 = 2$ as initial approximation. Find the positive real root of the equation $4x_3 - 2x - 6 = 0$ correct to three 03 C) decimal places by using bisection method. (Perform four iterations only) Solve the following.

Q.3

- Solve the following system of equations by Gauss- elimination method. 03 a) x + y + z = 9; 2x - 3y + 4z = 13; 3x + 4y + 5z = 40
- Solve the following system of equations by L-U decomposition method. 06 b) x + y + z = 1; 4x + 3y - z = 6; 3x + 5y + 3z = 4

Q.4 Solve the following.

a)	Fit parabola of the form $y = a + bx + cx^2$ to the data given below.						elow.	03
	X:	0	1	2	3	4		

Χ.	0	I	Z	3	4
y:	1	1.8	1.3	2.5	6.3
	,	c , , ,			• \ •

Using Lagrange's formula of interpolation find f(9.5) given. b)

Х	7	8	9	10
у	3	1	1	9

Find $\frac{dy}{dx}$ at x = 9 from the following table by using Newton's divided C) difference formula.

X:	5	7	11	13	17
y:	150	392	1452	2366	5202

Q.5 Solve the following.

Obtain cubic spline for the following data a)

х	0	1	2	3
У	1	2	33	244

b) Solve the following system of equations by using Jacobi's method. 27x + 6y - z = 85; x + y + 54z = 110; 6x + 15y + 2z = 72

Max. Marks: 56

04

06

03

Section – II

Q.6	Sol a)	ve the following. Use Romberg's method to compute $\int_0^1 \frac{1}{1+x^2} dx$ (Take h = 0.5, 0.25).	05
	b)	Evaluate $\int_0^1 \frac{1}{1+x} dx$ taking 7 ordinates by applying Simpson's rule.	04
Q.7	Sol a)	ve the following. Determine the largest eigen value and corresponding eigen vector of the matrix. $\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$ Using power method	05
	b)	Taking $\begin{bmatrix} 1, 0, 0 \end{bmatrix}^{T}$ as an initial eigen vector. Using Jacobi's Method, find all eigen values and eigen vectors. $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$	04
Q.8	Sol a) b)	ve the following. Solve the equation $\bigvee^2 u = 0$ for the following mesh by using Leibmann's method. (Perform Four Iterations): $\begin{array}{c ccccccccccccccccccccccccccccccccccc$	05
Q.9	Sol a)	steps of 0.1, if $\frac{dy}{dx} = \frac{y-x}{y+x}$ given that $y = 1$ where $x = 0$. ve the following. Find first derivative for the following data at $x = 900$.	05
		x 0 300 600 900 1200 1500 1800 y 135 149 157 183 201 205 193	
	b)	Compute $\int_0^6 \frac{1}{1+x^2} dx$ by using Trapezoidal rule.	05

Sect						
Seat No.				Set	Ρ	
	S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – II					
		aturday, 23-11-2019 / To 05:30 PM		Max. Mark	s: 70	
Instruc		 Q. No. 1 is compulsory and it answer book. Figures to the right indicate full 		be solved in first 30 minutes in		
	-	MCQ/Objective				
Duratio	on: 30 Mi	-	туре ч		s: 14	
		the correct alternatives from	the op	tions and rewrite the	14	
	s entence) An	e. Induction motor is analogous to	า			
·	́a)	DC motor Synchronous motor	b) d)	 Transformer DC Generator		
2	The with	P-phase, 4-pole, 50-Hz induction e rotating field produced by the n respect to the rotor. 1500		r runs at a speed of 1440 r.p.m. otates at a speed ofr.p.m. 1440		
	c)	60	d)	0		
3	,	e starting torque of induction mo				
	,	f 1/f	b) d)	1/f ² f ²		
4	l) For	high starting torque, the comm	nonly us	sed 3-phase induction motor is		
	a) c)	Squirrel-cage type Deep bar squirrel-cage type		Slip-ring type Double-cage induction motor		
5	,	e speed characteristics of an indeed-load characteristics of whic D.C. series motor Universal motor		e following machines?		
6	6) Sta a) c)	r-delta starting of motors is not single phase motors low horse power motors	b)	le in case of variable speed motors high speed motors		
7	́a)	L starting of induction motors is low horsepower motors high horsepower motors	b)	variable speed motors		
8	swi	a SCIM, torque with autostarter tching. K ² K	is b) d)	times the torque with direct- 1/K none of the above		

will drop by _____. a) 10% b) 40% 30% c) 20% d) 10) Line joining tangent and output line in a circle diagram gives _____. a) Culoss Stator loss b) c) Maximum output d) Maximum Torque No load test is conducted at _____. 11) a) High voltage b) Rated current c) High current d) Rated voltage 12) Parameter from no load test is _____. b) a) Ri and Xi Ro and Xo c) Copper loss d) Impedance A capacitor start single phase induction motor will usually have a power 13) factor of _____. a) unity b) 0.8 leading c) 0.6 leading d) 0.6 lagging 14) For how many poles is a split-phase motor wound if it operates at 1750 rpm at full load from a 60 Hz source?

Page 2 of 16

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Set P

9) If the stator voltage of an IM is reduced by 10%, the torque of the motor

- 4 poles
 - a) 2 poles b) c) 6 poles d) 12 poles

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – II

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four of the following questions.

- a) Explain with control circuit star delta starter used for three phase IM.
- **b)** Explain DOL starter with neat circuit diagram.
- c) Draw and explain equivalent circuit of a double cage IM.
- d) Explain the following terms regarding three phase IM.
 - 1) Crawling
 - 2) Cogging
- e) Explain how rotating magnetic field is produced when three phase supply is given to stator winding of three phase IM.
- f) Derive the equation of torque for three phase induction motor.

Q.3 Attempt any two of the following questions.

- a) A three phase 4 pole 50 Hz 208 v induction motor has starting line current of 700 amp and starting torque of 225 NM. if a reduced voltage of 120v is applied to stator at the time of starting, find the starting torque and starting line current.
- **b)** Compare sq. cage and wound rotor (slip ring) IM with reference to construction, performance and applications.
- c) A 50Hz, 8-pole I.M has full-load slip of 4%. The rotor resistance/phase = 0.01 ohm and standstill reactance/phase =0.1 ohm. Find the ratio of maximum to full- load torque and speed at which the maximum torque occurs.

Section – II

Q.4 Attempt any four of the following questions.

- a) What if double revolving field theory applied to single phase IM. Explain how single stationary flux can be resolved into two rotating fluxes.
- **b)** With neat circuit diagram and vector diagram explain capacitor start single phase IM.
- c) Explain the procedure to construct a circle diagram for induction motor from no load test and blocked rotor test data.
- d) Explain operation of induction machine as an induction generator.
- e) Explain speed control of induction motor by pole changing method.
- f) Explain the stator voltage control of three phase IM.

Max. Marks: 56

12

16

Q.5 Attempt any two of the following questions.

- a) Find the mechanical power output of the 185w,110v, 60 Hz single phase induction motor whose constants referred to stator are: stator resistance= 1.86 ohm; rotor resistance = 3.56 ohm; stator reactance = 3.56 ohm; rotor reactance = 2.56 ohm; magnetizing reactance = 53.5 ohm.
- b) Draw circle diagram from no-load and short-circuit test on a 3-phase, 14.92 kW, 400 V, 6- pole induction motor from the following test results: No load: 400V, 11A, p.f. = 0.2 Short circuit: 100 V, 25 A, p.f. = 0.4 Rotor cu loss at standstill is half the total Cu loss. From the circle diagram, Find
 - 1) line current, slip, Efficiency and p.f. at full-load
 - 2) the maximum torque.
- c) Explain the speed control of induction motor by
 - 1) cascade connection
 - 2) emf injection
 - 3) rotor resistance control

SLR-FM-726 Set P

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – II									
Day o Time	Max. Marks: 70								
 Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book. 2) Figures to the right indicate full marks. 									
MCQ/Objective Type Questions									
Duration: 30 Minutes Marks: 7									
Q.1	Q.1 Choose the correct alternatives from the options and rewrite the 14 sentence.								
	1)	In a SCIM, torque with autostarter is _ switching.		_ times the torque with direct-					
		a) K ² b	'	1/K					
		c) K d	3)	none of the above					
	2)	,	d by o) d)	y 10%, the torque of the motor 40% 30%					
	3)			ircle diagram gives Stator loss Maximum Torque					
	4)) d)	Rated current Rated voltage					
	5)	Parameter from no load test isa) Ri and Xibc) Copper lossd) d)	Ro and Xo Impedance					
	6)	, .	on m o) d)	notor will usually have a power 0.8 leading 0.6 lagging					
	7)		noto o) d)	or wound if it operates at 1750 4 poles 12 poles					
	8)) d)	Transformer DC Generator					

Set

Q

Seat No.

- 9) A 3-phase, 4-pole, 50-Hz induction motor runs at a speed of 1440 r.p.m. The rotating field produced by the rotor rotates at a speed of _____r.p.m. with respect to the rotor.
 - 1500 1440 a) b)
 - c) 60 d) 0
- 10) The starting torque of induction motor varies as:
 - $1/f^{2}$ b) a) f \mathbf{f}^2
 - d) c) 1/f
- 11) For high starting torque, the commonly used 3-phase induction motor is
 - Squirrel-cage type a)
- b) Slip-ring type
- Deep bar squirrel-cage type Double-cage induction motor c) d)
- 12) The speed characteristics of an induction motor closely resemble the speed-load characteristics of which of the following machines?
 - D.C. series motor a)

c)

- D.C. shunt motor b) Universal motor d) None of the above
- Star-delta starting of motors is not possible in case of _ 13)
 - a) single phase motors
- b) variable speed motors
- c) low horse power motors
- high speed motors d)
- 14) DOL starting of induction motors is usually restricted to
 - a) low horsepower motors high horsepower motors C)
 - b) d)
- variable speed motors high speed motors

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – II

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four of the following questions.

- a) Explain with control circuit star delta starter used for three phase IM.
- **b)** Explain DOL starter with neat circuit diagram.
- c) Draw and explain equivalent circuit of a double cage IM.
- d) Explain the following terms regarding three phase IM.
 - 1) Crawling
 - 2) Cogging
- e) Explain how rotating magnetic field is produced when three phase supply is given to stator winding of three phase IM.
- f) Derive the equation of torque for three phase induction motor.

Q.3 Attempt any two of the following questions.

- a) A three phase 4 pole 50 Hz 208 v induction motor has starting line current of 700 amp and starting torque of 225 NM. if a reduced voltage of 120v is applied to stator at the time of starting, find the starting torque and starting line current.
- **b)** Compare sq. cage and wound rotor (slip ring) IM with reference to construction, performance and applications.
- c) A 50Hz, 8-pole I.M has full-load slip of 4%. The rotor resistance/phase = 0.01 ohm and standstill reactance/phase =0.1 ohm. Find the ratio of maximum to full- load torque and speed at which the maximum torque occurs.

Section – II

Q.4 Attempt any four of the following questions.

- a) What if double revolving field theory applied to single phase IM. Explain how single stationary flux can be resolved into two rotating fluxes.
- **b)** With neat circuit diagram and vector diagram explain capacitor start single phase IM.
- c) Explain the procedure to construct a circle diagram for induction motor from no load test and blocked rotor test data.
- d) Explain operation of induction machine as an induction generator.
- e) Explain speed control of induction motor by pole changing method.
- f) Explain the stator voltage control of three phase IM.

Max. Marks: 56

12

16

Q.5 Attempt any two of the following questions.

- a) Find the mechanical power output of the 185w,110v, 60 Hz single phase induction motor whose constants referred to stator are: stator resistance= 1.86 ohm; rotor resistance = 3.56 ohm; stator reactance = 3.56ohm; rotor reactance = 2.56 ohm; magnetizing reactance = 53.5 ohm.
- b) Draw circle diagram from no-load and short-circuit test on a 3-phase, 14.92 kW, 400 V, 6- pole induction motor from the following test results: No load: 400V, 11A, p.f. = 0.2 Short circuit: 100 V, 25 A, p.f. = 0.4 Rotor cu loss at standstill is half the total Cu loss. From the circle diagram, Find
 - 1) line current, slip, Efficiency and p.f. at full-load
 - 2) the maximum torque.
- c) Explain the speed control of induction motor by
 - 1) cascade connection
 - 2) emf injection
 - 3) rotor resistance control

SLR-FM-726 Set Q

No. Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

Q.1 Choose the correct alternatives from the options and rewrite the

MCQ/Objective Type Questions

 sentence. The speed characteristics of an induction motor closely resemble the 						
')	spe	ed-load characteristics of which o	of the b)			
2)	a)	single phase motors	b)			
3)	a)	low horsepower motors	b)	variable speed motors		
4)	swi a)	tching. K ²		·		
5)	will	drop by	ed by b) d)	40%, the torque of the motor 40% 30%		
6)	a)	Culoss	b)	Stator loss		
7)	a) c)	High voltage High current	b) d)	Rated current Rated voltage		
8)	a)	Ri and Xi	 b) d)	Ro and Xo Impedance		
9)	fact a)	tor of unity	ion m b) d)	otor will usually have a power 0.8 leading 0.6 lagging		
	 1) 2) 3) 4) 5) 6) 7) 8) 	 The special (1) Star (2) Star (2) Star (2) DO (2) DO (2) DO (2) DO (2) In a swite (2) In a swite	 The speed characteristics of an indu speed-load characteristics of which of a) D.C. series motor C. series motor C. veries motor Star-delta starting of motors is not por a) single phase motors Iow horse power motors DOL starting of induction motors is u a) Iow horse power motors DOL starting of induction motors is u a) low horse power motors In a SCIM, torque with autostarter is switching.	 The speed characteristics of an induction speed-load characteristics of which of the a) D.C. series motor b) c) Universal motor d) Star-delta starting of motors is not possible a) single phase motors b) c) low horse power motors d) DOL starting of induction motors is usually a) low horse power motors b) c) high horsepower motors d) In a SCIM, torque with autostarter is		

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – II**

Seat

Duration: 30 Minutes

SLR-FM-726

Set

Max. Marks: 70

R

- Marks: 14
 - 14

Set | R 10) For how many poles is a split-phase motor wound if it operates at 1750 rpm at full load from a 60 Hz source? 2 poles 4 poles a) b) c) 6 poles d) 12 poles 11) An Induction motor is analogous to _ b) Transformer DC motor a) **DC** Generator Synchronous motor d) C) 12) A 3-phase, 4-pole, 50-Hz induction motor runs at a speed of 1440 r.p.m. The rotating field produced by the rotor rotates at a speed of _____r.p.m. with respect to the rotor. a) 1500 b) 1440 C) 60 d) 0 13) The starting torque of induction motor varies as: $1/f^2$ a) F b) f² d) 1/f C) 14) For high starting torque, the commonly used 3-phase induction motor is Squirrel-cage type b) Slip-ring type a)

- Deep bar squirrel-cage type c)
- Double-cage induction motor d)

SLR-FM-726

Seat No.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – II

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four of the following questions.

- a) Explain with control circuit star delta starter used for three phase IM.
- **b)** Explain DOL starter with neat circuit diagram.
- c) Draw and explain equivalent circuit of a double cage IM.
- d) Explain the following terms regarding three phase IM.
 - 1) Crawling
 - 2) Cogging
- e) Explain how rotating magnetic field is produced when three phase supply is given to stator winding of three phase IM.
- f) Derive the equation of torque for three phase induction motor.

Q.3 Attempt any two of the following questions.

- a) A three phase 4 pole 50 Hz 208 v induction motor has starting line current of 700 amp and starting torque of 225 NM. if a reduced voltage of 120v is applied to stator at the time of starting, find the starting torque and starting line current.
- **b)** Compare sq. cage and wound rotor (slip ring) IM with reference to construction, performance and applications.
- c) A 50Hz, 8-pole I.M has full-load slip of 4%. The rotor resistance/phase = 0.01 ohm and standstill reactance/phase =0.1 ohm. Find the ratio of maximum to full- load torque and speed at which the maximum torque occurs.

Section – II

Q.4 Attempt any four of the following questions.

- a) What if double revolving field theory applied to single phase IM. Explain how single stationary flux can be resolved into two rotating fluxes.
- **b)** With neat circuit diagram and vector diagram explain capacitor start single phase IM.
- c) Explain the procedure to construct a circle diagram for induction motor from no load test and blocked rotor test data.
- d) Explain operation of induction machine as an induction generator.
- e) Explain speed control of induction motor by pole changing method.
- f) Explain the stator voltage control of three phase IM.

Max. Marks: 56

R

12

16

Q.5 Attempt any two of the following questions.

- a) Find the mechanical power output of the 185w,110v, 60 Hz single phase induction motor whose constants referred to stator are: stator resistance= 1.86 ohm; rotor resistance = 3.56 ohm; stator reactance = 3.56 ohm; rotor reactance = 2.56 ohm; magnetizing reactance = 53.5 ohm.
- b) Draw circle diagram from no-load and short-circuit test on a 3-phase, 14.92 kW, 400 V, 6- pole induction motor from the following test results: No load: 400V, 11A, p.f. = 0.2 Short circuit: 100 V, 25 A, p.f. = 0.4 Rotor cu loss at standstill is half the total Cu loss. From the circle diagram, Find
 - 1) line current, slip, Efficiency and p.f. at full-load
 - 2) the maximum torque.
- c) Explain the speed control of induction motor by
 - 1) cascade connection
 - 2) emf injection
 - 3) rotor resistance control

SLR-FM-726

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Seat No.							Set	S			
S.E. (Part – II) (OId) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – II											
Day & Date: Saturday, 23-11-2019 Max. Marks: 7 Time: 02:30 PM To 05:30 PM											
Instructions: 1) Q. No. 1 is compulsory and it should be solved in first 30 minutes in answer book.2) Figures to the right indicate full marks.											
	MCQ/Objective Type Questions										
Duratio	on: 30) Mi					Marks:	14			
Q.1 Choose the correct alternatives from the options and rewrite the sentence.								14			
1	,			gent and output		rcle diagram gives	·				
		a) c)	Cu loss Maximum o	utout	b) d)	Stator loss Maximum Torque					
2	2)	,		conducted at	,						
2	.)	a)			 b)	Rated current					
		c)	High curren	t	d)	Rated voltage					
3	3)			no load test is							
		a) c)	Ri and Xi Copper loss	、	b) d)	Ro and Xo Impedance					
1	N	,			,	•	nower				
4	'		or of	t single phase i		otor will usually have a	a power				
			unity		b)	0.8 leading					
		c)	0.6 leading		d)	0.6 lagging					
5	5) For how many poles is a split-phase motor wound if it operates at 1750 rpm at full load from a 60 Hz source?						at 1750				
		a)	2 poles		b)	4 poles					
		c)	6 poles		d)	12 poles					
6) An Induction motor is analogous to											
		a)	DC motor	is motor	b) d)	Transformer					
 c) Synchronous motor d) DC Generator 7) A 3-phase, 4-pole, 50-Hz induction motor runs at a speed of 1440 r.p The rotating field produced by the rotor rotates at a speed ofr.p. 											
			respect to t	he rotor.	b)	1440					
		a) c)	1500 60		b) d)	1440 0					
8	3)	,		que of induction	,						
	,		f 1/f		b) d)	1/f ² f ²					
9))	,		g torque, the co	,	ed 3-phase induction r	notor is				
		a) c)	Squirrel-cag Deep bar so	ge type quirrel-cage type	b) e d)	Slip-ring type Double-cage induction	n motor				

SLR-FM-726

			SLR-FM-726
			Set S
10)	The speed characteristics of an induspeed-load characteristics of which a) D.C. series motor c) Universal motor	of the	e following machines? D.C. shunt motor
11)	Star-delta starting of motors is not pa) single phase motorsc) low horse power motors	b)	variable speed motors
12)	DOL starting of induction motors isa) low horsepower motorsc) high horsepower motors	b)	variable speed motors
13)	In a SCIM, torque with autostarter is switching. a) K ² c) K	s b) d)	times the torque with direct- 1/K none of the above
14)	If the stator voltage of an IM is redu will drop by	ced b	y 10%, the torque of the motor

- 40% 30%
- a) 10% c) 20% b) d)

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE - II

Day & Date: Saturday, 23-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four of the following questions.

- a) Explain with control circuit star delta starter used for three phase IM.
- **b)** Explain DOL starter with neat circuit diagram.
- c) Draw and explain equivalent circuit of a double cage IM.
- d) Explain the following terms regarding three phase IM.
 - 1) Crawling
 - 2) Cogging
- e) Explain how rotating magnetic field is produced when three phase supply is given to stator winding of three phase IM.
- f) Derive the equation of torque for three phase induction motor.

Q.3 Attempt any two of the following questions.

- a) A three phase 4 pole 50 Hz 208 v induction motor has starting line current of 700 amp and starting torque of 225 NM. if a reduced voltage of 120v is applied to stator at the time of starting, find the starting torque and starting line current.
- **b)** Compare sq. cage and wound rotor (slip ring) IM with reference to construction, performance and applications.
- c) A 50Hz, 8-pole I.M has full-load slip of 4%. The rotor resistance/phase = 0.01 ohm and standstill reactance/phase =0.1 ohm. Find the ratio of maximum to full- load torque and speed at which the maximum torque occurs.

Section – II

Q.4 Attempt any four of the following questions.

- a) What if double revolving field theory applied to single phase IM. Explain how single stationary flux can be resolved into two rotating fluxes.
- **b)** With neat circuit diagram and vector diagram explain capacitor start single phase IM.
- c) Explain the procedure to construct a circle diagram for induction motor from no load test and blocked rotor test data.
- d) Explain operation of induction machine as an induction generator.
- e) Explain speed control of induction motor by pole changing method.
- f) Explain the stator voltage control of three phase IM.

Max. Marks: 56

12

16

Q.5 Attempt any two of the following questions.

- a) Find the mechanical power output of the 185w,110v, 60 Hz single phase induction motor whose constants referred to stator are: stator resistance= 1.86 ohm; rotor resistance = 3.56 ohm; stator reactance = 3.56 ohm; rotor reactance = 2.56 ohm; magnetizing reactance = 53.5 ohm.
- b) Draw circle diagram from no-load and short-circuit test on a 3-phase, 14.92 kW, 400 V, 6- pole induction motor from the following test results: No load: 400V, 11A, p.f. = 0.2 Short circuit: 100 V, 25 A, p.f. = 0.4 Rotor cu loss at standstill is half the total Cu loss. From the circle diagram, Find
 - 1) line current, slip, Efficiency and p.f. at full-load
 - 2) the maximum torque.
- c) Explain the speed control of induction motor by
 - 1) cascade connection
 - 2) emf injection
 - 3) rotor resistance control





Seat No.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
 - 2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - 1) Which of the following is correct?
 - a) -AB+CD=-1 b)
 - c) AB-CD=-1 d) -AD+BC=-1
 - 2) The material used for the manufacture of ground wire is _
 - a) AL c) Cast iron

Galvanized steel b) d) Stainless steel

AD+CD=1

- 3) 100% string efficiency means
 - a) one insulator disc shorted
 - zero potential across each disc b)
 - equal potential across each disc c)
 - d) none of the above
- 4) Suspension insulators are used for voltage beyond .
 - 11kV 33kV a) b)
 - 400V d) 66kV c)
- Bedding on cable consists of _____. 5)
 - a) jute strands
 - b) hessian tape
 - c) paper tape comp with a fibrous material
 - d) any one of the above
- 6) In the analysis of which of the following lines shunt capacitance is neglected?
 - a) Short transmission lines
 - b) Medium transmission lines
 - Long transmission lines c)
 - d) Medium as well as long transmission lines
- Transposition of a transmission line is done to ____ 7)
 - a) reduce line loss reduce skin effect b) c) balance the line voltage drop
 - d) reduce corona
- 8) Which of the following voltage regulation is considered to be the best?
 - a) 2% c) 70%

- b) 30%
- d) 98%

SLR-FM-727

Set



Max. Marks: 70

Marks: 14

9) The highest transmission voltage used in India is _____.

- a) 400kv
- c) 132kv
- 10) ACSR conductors have ____
 - a) All conductors made of AL
 - c) Inner conductor made AL
- 11) For medium transmission line A is _
 - a) Equal to B
 - c) Equal to D

- b) Outer conductor made AL
- d) No conductor made AL
- b) Equ
- to D
- b) Equal to Cd) None of the above
- 12) The effect of corona is ____
 - a) increased energy loss
- b) increased reactanced) None
- c) increased inductance d)
- 13) The sag of transmission line is least affected owing to _____.
 - a) weight of conductor
 - b) current through the conductor
 - c) Temperature
 - d) ice deposited on the conductor
- 14) The volume of copper required for an ac transmission line is inversely proportional to _____.
 - a) Current
 - c) Power factor

- b) Voltage
- d) both B and C



220kv

765kv

b)

d)

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Write the various methods of reducing the corona effect.
- A 2 conductor cable 1 km long is required to supply a const. current of 200A throughout the year. The cost of cable including installation is Rs (20a+20)/ metre where 'a' is area of X- section in cm². The cost of energy is 5 paisa per KWh and interest and depreciation charges10%. Calculate economical conductor size. Assume resistivity of conductor material to be1.73 µΩcm
- c) Explain safety factor and puncture of insulators.
- d) Write the difference between AC and DC system.
- e) Derive equation for conductor material required in single phase 3-phase 3-wire AC & compare with 2 wire DC system.
- f) State and explain the Kelvin's law.

Q.3 Attempt any two.

- a) Draw and explain the construction of cable.
- b) Each line of 3 ph system is suspended by a string of three identical insulators of self capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases capacitance to line of metal work of lowest insulator to 0.3C.
- c) What is meant by sag? Derive an expression for sag in a transmission line having equal level of supports and unequal level of supports.

Section – II

Q.4 Attempt any four.

- a) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal π -method.
- **b)** Derive the generalized circuit constants for medium line using nominal T-method.
- c) Explain belted cables and screened cables.
- d) Explain the concept of self GMD and Mutual GMD.
- e) What are the properties of insulating material used in underground cable? Describe any three insulating materials.
- f) Explain various types of earthing.

Max. Marks: 56

16

16

SLR-FM-727 Set P

Q.5 Attempt any two.

- a) Draw and describe the uniformly loaded distributor fed at one end in DC system with a point of minimum potential, maximum and minimum voltage drops?
- **b)** Derive the expression for inductance of 3-phase unsymmetrical spaced line.
- c) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants Resistance/km/phase = 0.1Ω Inductive reactance/km/phase = 0.2Ω Capacitive susceptance/km/phase = 0.04×10^{-4} siemen Determine:
 - 1) the sending end current
 - 2) sending end voltage
 - 3) sending end power factor and
 - 4) transmission efficiency when supplying a balanced load of 10,000 kW at 66 kV, p.f. 0.8 lagging. Use nominal T method.

Set

ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Choose the correct alternatives from the options and rewrite the sentence. Q.1 14

- Which of the following voltage regulation is considered to be the best? 1)
 - a) 2% 30% b) d) 98% c) 70%
- 2) The highest transmission voltage used in India is _____
 - 400kv b) 220kv a) c) 132kv d) 765kv

3) ACSR conductors have _____

- a) All conductors made of AL
- c) Inner conductor made AL
- For medium transmission line A is _ 4)
 - a) Equal to B
 - c) Equal to D
- 5) The effect of corona is _____
 - a) increased energy loss
 - c) increased inductance
- The sag of transmission line is least affected owing to _____. 6)
 - a) weight of conductor
 - b) current through the conductor
 - c) Temperature
 - d) ice deposited on the conductor
- The volume of copper required for an ac transmission line is inversely 7) proportional to _____.
 - a) Current b) Voltage c) Power factor d) both B and C
- 8) Which of the following is correct?
 - a) -AB+CD=-1 b) AD+CD=1
 - c) AB-CD=-1 d) -AD+BC=-1
- The material used for the manufacture of ground wire is _____ 9)
 - a) AL c) Cast iron

Galvanized steel b) Stainless steel d)

Outer conductor made AL b)

.

- No conductor made AL d)
- b) Equal to C
- None of the above d)
- b) increased reactance
- None d)

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

Max. Marks: 70

Marks: 14

SLR-FM-727

- 10) 100% string efficiency means
 - a) one insulator disc shorted
 - b) zero potential across each disc
 - c) equal potential across each disc
 - d) none of the above
- 11) Suspension insulators are used for voltage beyond _____.
 - a) 33kV c) 400V
- b) 11Kv d) 66kV
- 12) Bedding on cable consists of _____.
 - a) jute strands
 - b) hessian tape
 - c) paper tape comp with a fibrous material
 - d) any one of the above
- 13) In the analysis of which of the following lines shunt capacitance is neglected?
 - a) Short transmission lines
 - b) Medium transmission lines
 - c) Long transmission lines
 - d) Medium as well as long transmission lines
- 14) Transposition of a transmission line is done to _____.
 - a) reduce line loss b) reduce skin effect
 - c) balance the line voltage drop d) reduce corona

Set Q

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

- a) Write the various methods of reducing the corona effect.
- A 2 conductor cable 1 km long is required to supply a const. current of 200A throughout the year. The cost of cable including installation is Rs (20a+20)/ metre where 'a' is area of X- section in cm². The cost of energy is 5 paisa per KWh and interest and depreciation charges10%. Calculate economical conductor size. Assume resistivity of conductor material to be1.73 µΩcm
- c) Explain safety factor and puncture of insulators.
- d) Write the difference between AC and DC system.
- e) Derive equation for conductor material required in single phase 3-phase 3-wire AC & compare with 2 wire DC system.
- f) State and explain the Kelvin's law.

Q.3 Attempt any two.

- a) Draw and explain the construction of cable.
- b) Each line of 3 ph system is suspended by a string of three identical insulators of self capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases capacitance to line of metal work of lowest insulator to 0.3C.
- c) What is meant by sag? Derive an expression for sag in a transmission line having equal level of supports and unequal level of supports.

Section – II

Q.4 Attempt any four.

- a) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal π -method.
- **b)** Derive the generalized circuit constants for medium line using nominal T-method.
- c) Explain belted cables and screened cables.
- d) Explain the concept of self GMD and Mutual GMD.
- e) What are the properties of insulating material used in underground cable? Describe any three insulating materials.
- f) Explain various types of earthing.

Max. Marks: 56

16

Set

12

SLR-FM-727 Set Q

Q.5 Attempt any two.

- a) Draw and describe the uniformly loaded distributor fed at one end in DC system with a point of minimum potential, maximum and minimum voltage drops?
- **b)** Derive the expression for inductance of 3-phase unsymmetrical spaced line.
- c) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants Resistance/km/phase = 0.1Ω Inductive reactance/km/phase = 0.2Ω Capacitive susceptance/km/phase = 0.04×10^{-4} siemen Determine:
 - 1) the sending end current
 - 2) sending end voltage
 - 3) sending end power factor and
 - 4) transmission efficiency when supplying a balanced load of 10,000 kW at 66 kV, p.f. 0.8 lagging. Use nominal T method.

Set R

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Bedding on cable consists of _____.
 - a) jute strands
 - b) hessian tape
 - c) paper tape comp with a fibrous material
 - d) any one of the above
- 2) In the analysis of which of the following lines shunt capacitance is neglected?
 - a) Short transmission lines
 - b) Medium transmission lines
 - c) Long transmission lines
 - d) Medium as well as long transmission lines
- Transposition of a transmission line is done to _____.
 - a) reduce line loss b) reduce skin effect
 - c) balance the line voltage drop d) reduce corona
- 4) Which of the following voltage regulation is considered to be the best?
 - a) 2% b) 30%
 - c) 70% d) 98%

5) The highest transmission voltage used in India is _____.

- a) 400kv b) 220kv
- c) 132kv d) 765kv
- 6) ACSR conductors have _____
 - a) All conductors made of AL
- b) Outer conductor made ALd) No conductor made AL
- c) Inner conductor made AL
- 7) For medium transmission line A is _
 - a) Equal to B
 - c) Equal to D

- b) Equal to Cd) None of the above
- 8) The effect of corona is _____
 - a) increased energy loss
 - c) increased inductance
- b) increased reactance
- d) None

Max. Marks: 70

Marks: 14

9) The sag of transmission line is least affected owing to _____.

- a) weight of conductor
- b) current through the conductor
- c) Temperature
- d) ice deposited on the conductor

10) The volume of copper required for an ac transmission line is inversely proportional to _____.

a) Current

- b) Voltage
- c) Power factor both B and C d)
- 11) Which of the following is correct?
 - a) -AB+CD=-1 AD+CD=1 b)
 - c) AB-CD=-1 d) -AD+BC=-1
- 12) The material used for the manufacture of ground wire is _____
 - a) AL Galvanized steel b)
 - c) Cast iron d)
- 13) 100% string efficiency means
 - a) one insulator disc shorted
 - b) zero potential across each disc
 - c) equal potential across each disc
 - d) none of the above

14) Suspension insulators are used for voltage beyond _____.

- a) 33kV 11kV b) d)
- c) 400V

66kV

Stainless steel

SLR-FM-727 Set R

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELEMENTS OF POWER SYSTEMS**

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

Seat

No.

- Write the various methods of reducing the corona effect. a)
- A 2 conductor cable 1 km long is required to supply a const. current of b) 200A throughout the year. The cost of cable including installation is Rs (20a+20)/ metre where 'a' is area of X- section in cm². The cost of energy is 5 paisa per KWh and interest and depreciation charges 10%. Calculate economical conductor size. Assume resistivity of conductor material to be1.73 μΩcm
- Explain safety factor and puncture of insulators. C)
- Write the difference between AC and DC system. d)
- Derive equation for conductor material required in single phase 3-phase e) 3-wire AC & compare with 2 wire DC system.
- State and explain the Kelvin's law. **f)**

Q.3 Attempt any two.

- Draw and explain the construction of cable. a)
- b) Each line of 3 ph system is suspended by a string of three identical insulators of self capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases capacitance to line of metal work of lowest insulator to 0.3C.
- What is meant by sag? Derive an expression for sag in a transmission line C) having equal level of supports and unequal level of supports.

Section – II

Q.4 Attempt any four.

- Derive an expression for voltage regulation and efficiency of Medium a) transmission line consider nominal π -method.
- Derive the generalized circuit constants for medium line using nominal Tb) method.
- Explain belted cables and screened cables. c)
- Explain the concept of self GMD and Mutual GMD. d)
- What are the properties of insulating material used in underground cable? e) Describe any three insulating materials.
- Explain various types of earthing. **f**)

Set

Max. Marks: 56

16

16

SLR-FM-727 Set R

Q.5 Attempt any two.

- a) Draw and describe the uniformly loaded distributor fed at one end in DC system with a point of minimum potential, maximum and minimum voltage drops?
- **b)** Derive the expression for inductance of 3-phase unsymmetrical spaced line.
- c) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants Resistance/km/phase = 0.1Ω Inductive reactance/km/phase = 0.2Ω Capacitive susceptance/km/phase = 0.04×10^{-4} siemen Determine:
 - 1) the sending end current
 - 2) sending end voltage
 - 3) sending end power factor and
 - 4) transmission efficiency when supplying a balanced load of 10,000 kW at 66 kV, p.f. 0.8 lagging. Use nominal T method.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019

Electrical Engineering ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- ACSR conductors have 1)
 - a) All conductors made of AL
 - c) Inner conductor made AL
- For medium transmission line A is _ 2)
 - a) Equal to B
 - c) Equal to D

The effect of corona is 3)

- a) increased energy loss
- c) increased inductance d)
- 4) The sag of transmission line is least affected owing to . a) weight of conductor
 - b) current through the conductor
 - c) Temperature
 - d) ice deposited on the conductor
- 5) The volume of copper required for an ac transmission line is inversely proportional to .
 - a) Current b) Voltage
 - both B and C c) Power factor d)
- 6) Which of the following is correct?
 - a) -AB+CD=-1 b)
 - c) AB-CD=-1 d)
- The material used for the manufacture of ground wire is ____ 7)
 - a) AL b)
 - c) Cast iron
- 8) 100% string efficiency means
 - a) one insulator disc shorted
 - b) zero potential across each disc
 - c) equal potential across each disc
 - d) none of the above

Marks: 14

b) Outer conductor made AL

- d)
- d)
 - increased reactance

 - b)
- None
- Equal to C None of the above

Set

SLR-FM-727

- AD+CD=1
- -AD+BC=-1
- Galvanized steel d)

- No conductor made AL
- b)

No.

Seat

Max. Marks: 70

9) Suspension insulators are used for voltage beyond _____.

- a) 33kV b) 11kV
- c) 400V d) 66kV
- 10) Bedding on cable consists of _____.
 - a) jute strands
 - b) hessian tape
 - c) paper tape comp with a fibrous material
 - d) any one of the above
- 11) In the analysis of which of the following lines shunt capacitance is neglected?
 - a) Short transmission lines
 - b) Medium transmission lines
 - c) Long transmission lines
 - d) Medium as well as long transmission lines
- 12) Transposition of a transmission line is done to _____.
 - a) reduce line loss

b) reduce skin effect

SLR-FM-727

Set S

- c) balance the line voltage drop d) reduce corona
- 13) Which of the following voltage regulation is considered to be the best?
 - a) 2% b) 30%
 - c) 70% d) 98%
- 14) The highest transmission voltage used in India is _____.
 - a) 400kv b) 220kv
 - c) 132kv d) 765kv

Set S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicate full marks.

Section – I

Q.2 Attempt any four.

Seat No.

- a) Write the various methods of reducing the corona effect.
- b) A 2 conductor cable 1 km long is required to supply a const. current of 200A throughout the year. The cost of cable including installation is Rs (20a+20)/ metre where 'a' is area of X- section in cm². The cost of energy is 5 paisa per KWh and interest and depreciation charges10%. Calculate economical conductor size. Assume resistivity of conductor material to be1.73 µΩcm
- c) Explain safety factor and puncture of insulators.
- d) Write the difference between AC and DC system.
- e) Derive equation for conductor material required in single phase 3-phase 3-wire AC & compare with 2 wire DC system.
- f) State and explain the Kelvin's law.

Q.3 Attempt any two.

- a) Draw and explain the construction of cable.
- b) Each line of 3 ph system is suspended by a string of three identical insulators of self capacitance C farad. The shunt capacitance of connecting metal work of each insulator is 0.2C to earth and 0.1C to line. Calculate the string efficiency of the system if a guard ring increases capacitance to line of metal work of lowest insulator to 0.3C.
- c) What is meant by sag? Derive an expression for sag in a transmission line having equal level of supports and unequal level of supports.

Section – II

Q.4 Attempt any four.

- a) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal π -method.
- **b)** Derive the generalized circuit constants for medium line using nominal T-method.
- c) Explain belted cables and screened cables.
- d) Explain the concept of self GMD and Mutual GMD.
- e) What are the properties of insulating material used in underground cable? Describe any three insulating materials.
- f) Explain various types of earthing.

Max. Marks: 56

16

16

SLR-FM-727 Set S

Q.5 Attempt any two.

- a) Draw and describe the uniformly loaded distributor fed at one end in DC system with a point of minimum potential, maximum and minimum voltage drops?
- **b)** Derive the expression for inductance of 3-phase unsymmetrical spaced line.
- c) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants Resistance/km/phase = 0.1Ω Inductive reactance/km/phase = 0.2Ω Capacitive susceptance/km/phase = 0.04×10^{-4} siemen Determine:
 - 1) the sending end current
 - 2) sending end voltage
 - 3) sending end power factor and
 - 4) transmission efficiency when supplying a balanced load of 10,000 kW at 66 kV, p.f. 0.8 lagging. Use nominal T method.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019 **Electrical Engineering** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book

- 2) Figures to the right indicate full marks.
- Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

C)

a)

C)

Seat

No.

Q.1 Choose the correct alternative from the options and rewrite the sentence. 14

b)

- 1) The large signal bandwidth of an op-amp is limited by its
 - loop gain a)
 - output impedance input frequency d)
- 2) is not the internal circuit of operational amplifier.
 - Level Translator b)
 - **Differential Amplifier** Output driver
- In inverting adder circuit, is present. 3)
 - More than one input a)
 - b) Output voltage is phase reversal
 - c) Both a) and b)
 - d) None of the above
- 4) CMRR of a differential amplifier can be improved by decreasing.
 - Common mode voltage gain a) Differential voltage gain b)
 - d) None of the above Both a and b c)
- 5) For an inverting amplifier, if $R_f=100k\Omega$ and $R_i=1k\Omega$ then closed loop gain is
 - a) 1,00,000 1.000 b)
 - c) 101 d) 100
- 6) In a typical op-amp, which stage is supposed to be a dual-input unbalanced output or single-ended output differential amplifier?
 - Intermediate stage a) Input stage b) c)
 - Output stage d) Level shifting stage
- 7) Basic differentiator circuit contains feedback
 - a) Resistor b) Capacitor d) None of the above Inductor C)
- 8) A multiplexer is also known as a
 - a) data accumulator b) data restorer c) data selector data distributor d)
- 9) A flip flop has two outputs which are
 - a) always 0 b) always 1
 - always complementary all of the above C) d)

Max. Marks: 70

Marks: 14

Set Ρ

- Clamper

SLR-FM-728

slew rate

- d)

- 10) Which of the following flip flop is used as a latch?
 - a) JK flip flop b) Master-slave flip flop
 - c) T flip flop d) D flip flop
- 11) In general, a sequential logic circuits consists of
 - a) only flip flops
 - b) only gates
 - c) flip flops and combinational logic circuits
 - d) only combinational logic circuits
- 12) The race around condition occurs in a JK flip flop when
 - a) both inputs are 0
 - b) both inputs are 1
 - c) both inputs are complementary
 - d) any one of the above input combinations is present
- 13) A shift register using flip flops is called a
 - a) dynamic shift register
- b) flip flop shift register

Set P

- c) static shift register d) buffer shift register
- 14) In sequential circuits the present input depends on
 - a) past inputs only

- b) Present inputs only
- c) Present as well as past inputs
- d) Past outputs

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019 **Electrical Engineering** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are Compulsory.

- 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- Explain the ideal characteristics of op-amp. a)
- Draw and explain working of differentiator. b)
- Explain the concept of virtual ground condition. c)
- d) Explain DC Analysis of differential amplifier (SIBO)
- With neat circuit diagram explain op-amp as a adder. e)

Attempt any two. Q.3

- Derive an expression for closed loop gain, input resistance, bandwidth and a) output resistance for voltage shunt feedback amplifier.
- b) Explain the following terms:
 - input offset voltage 1)
 - input offset current 3)
 - SVRR 5)
- Explain instrumentation amplifier. c)

Section – II

Q.4 Attempt any four

- Define flip-flop. Draw the logical diagram and truth table of SR flip flop. a)
- Explain 4 bit ring counter. b)
- Explain 4:1 MUX with the help of neat diagram and truth table. c)
- Differentiate TTL and CMOS families. d)
- With truth table explain operation of T flip flop. e)

Q.5 Attempt any two.

- Explain operation of JK flip flop and how race around condition can be a) eliminated.
- Simplify the following function using K-map and realize it using NOR gates b) only.
 - $F(A, B, C, D) = \sum m (0, 2, 4, 6, 7, 8, 10, 12, 13, 15)$
- Explain universal shift registers. C)

- input bias current 2)
- CMRR 4)
- Slew rate 6)







Max. Marks: 56

16

16

12

Set

Max. Marks: 70

Marks: 14

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019 **Electrical Engineering** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book

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- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Choose the correct alternative from the options and rewrite the sentence. Q.1 14

- A multiplexer is also known as a 1)
 - a) data accumulator b) data restorer c) data selector d) data distributor
- A flip flop has two outputs which are 2) a) always 0
 - c) always complementary
- Which of the following flip flop is used as a latch? 3)
 - a) JK flip flop b)
 - c) T flip flop d) D flip flop
- 4) In general, a sequential logic circuits consists of
 - a) only flip flops
 - b) only gates
 - c) flip flops and combinational logic circuits
 - d) only combinational logic circuits
- 5) The race around condition occurs in a JK flip flop when
 - a) both inputs are 0
 - b) both inputs are 1
 - c) both inputs are complementary
 - d) any one of the above input combinations is present
- A shift register using flip flops is called a 6)
 - a) dynamic shift register flip flop shift register b)
 - c) static shift register d) buffer shift register
- In sequential circuits the present input depends on 7)
 - a) past inputs only b) Present inputs only
 - c) Present as well as past inputs d) Past outputs
- 8) The large signal bandwidth of an op-amp is limited by its slew rate
 - a) loop gain
 - output impedance input frequency d) c)

b)

- always 1
- all of the above d)
 - Master-slave flip flop

- b)

- 9) is not the internal circuit of operational amplifier.
 - Differential Amplifier a)
- b) Level Translator d) Clamper
- c) Output driver
- 10) In inverting adder circuit, is present.
 - More than one input a)
 - b) Output voltage is phase reversal
 - c) Both a) and b)
 - d) None of the above
- 11) CMRR of a differential amplifier can be improved by decreasing _____.
 - a) Differential voltage gain Common mode voltage gain b)
 - c) Both a and b d) None of the above
- 12) For an inverting amplifier, if $R_f=100k\Omega$ and $R_i=1k\Omega$ then closed loop gain is
 - 1,00,000 1,000 a) b)
 - C) 101 d) 100

In a typical op-amp, which stage is supposed to be a dual-input 13) unbalanced output or single-ended output differential amplifier?

- a) Input stage b) Intermediate stage
- c) Output stage
- Level shifting stage
- d)
- Basic differentiator circuit contains feedback 14)
 - Resistor a) Inductor

C)

- Capacitor b)
- None of the above d)

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SLR-FM-728 Set Q

Seat	
No.	

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019 **Electrical Engineering** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are Compulsory.

- 2) Figures to the right indicate full marks.
 - 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- Explain the ideal characteristics of op-amp. a)
- Draw and explain working of differentiator. b)
- Explain the concept of virtual ground condition. c)
- d) Explain DC Analysis of differential amplifier (SIBO)
- With neat circuit diagram explain op-amp as a adder. e)

Attempt any two. Q.3

- Derive an expression for closed loop gain, input resistance, bandwidth and a) output resistance for voltage shunt feedback amplifier.
- b) Explain the following terms:
 - input offset voltage 1)
 - input offset current 3)
 - SVRR 5)
- Explain instrumentation amplifier. c)

Section – II

Q.4 Attempt any four

- Define flip-flop. Draw the logical diagram and truth table of SR flip flop. a)
- Explain 4 bit ring counter. b)
- Explain 4:1 MUX with the help of neat diagram and truth table. c)
- Differentiate TTL and CMOS families. d)
- With truth table explain operation of T flip flop. e)

Q.5 Attempt any two.

- Explain operation of JK flip flop and how race around condition can be a) eliminated.
- Simplify the following function using K-map and realize it using NOR gates b) only.
 - $F(A, B, C, D) = \sum m (0, 2, 4, 6, 7, 8, 10, 12, 13, 15)$
- Explain universal shift registers. C)

- 2) input bias current
- CMRR 4)
- Slew rate 6)







Max. Marks: 56

12

16

16

Set

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019 **Electrical Engineering** ANALOG & DIGITAL INTEGRATED CIRCUITS

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MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

14 Q.1 Choose the correct alternative from the options and rewrite the sentence.

- For an inverting amplifier, if $R_f=100k\Omega$ and $R_i=1k\Omega$ then closed loop gain 1)
 - is a) 1,00,000 1,000 b)
 - 101 d) 100 c)
- In a typical op-amp, which stage is supposed to be a dual-input 2) unbalanced output or single-ended output differential amplifier?
 - Intermediate stage a) Input stage b) c) Output stage d) Level shifting stage
- 3) Basic differentiator circuit contains feedback
 - a) Resistor b) Capacitor
 - Inductor d) None of the above c)
- 4) A multiplexer is also known as a_
 - data accumulator b) data restorer a) data selector data distributor
 - c) d)
- 5) A flip flop has two outputs which are
 - a) always 0 always 1 b)
 - c) always complementary d)
- Which of the following flip flop is used as a latch? 6)
 - a) JK flip flop Master-slave flip flop b) c) T flip flop
- 7) In general, a sequential logic circuits consists of
 - a) only flip flops
 - b) only gates
 - c) flip flops and combinational logic circuits
 - d) only combinational logic circuits
- 8) The race around condition occurs in a JK flip flop when
 - a) both inputs are 0
 - b) both inputs are 1
 - c) both inputs are complementary
 - d) any one of the above input combinations is present

Max. Marks: 70

Marks: 14



- d) D flip flop
- all of the above

- 9) A shift register using flip flops is called a
 - a) dynamic shift register

10)

b) flip flop shift registerd) buffer shift register

SLR-FM-728

Set | R

_.

- c) static shift register
- In sequential circuits the present input depends on
- a) past inputs only b) Present inputs only
 - c) Present as well as past inputs d) Past outputs
- 11) The large signal bandwidth of an op-amp is limited by its
 - a) loop gain
- b) slew rate
- c) output impedance d) input frequency
- 12) _____ is not the internal circuit of operational amplifier.
 - a) Differential Amplifier
- b) Level Translatord) Clamper
- c) Output driver
- 13) In inverting adder circuit, _____ is present.
 - a) More than one input
 - b) Output voltage is phase reversal
 - c) Both a) and b)
 - d) None of the above
- 14) CMRR of a differential amplifier can be improved by decreasing _
 - a) Differential voltage gain
- b) Common mode voltage gain

c) Both a and b

d) None of the above

Set R

Max. Marks: 56

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019 Electrical Engineering ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are Compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

Seat No.

- a) Explain the ideal characteristics of op-amp.
- **b)** Draw and explain working of differentiator.
- c) Explain the concept of virtual ground condition.
- d) Explain DC Analysis of differential amplifier (SIBO)
- e) With neat circuit diagram explain op-amp as a adder.

Q.3 Attempt any two.

a) Derive an expression for closed loop gain, input resistance, bandwidth and output resistance for voltage shunt feedback amplifier.

2)

4)

6)

input bias current

CMRR

Slew rate

- **b)** Explain the following terms:
 - 1) input offset voltage
 - 3) input offset current
 - 5) SVRR
- c) Explain instrumentation amplifier.

Section – II

Q.4 Attempt any four

- a) Define flip-flop. Draw the logical diagram and truth table of SR flip flop.
- **b)** Explain 4 bit ring counter.
- c) Explain 4:1 MUX with the help of neat diagram and truth table.
- d) Differentiate TTL and CMOS families.
- e) With truth table explain operation of T flip flop.

Q.5 Attempt any two.

- a) Explain operation of JK flip flop and how race around condition can be eliminated.
- **b)** Simplify the following function using K-map and realize it using NOR gates only.
 - $F(A, B, C, D) = \sum m (0, 2, 4, 6, 7, 8, 10, 12, 13, 15)$
- c) Explain universal shift registers.

12

16

12

Seat

No.

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019 **Electrical Engineering** ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book

- Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternative from the options and rewrite the sentence. 14

- Which of the following flip flop is used as a latch? 1)
 - a) JK flip flop

c) T flip flop

- Master-slave flip flop b) d) D flip flop
- In general, a sequential logic circuits consists of 2)
 - a) only flip flops
 - b) only gates
 - c) flip flops and combinational logic circuits
 - d) only combinational logic circuits
- The race around condition occurs in a JK flip flop when 3)
 - a) both inputs are 0
 - b) both inputs are 1
 - c) both inputs are complementary
 - d) any one of the above input combinations is present
- 4) A shift register using flip flops is called a
 - a) dynamic shift register flip flop shift register b)
 - c) static shift register d) buffer shift register
- In sequential circuits the present input depends on 5) past inputs only a)
 - Present inputs only b)
 - c) Present as well as past inputs d) Past outputs
- The large signal bandwidth of an op-amp is limited by its 6)
 - loop gain a) b)
 - output impedance d) c)
 - is not the internal circuit of operational amplifier. a)
 - **Differential Amplifier** b) Level Translator
 - Output driver d) c)
- In inverting adder circuit, _____ is present. 8)
 - a) More than one input
 - b) Output voltage is phase reversal
 - Both a) and b) c)

7)

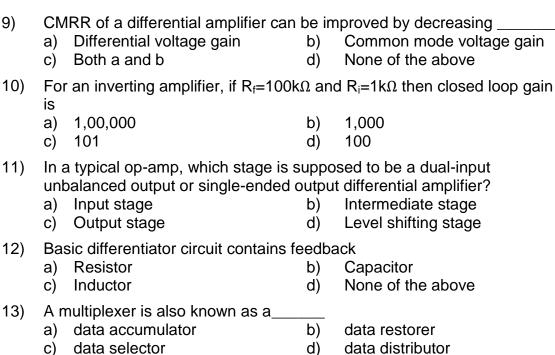
None of the above d)

Marks: 14

Max. Marks: 70

Set

- slew rate
- input frequency
- - - Clamper



- 14) A flip flop has two outputs which are
 - a) always 0
 - always complementary c)
- b) always 1
- all of the above d)

SLR-FM-728 Set S

9)

Set S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019 Electrical Engineering ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are Compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

Seat No.

- a) Explain the ideal characteristics of op-amp.
- **b)** Draw and explain working of differentiator.
- c) Explain the concept of virtual ground condition.
- d) Explain DC Analysis of differential amplifier (SIBO)
- e) With neat circuit diagram explain op-amp as a adder.

Q.3 Attempt any two.

a) Derive an expression for closed loop gain, input resistance, bandwidth and output resistance for voltage shunt feedback amplifier.

2)

4)

6)

input bias current

CMRR

Slew rate

- **b)** Explain the following terms:
 - 1) input offset voltage
 - 3) input offset current
 - 5) SVRR
- c) Explain instrumentation amplifier.

Section – II

Q.4 Attempt any four

- a) Define flip-flop. Draw the logical diagram and truth table of SR flip flop.
- **b)** Explain 4 bit ring counter.
- c) Explain 4:1 MUX with the help of neat diagram and truth table.
- d) Differentiate TTL and CMOS families.
- e) With truth table explain operation of T flip flop.

Q.5 Attempt any two.

- a) Explain operation of JK flip flop and how race around condition can be eliminated.
- **b)** Simplify the following function using K-map and realize it using NOR gates only.
 - $F(A, B, C, D) = \sum m (0, 2, 4, 6, 7, 8, 10, 12, 13, 15)$
- c) Explain universal shift registers.

Max. Marks: 56

12

16

12

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering NETWORK ANALYSIS**

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

Make suitable assumption if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

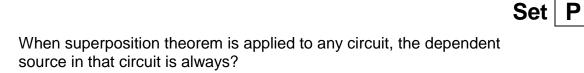
- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14 1)
 - Three equal resistances of 3 Ω are connected in star. What is the resistance in one of the arms in an equivalent delta circuit?
 - a) 10Ω b) 3Ω d) C) 9Ω 27 Ω
 - 2) In an electric circuit dual of inductance is
 - Conductance Resistance a) b) C) Capacitance d) Susceptance
 - Current between two open terminals is 3)
 - Maximum Zero a) b)
 - Minimum None of these c) d)
 - Two resistances R1 and R2 give combined resistance of 4.5 ohms when 4) in series and 1 ohm when in parallel. The resistances are
 - 2.5 ohms and 2 ohms b) 3.5 ohms and 1 ohms a)
 - 1.5 ohms and 3 ohms d) 1.5 ohms and 0.5 ohms c)
 - At t = 0+ with zero initial condition, which of the following acts as short 5) circuit?
 - Capacitor a) Inductor b) All of the above c) d)
 - Resistor
 - 6) For a two port network to be reciprocal.
 - $Z_{11} = Z_{22}$ $Y_{12} = Y_{21}$ a) b) $h_{22} = h_{12} + h_{21}$ d) AD - BC = 0C)
 - 7) Indicate the dual of series network consists of voltage source, capacitance, inductance in
 - Parallel combination of resistance, capacitance and inductance a)
 - Series combination of current source, capacitance and inductance b)
 - Parallel combination of current source, inductance and capacitance c)
 - None of the above d)
 - Ohm's law is valid only when temperature is ____ 8)
 - Variable b) Constant a)
 - Varies with constant rate d) None of these C)



Set

Max. Marks: 70

Marks: 14



- a) Voltage source short circuited
- b) Active as it is in the circuit

9)

- c) Current source open circuited
- d) Both current and voltage source are short circuited
- 10) The h parameters of h11 and h21 obtained _
 - a) by shorting input terminals
 - b) by shorting output terminals

SLR-FM-729

- c) by opening input terminals d) by opening output terminals
- 11) In series RLC circuit which phase's are in phase opposition _____.
 - a) VL, VC b) VL, VR
 - c) VC, VR d) None of the above
- 12) In a graph having b branches and n noads, the no. f-circuits or tiesets will be _____.
 - a) b-n b) n-b c) b-n+1 d) n-b+1
- 13) Laplace transform of unit step function _____.
 - a) S b) 1/sc) s^2 d) $1/s^2$
- 14) Laplace transform of unit ramp function _____
 - a) s b) 1/s
 - c) s^2 d) $1/s^2$

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

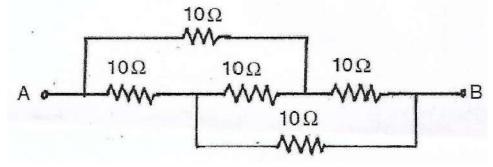
2) Figure to the right indicates full marks.

Section – I

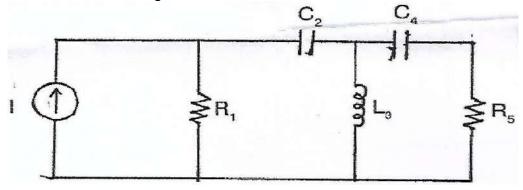
 30Ω

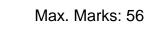
Q.2 Solve any three.

- a) State and explain maximum power transfer theorem.
- b) Determine current through 24 Ω resistor using Thevenin's Theorem.
 - 220V T 50Ω.4 N
- c) Find an equivalent resistance between A and B.



d) Draw the dual of the given network.





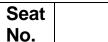
20Ω

 \mathbf{O}

SLR-FM-729

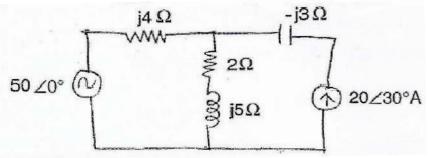
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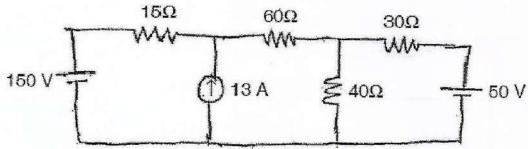


Q.3 Solve any two.

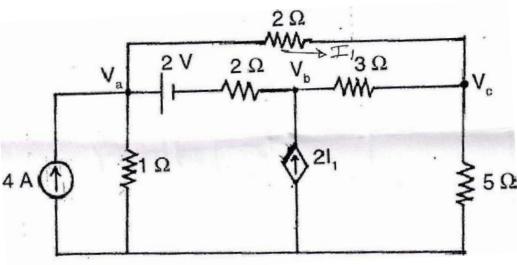
 a) State and explain Super position theorem. Determine the voltage across the (2+j5) ohm impedance in fig. shown below using Super position theorem.



b) State and Explain Thevenin's Theorem. Find the current through the 30 Ω resistor using Thevenin's Theorem.



c) Find voltages Va₁ Vb₁ Vc using nodal analysis technique.



Section – II

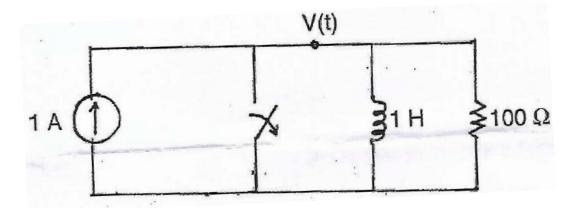
Q.4 Solve any three.

- a) Derive h parameter in terms of Z-parameter.
- b) In the given network at t=0 switch is opened. Calculate v & dv/dt at t = 0^+

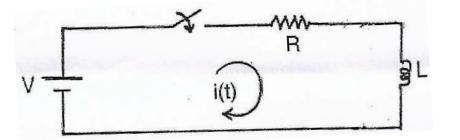
SLR-FM-729



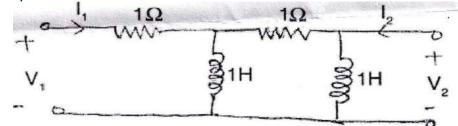
Set P



c) Derive an expression for i(t) for following circuit.

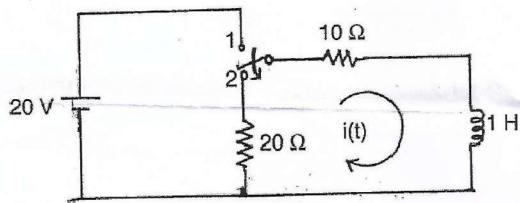


d) Find Z parameter for the network shown below.



Q.5 Solve any two.

- a) Derive H-parameter in terms of Z and transmission parameters.
- b) In the given network switch is changed from the position 1 to position 2 at t=0,steady condition is reached before switching, find the values of I, di/dt, d²i/dt².



- c) Give the Laplace transform of following function.
 - 1) unit step function
 - 2) unit ramp function
 - 3) unit impluse function
 - 4) Exponential function

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Make suitable assumption if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

c)

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) Ohm's law is valid only when temperature is _____.
 - a) Variable b) Constant
 - c) Varies with constant rate d) None of these
- 2) When superposition theorem is applied to any circuit, the dependent source in that circuit is always?
 - a) Voltage source short circuited
 - b) Active as it is in the circuit
 - c) Current source open circuited
 - d) Both current and voltage source are short circuited

3) The h parameters of h11 and h21 obtained _____

- a) by shorting input terminals b) by shorting output terminals
 - by opening input terminals d) by opening output terminals
- 4) In series RLC circuit which phase's are in phase opposition _____.
 - a) VL, VC
 b) VL, VR
 c) VC, VR
 d) None of the above
- 5) In a graph having b branches and n noads, the no. f-circuits or tiesets will be _____.
 - a) b-n b) n-b
 - c) b-n+1 d) n-b+1

6) Laplace transform of unit step function _____

- a) S b) 1/s c) s^2 d) $1/s^2$
- Applace transform of unit ramp function _________
 a) s
 b) 1/s
 - a) s b) 1/s c) s^2 d) $1/s^2$
- 8) Three equal resistances of 3 Ω are connected in star. What is the resistance in one of the arms in an equivalent delta circuit?
 - a) 10Ω b) 3Ω c) 9Ω d) 27Ω
- 9) In an electric circuit dual of inductance is ____
 - a) Conductance
 - c) Capacitance
- b) Resistance
- d) Susceptance

SLR-FM-729



Marks: 14

Max. Marks: 70

Set Q

- 10) Current between two open terminals is
 - Maximum a)

C)

- b) Zero
- Minimum d) None of these
- 11) Two resistances R1 and R2 give combined resistance of 4.5 ohms when in series and 1 ohm when in parallel. The resistances are _____.
 - a) 2.5 ohms and 2 ohms
- b) 3.5 ohms and 1 ohms
- 1.5 ohms and 3 ohms C)
- d) 1.5 ohms and 0.5 ohms
- 12) At t = 0+ with zero initial condition, which of the following acts as short circuit?
 - a) Inductor
- b) Capacitor
- c) Resistor d) All of the above
- 13) For a two port network to be reciprocal.
 - a) $Z_{11} = Z_{22}$ b) $Y_{12} = Y_{21}$ c)
 - d) AD BC = 0 $h_{22} = h_{12} + h_{21}$
- 14) Indicate the dual of series network consists of voltage source, capacitance, inductance in
 - a) Parallel combination of resistance, capacitance and inductance
 - Series combination of current source, capacitance and inductance b)
 - Parallel combination of current source, inductance and capacitance C)
 - None of the above d)

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

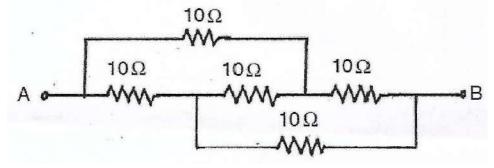
2) Figure to the right indicates full marks.

Section – I

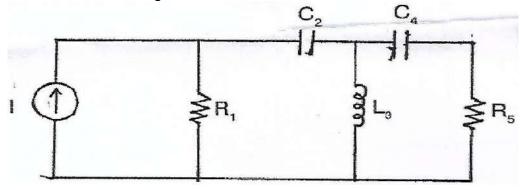
 30Ω

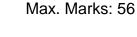
Q.2 Solve any three.

- a) State and explain maximum power transfer theorem.
- b) Determine current through 24 Ω resistor using Thevenin's Theorem.
- 220V T 50Ω.4
- c) Find an equivalent resistance between A and B.



d) Draw the dual of the given network.





20Ω

 \mathbf{O}

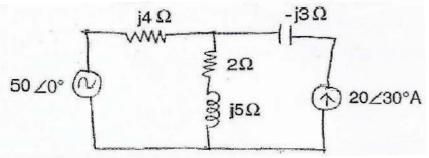
12

SLR-FM-729 Set Q

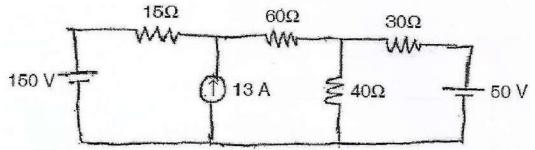
Seat No.

Q.3 Solve any two.

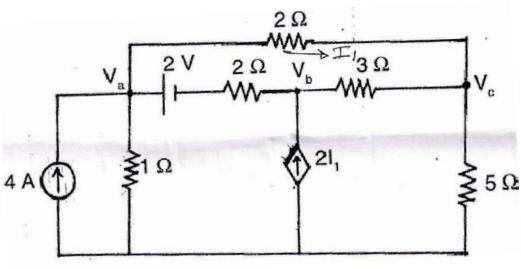
 a) State and explain Super position theorem. Determine the voltage across the (2+j5) ohm impedance in fig. shown below using Super position theorem.



b) State and Explain Thevenin's Theorem. Find the current through the 30 Ω resistor using Thevenin's Theorem.



c) Find voltages Va₁ Vb₁ Vc using nodal analysis technique.



Section – II

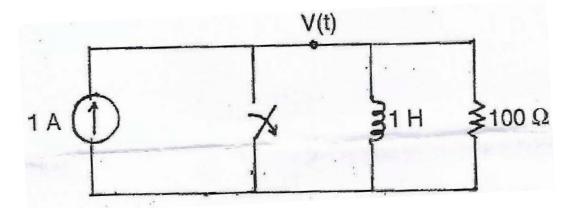
Q.4 Solve any three.

- a) Derive h parameter in terms of Z-parameter.
- b) In the given network at t=0 switch is opened. Calculate v & dv/dt at t = 0^+

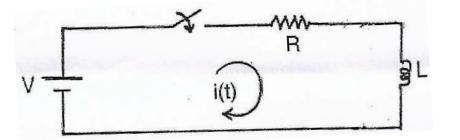
SLR-FM-729



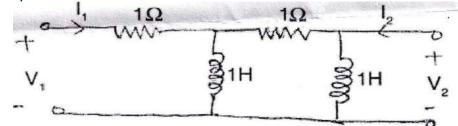
Set Q



c) Derive an expression for i(t) for following circuit.

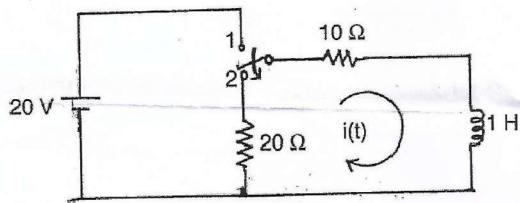


d) Find Z parameter for the network shown below.



Q.5 Solve any two.

- a) Derive H-parameter in terms of Z and transmission parameters.
- b) In the given network switch is changed from the position 1 to position 2 at t=0,steady condition is reached before switching, find the values of I, di/dt, d²i/dt².



- c) Give the Laplace transform of following function.
 - 1) unit step function
 - 2) unit ramp function
 - 3) unit impluse function
 - 4) Exponential function

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering NETWORK ANALYSIS**

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

Make suitable assumption if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes

a)

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- At t = 0+ with zero initial condition, which of the following acts as short 1) circuit?
 - Inductor b) Capacitor a) Resistor d) All of the above C)
- 2) For a two port network to be reciprocal.

a)	$Z_{11} = Z_{22}$	b)	$Y_{12} = Y_{21}$
c)	$h_{22} = h_{12} + h_{21}$	d)	AD - BC = 0

Indicate the dual of series network consists of voltage source, 3) capacitance, inductance in _

- Parallel combination of resistance, capacitance and inductance a)
- Series combination of current source, capacitance and inductance b)
- Parallel combination of current source, inductance and capacitance c)
- d) None of the above
- 4) Ohm's law is valid only when temperature is ____
 - Variable b) Constant a)
 - Varies with constant rate d) None of these C)
- 5) When superposition theorem is applied to any circuit, the dependent source in that circuit is always?
 - Voltage source short circuited a)
 - b) Active as it is in the circuit
 - Current source open circuited c)
 - Both current and voltage source are short circuited d)
- The h parameters of h11 and h21 obtained 6)
 - a) by shorting input terminals b) by shorting output terminals
 - c) by opening input terminals d) by opening output terminals
- 7) In series RLC circuit which phase's are in phase opposition _____.
 - VL, VC b) VL, VR
 - VC, VR d) None of the above c)
- In a graph having b branches and n noads, the no. f-circuits or tiesets will 8) be ____.
 - b-n a) b) n-b d) n-b+1 C) b-n+1
- Laplace transform of unit step function 9)
 - S 1/s a) b)
 - s² 1/s² c) d)

Max. Marks: 70

SLR-FM-729

Set

Marks: 14

- Set R
- 10) Laplace transform of unit ramp function ____
 - a) s b) 1/s c) s^2 d) $1/s^2$
- 11) Three equal resistances of 3 Ω are connected in star. What is the resistance in one of the arms in an equivalent delta circuit?
 - a) 10 Ω b) 3 Ω
 - c) 9Ω d) 27Ω

12) In an electric circuit dual of inductance is ____

- Conductance b) Resistance
- c) Capacitance d) Susceptance
- 13) Current between two open terminals is _____
 - a) Maximum b) Zero
 - c) Minimum d) None of these
- 14) Two resistances R1 and R2 give combined resistance of 4.5 ohms when in series and 1 ohm when in parallel. The resistances are _____.
 - a) 2.5 ohms and 2 ohms

a)

- b) 3.5 ohms and 1 ohms
- c) 1.5 ohms and 3 ohms d)
- d) 1.5 ohms and 0.5 ohms

Seat S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

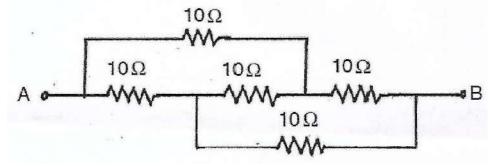
 30Ω

NETWORK ANALYSIS

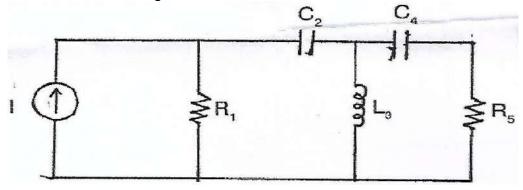
Q.2 Solve any three.

No.

- State and explain maximum power transfer theorem. a)
- Determine current through 24 Ω resistor using Thevenin's Theorem. b)
 - 220V **50**Ω
- Find an equivalent resistance between A and B. c)



Draw the dual of the given network. d)



Max. Marks: 56

20Ω

 \mathbf{O}

12

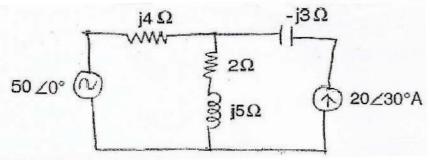
SLR-FM-729

Set

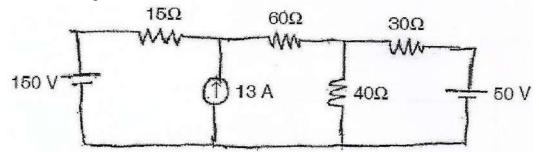
R

Q.3 Solve any two.

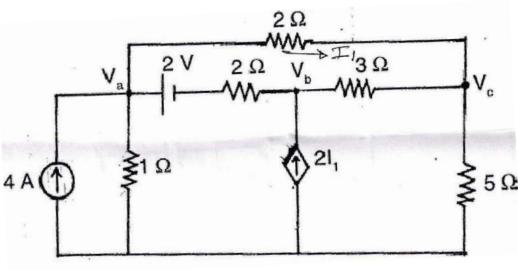
 a) State and explain Super position theorem. Determine the voltage across the (2+j5) ohm impedance in fig. shown below using Super position theorem.



b) State and Explain Thevenin's Theorem. Find the current through the 30 Ω resistor using Thevenin's Theorem.



c) Find voltages Va₁ Vb₁ Vc using nodal analysis technique.



Section – II

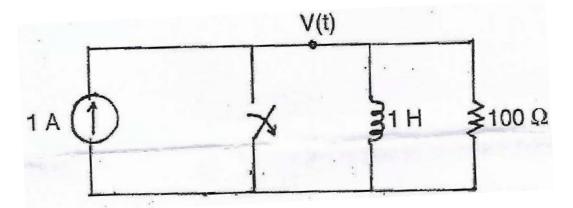
Q.4 Solve any three.

- a) Derive h parameter in terms of Z-parameter.
- b) In the given network at t=0 switch is opened. Calculate v & dv/dt at t = 0^+

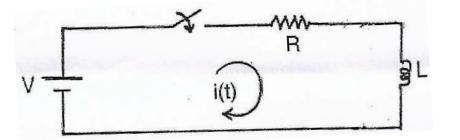




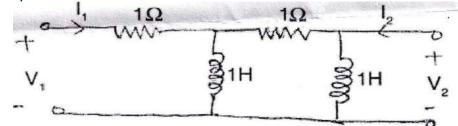
Set R



c) Derive an expression for i(t) for following circuit.

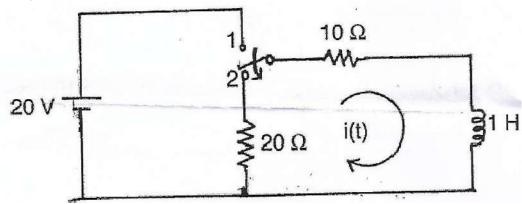


d) Find Z parameter for the network shown below.



Q.5 Solve any two.

- a) Derive H-parameter in terms of Z and transmission parameters.
- b) In the given network switch is changed from the position 1 to position 2 at t=0,steady condition is reached before switching, find the values of I, di/dt, d²i/dt².



- c) Give the Laplace transform of following function.
 - 1) unit step function
 - 2) unit ramp function
 - 3) unit impluse function
 - 4) Exponential function

ura	tion: 3	BO Mi	nutes			Marks: '
.1	Choo 1)		the correct alternatives from th h parameters of h11 and h21 ob by shorting input terminals by opening input terminals	tain b)	ed by shorting output terminals	ence. ⁷
	2)	a)	eries RLC circuit which phase's a VL, VC VC, VR		n phase opposition VL, VR None of the above	
	3)		graph having b branches and n b-n b-n+1	noad b) d)	ds, the no. f-circuits or tiesets n-b n-b+1	will
	4)	Lap a) c)	lace transform of unit step functions S s ²	on _ b) d)	1/s 1/s ²	
	5)	Lap a) c)	lace transform of unit ramp funct s s ²	ion _ b) d)	1/s 1/s ²	
	6)		ee equal resistances of 3 Ω are c stance in one of the arms in an e 10 Ω 9 Ω		alent delta circuit?	
	7)	In a a) c)	n electric circuit dual of inductand Conductance Capacitance		Resistance	
	8)	Curr a) c)	rent between two open terminals Maximum Minimum	b)		
	9)		o resistances R1 and R2 give cor eries and 1 ohm when in parallel 2.5 ohms and 2 ohms 1.5 ohms and 3 ohms	. The b)		ien
	10)	circu	= 0+ with zero initial condition, w uit?	hich	of the following acts as shor	t

2) Make suitable assumption if necessary.

Duration: 30 Minutes

Q.

MCQ/Objective Type Questions

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering NETWORK ANALYSIS**

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

No.

Time: 02:30 PM To 05:30 PM

Day & Date: Wednesday, 27-11-2019

book.

Max. Marks: 70

Marks: 14

SLR-FM-729

Set

a) Inductor c) Resistor

- b) Capacitor
- d) All of the above

Seat

Set S

- 11) For a two port network to be reciprocal. $Z_{11} = Z_{22}$
 - b) $Y_{12} = Y_{21}$
 - $h_{22} = h_{12} + h_{21}$ d) AD - BC = 0C)
- 12) Indicate the dual of series network consists of voltage source, capacitance, inductance in ____
 - Parallel combination of resistance, capacitance and inductance a)
 - Series combination of current source, capacitance and inductance b)
 - Parallel combination of current source, inductance and capacitance c)
 - d) None of the above

a)

- 13) Ohm's law is valid only when temperature is _____.
 - b) Constant a) Variable
 - Varies with constant rate d) None of these c)
- When superposition theorem is applied to any circuit, the dependent 14) source in that circuit is always?
 - Voltage source short circuited a)
 - Active as it is in the circuit b)
 - Current source open circuited C)
 - Both current and voltage source are short circuited d)

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering

NETWORK ANALYSIS

Day & Date: Wednesday, 27-11-2019 Time: 02:30 PM To 05:30 PM

220V

Instructions: 1) All questions are compulsory.

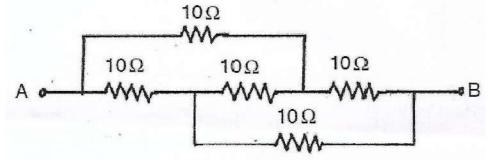
2) Figure to the right indicates full marks.

Section – I

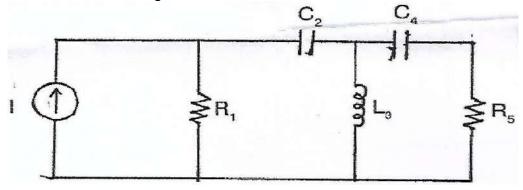
 30Ω

Q.2 Solve any three.

- a) State and explain maximum power transfer theorem.
- b) Determine current through 24 Ω resistor using Thevenin's Theorem.
- 50 Q.M
- c) Find an equivalent resistance between A and B.



d) Draw the dual of the given network.





20Ω

 \mathbf{O}

SLR-FM-729

Set

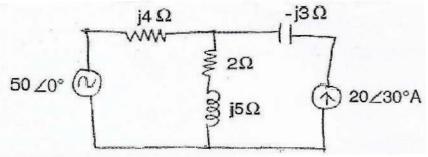
S

12

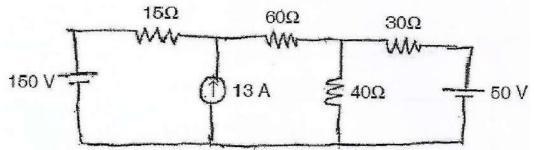
Seat No.

Q.3 Solve any two.

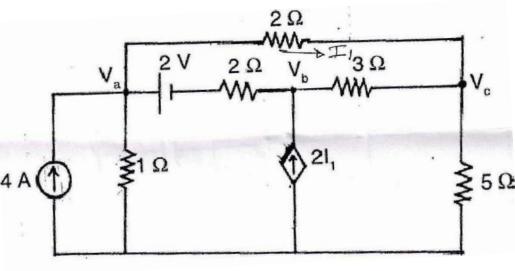
 a) State and explain Super position theorem. Determine the voltage across the (2+j5) ohm impedance in fig. shown below using Super position theorem.



b) State and Explain Thevenin's Theorem. Find the current through the 30 Ω resistor using Thevenin's Theorem.



c) Find voltages Va₁ Vb₁ Vc using nodal analysis technique.



Section – II

Q.4 Solve any three.

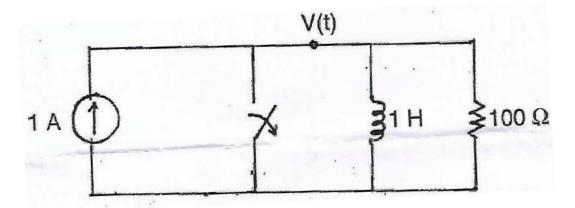
- a) Derive h parameter in terms of Z-parameter.
- b) In the given network at t=0 switch is opened. Calculate v & dv/dt at t = 0^+

12

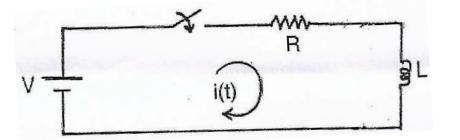


Set

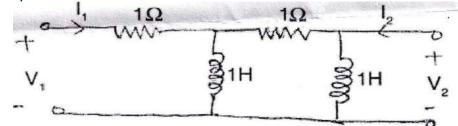
Set S



c) Derive an expression for i(t) for following circuit.

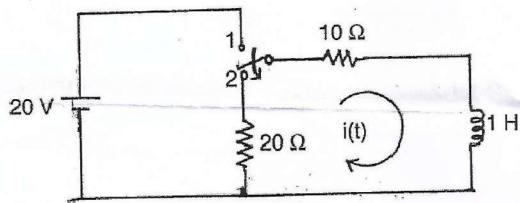


d) Find Z parameter for the network shown below.



Q.5 Solve any two.

- a) Derive H-parameter in terms of Z and transmission parameters.
- b) In the given network switch is changed from the position 1 to position 2 at t=0,steady condition is reached before switching, find the values of I, di/dt, d²i/dt².



- c) Give the Laplace transform of following function.
 - 1) unit step function
 - 2) unit ramp function
 - 3) unit impluse function
 - 4) Exponential function

u)	22.5 MW entering the node and	. 22 ג	5 www leaving the hode	
	a 15-bus power system with 3 v	oltag	ge controlled bus, the size of	
Jac	obian matrix is			
a)	11 × 11	b)	12×12	
c)	24×24	d)	28×28	
ΕM	F source is present sequ	lenc	e N/W.	
a)	positive	b)	zero	
c)	negative	d)	all of the above	
sub	ur identical alternators each rated transient reactance of 16% are velocities are velocities and the bus-bars is			
a)	500 MVA	b)	400 MVA	
c)	125 MVA	d)	80 MVA	
				Pag

MCQ/Objective Type Questions Duration: 30 Minutes

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering POWER SYSTEM ANALYSIS**

- A synchronous machine is 1)
 - a) single excited machine b) doubly excited machine

2) Figures to the right indicate full marks.

- made to run below Ns d) lagging power factor machine c)
- The per unit value of a 2 ohm resistor at 100 MVA base and 10 KV base 2) voltage is . b) 2 pu
 - 4 pu a)

Day & Date: Friday, 06-12-2019

book.

Time: 02:30 PM To 05:30 PM

- d) 0.2 pu c) 0.5 pu
- If a new line is added between the buses 2 and 3 in a system, the elements 3) of Y Bus affected by addition of this line are
 - b) Y22, Y23, Y32, Y33 Y22, Y33 a) d) None of the above
 - C) Y23, Y32
- The bus admittance matrix (Ybus) of a power system is not . 4)
 - Symmetric a)
 - b) a square matrix
 - a full matrix C)

8)

- generally having dominant diagonal elements d)
- At a particular unbalanced node, the real powers specified are: Leaving 5) the node 20 MW, 25 MW Entering the node 60 MW, 30 MW The balancing power will be _____
 - a) 30 MW leaving the node
 - 45 MW leaving the node b)
 - 45 MW entering the node c)
 - 22.5 MW entering the node and 22.5 MW leaving the node d)
- For a 15-bus 6) Jacobian ma
 - a) 11×11
 - 24×24 c)
- **EMF** source 7)
 - a) positive c)
 - negative Four identica

Seat No.

SLR-FM-730

Set

Max. Marks: 70

Marks: 14

Set P

- 9) The positive, negative and zero sequence impedances of a solidly grounded system under steady state condition always follow the relations
 - Z1>Z2>Z0 a)

- b) Z1<Z2<Z0
- Z0<Z1<Z2 c)

d) None of the above

- A zero phase sequence is one in which all phasors are of _____. 10)
 - equal in magnitude b) equal angle a) a and b c)
 - d) all of above
- When a line-to-ground fault occurs, the current in a faulted phase is 100 A. 11) The zero sequence current in this case will be _____.
 - a) zero b) 33.3 A
 - 66.6 A d) 100 A c)
- 12) A power system is subjected to a fault which makes the zero sequence component of current equal to zero. The nature of fault is
 - double line to ground fault b) double line fault a)
 - line of ground fault C)
- d) three-phase to ground fault
- 13) The inertia constant of two groups of machines which do not swing together are M1 and M2 such that M1 > M2. It is proposed to add some inertia to one of the two groups of machines for improving the transient stability of the system. It should be added to _____.
 - a) M1
 - M2 b)
 - It does not matter whether to add to M1 or M2 C)
 - d) none
- 14) The inertia constant H of a machine of 200 MVA is 2 p.u. its value corresponding to 400 MVA will be
 - 4.0 b) 2.0 a) C) 1.0 d) 0.5

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019

Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Attempt any four of the following questions.

- a) What is per unit system? What are the advantages of per unit representation?
- **b)** Determine Ybus for the three bus system whose series impedances are as follows. Neglect shunt admittances.

Line (bus to bus)	Impedance (pu)
1-2	0.06+j0.18
1-3	0.03+j0.09
2-3	0.08+j0.24

- c) Classify various types of buses in a power system for load flow studies. Justify the classification.
- d) Derive an expression for the load flow analysis by gauss siedal method when.
 - 1) PQ buses are present in the system
 - 2) PV buses are present in system
- e) The plant capacity of a 3-phase generating station consists of two 8 MVA generators of reactance14.5% each and one 4 MVA generator of reactance 9.5%. These are connected to a common bus-bar from which loads are taken through a number of 3 MVA step-up transformers each having 4% reactance. Determine the MVA rating of the circuit breakers on L.V. side. Reactances given are based on the MVA of each equipment.
- f) A three phase 5 MVA,6.6 KV alternator with reactance of 8% is connected to a feeder of series impedance of (0.12+j0.48) ohm/ph/km. the transformer is rated at 3 MVA,6.6/33 KV and has a series reactance of 5%. determine the fault current supplied by the generator operating under no load, with a voltage of 6.9 KV when a 3 phase symmetrical fault occurs at a point 15 kms along the feeder.

Max. Marks: 56

SLR-FM-730

Set

Seat No.



Q.3 Attempt any two of the following questions.

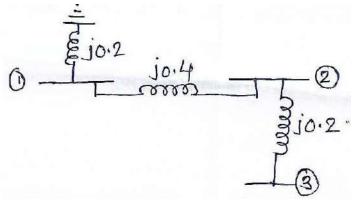
12

a) The following is the system data for load flow solution along with schedule of real and reactive powers, determine the voltages at the end of first iteration using gauss seidel method.

0 3	Bus	Voltage	Gene	eration	Load		
T0.01+j0.03 TT		i enaige	MW	MVAr	MW	MVAr	
how	1 slack	1.05	-	-	0	0	
+ 10.025	2	1+j0	50	30	305.6	140.2	
10.00254)0	3	1+j0	0	0	138.6	45.2	
PT .					Base M	VA=100	

- **b)** Explain clearly the computational procedure for load flow solution using Decoupled method when the system contains all types of buses.
- **c)** For the system shown in fig. build Zbus.

(2)



Section – II

Q.4 Attempt any four of the following questions.

- a) Draw the zero sequence N/W of star/star transformer with star point grounded through reactance and delta/delta transformer.
- b) In a 3-phase system, the phase voltages are as under.
 ER = 1 ∠0° V; EB = 1 ∠ 120° V; EY = 0 V
 Find the zero, positive and negative phase sequence components in the R-phase.
- c) Explain with sequence network various open conductor faults in power system.
- d) A 30 MVA, 11 KV generator has Z1= Z2 = j0.2 pu and Z0 = j0.05 pu. A LG fault occurs at on the generator terminals find the fault current during the fault conditions. Assume that the generator neutral is solidly grounded and generator is operating at no load.
- e) Derive swing equation and discuss its importance in power system stability.
- f) Explain various internal and external causes of overvoltage.

Q.5 Attempt any two of the following questions.

a) A 3-phase, 4-wire system supplies loads which are unequally distributed in the three phases. An analysis of the circuit shows that positive and negative phase sequence components of the current in the red line are as under.

 $IR1 = (7 \cdot 89 + j \, 0 \cdot 732) \text{ A}; IR2 = (2 \cdot 11 - j \, 2 \cdot 732) \text{ A}$

The total observed current flowing back to supply in the neutral conductor is zero. Calculate the current in the three lines.

- **b)** Derive an expression for the system with sequence network when.
 - 1) line to line fault occurs on generator
 - 2) LLG fault occurs on generator
- c) The per unit values of positive, negative and zero sequence reactances of a network at fault are 0.08, 0.07 and 0.05 respectively. Determine the fault current if fault is line-to-line-to-ground.



		e: Friday, 06-12-2019 Max. Marks: 70 0 PM To 05:30 PM
Instru	uctio	 ns: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book. 2) Figures to the right indicate full marks.
Durat		MCQ/Objective Type Questions
Q.1		0 Minutes Marks: 14 Marks: 14 Marks: 14
Q .1	1)	Four identical alternators each rated for 20 MVA, 11 kV having a subtransient reactance of 16% are working in parallel. The short-circuit level at the bus-bars is a) 500 MVA b) 400 MVA c) 125 MVA d) 80 MVA
	2)	The positive, negative and zero sequence impedances of a solidly grounded system under steady state condition always follow the relations
		a) Z1>Z2>Z0 b) Z1 <z2<z0< td=""> c) Z0<z1<z2< td=""> d) None of the above</z1<z2<></z2<z0<>
	3)	 A zero phase sequence is one in which all phasors are of a) equal in magnitude b) equal angle c) a and b d) all of above
	4)	When a line-to-ground fault occurs, the current in a faulted phase is 100 A.The zero sequence current in this case will bea) zerob) 33.3 Ac) 66.6 Ad) 100 A
	5)	 A power system is subjected to a fault which makes the zero sequence component of current equal to zero. The nature of fault is a) double line to ground fault b) double line fault c) line of ground fault d) three-phase to ground fault
	6)	The inertia constant of two groups of machines which do not swing together are M1 and M2 such that M1 > M2. It is proposed to add some inertia to one of the two groups of machines for improving the transient stability of the system. It should be added to a) M1 b) M2 c) It does not matter whether to add to M1 or M2 d) none
	7)	The inertia constant H of a machine of 200 MVA is 2 p.u. its valuecorresponding to 400 MVA will bea) 4.0b) 2.0c) 1.0d) 0.5

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

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Seat No.

Set Q

- 8) A synchronous machine is ____
 - a) single excited machine
 - made to run below Ns C)
- b) doubly excited machine d) lagging power factor machine
- The per unit value of a 2 ohm resistor at 100 MVA base and 10 KV base 9) voltage is _____.
 - 4 pu b) 2 pu a)
 - c) 0.5 pu d) 0.2 pu
- 10) If a new line is added between the buses 2 and 3 in a system, the elements of Y Bus affected by addition of this line are _____
 - a) Y22, Y33

b) Y22, Y23, Y32, Y33

c) Y23, Y32

- d) None of the above
- 11) The bus admittance matrix (Ybus) of a power system is not _____.
 - Symmetric a)
 - a square matrix b)
 - a full matrix c)
 - d) generally having dominant diagonal elements
- 12) At a particular unbalanced node, the real powers specified are: Leaving the node 20 MW, 25 MW Entering the node 60 MW, 30 MW The balancing power will be
 - 30 MW leaving the node a)
 - 45 MW leaving the node b)
 - c) 45 MW entering the node
 - d) 22.5 MW entering the node and 22.5 MW leaving the node
- For a 15-bus power system with 3 voltage controlled bus, the size of 13) Jacobian matrix is _____.
 - a) 11×11 b) 12 × 12
 - d) 28 × 28 24×24 c)
- 14) EMF source is present _____ sequence N/W.
 - a) positive
 - negative c)

- b) zero
- d) all of the above

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019

Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Attempt any four of the following questions.

- a) What is per unit system? What are the advantages of per unit representation?
- **b)** Determine Ybus for the three bus system whose series impedances are as follows. Neglect shunt admittances.

Line (bus to bus)	Impedance (pu)			
1-2	0.06+j0.18			
1-3	0.03+j0.09			
2-3	0.08+j0.24			

- c) Classify various types of buses in a power system for load flow studies. Justify the classification.
- d) Derive an expression for the load flow analysis by gauss siedal method when.
 - 1) PQ buses are present in the system
 - 2) PV buses are present in system
- e) The plant capacity of a 3-phase generating station consists of two 8 MVA generators of reactance14.5% each and one 4 MVA generator of reactance 9.5%. These are connected to a common bus-bar from which loads are taken through a number of 3 MVA step-up transformers each having 4% reactance. Determine the MVA rating of the circuit breakers on L.V. side. Reactances given are based on the MVA of each equipment.
- f) A three phase 5 MVA,6.6 KV alternator with reactance of 8% is connected to a feeder of series impedance of (0.12+j0.48) ohm/ph/km. the transformer is rated at 3 MVA,6.6/33 KV and has a series reactance of 5%. determine the fault current supplied by the generator operating under no load, with a voltage of 6.9 KV when a 3 phase symmetrical fault occurs at a point 15 kms along the feeder.

Max. Marks: 56

16



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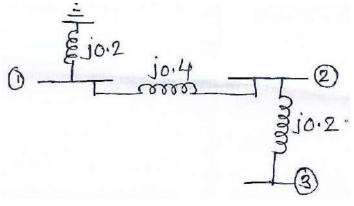


Q.3 Attempt any two of the following questions.

- 12
- a) The following is the system data for load flow solution along with schedule of real and reactive powers, determine the voltages at the end of first iteration using gauss seidel method.

0. 3	Bus	Voltage	Gene	eration	Load		
T0:01+10:03 TT		Due Fonage		MVAr	MW	MVAr	
how	1 slack	1.05	-	-	0	0	
0+20.0125+10.025	2	1+j0	50	30	305.6	140.2	
0 0.0125+3	3	1+j0	0	0	138.6	45.2	
PT .					Base M	VA=100	

- **b)** Explain clearly the computational procedure for load flow solution using Decoupled method when the system contains all types of buses.
- **c)** For the system shown in fig. build Zbus.



Section – II

Q.4 Attempt any four of the following questions.

- a) Draw the zero sequence N/W of star/star transformer with star point grounded through reactance and delta/delta transformer.
- b) In a 3-phase system, the phase voltages are as under.
 ER = 1 ∠0° V; EB = 1 ∠ 120° V; EY = 0 V
 Find the zero, positive and negative phase sequence components in the R-phase.
- c) Explain with sequence network various open conductor faults in power system.
- d) A 30 MVA, 11 KV generator has Z1= Z2 = j0.2 pu and Z0 = j0.05 pu. A LG fault occurs at on the generator terminals find the fault current during the fault conditions. Assume that the generator neutral is solidly grounded and generator is operating at no load.
- e) Derive swing equation and discuss its importance in power system stability.
- f) Explain various internal and external causes of overvoltage.

Page **10** of **20**

Q.5 Attempt any two of the following questions.

a) A 3-phase, 4-wire system supplies loads which are unequally distributed in the three phases. An analysis of the circuit shows that positive and negative phase sequence components of the current in the red line are as under.

 $IR1 = (7 \cdot 89 + j 0 \cdot 732) A; IR2 = (2 \cdot 11 - j 2 \cdot 732) A$

The total observed current flowing back to supply in the neutral conductor is zero. Calculate the current in the three lines.

- **b)** Derive an expression for the system with sequence network when.
 - 1) line to line fault occurs on generator
 - 2) LLG fault occurs on generator
- c) The per unit values of positive, negative and zero sequence reactances of a network at fault are 0.08, 0.07 and 0.05 respectively. Determine the fault current if fault is line-to-line-to-ground.



T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- At a particular unbalanced node, the real powers specified are: Leaving 1) the node 20 MW, 25 MW Entering the node 60 MW, 30 MW The balancing power will be .
 - 30 MW leaving the node a)
 - b) 45 MW leaving the node
 - 45 MW entering the node c)
 - 22.5 MW entering the node and 22.5 MW leaving the node d)
- 2) For a 15-bus power system with 3 voltage controlled bus, the size of Jacobian matrix is _____.
 - a) 11 × 11 b) 12 × 12
 - c) 24×24 d) 28 × 28
- EMF source is present sequence N/W. 3)
 - a) positive b) zero
 - negative d) all of the above C)
- Four identical alternators each rated for 20 MVA, 11 kV having a 4) subtransient reactance of 16% are working in parallel. The short-circuit level at the bus-bars is _____.
 - 500 MVA b) 400 MVA a)
 - 125 MVA d) 80 MVA C)
- The positive, negative and zero sequence impedances of a solidly 5) grounded system under steady state condition always follow the relations

a)	Z1>Z2>Z0	b))	Z1 <z2<z0< th=""></z2<z0<>
c)	Z0 <z1<z2< td=""><td>d</td><td>)</td><td>None of the above</td></z1<z2<>	d)	None of the above

- A zero phase sequence is one in which all phasors are of _____. 6)
 - a) equal in magnitude b) equal angle d) all of above c) a and b
- When a line-to-ground fault occurs, the current in a faulted phase is 100 A. 7) The zero sequence current in this case will be _____.
 - zero b) 33.3 A a)
 - c) 66.6 A d) 100 A

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Marks: 14

Max. Marks: 70

			Set	R
8)	A power system is subjected to a factorcomponent of current equal to zero.a) double line to ground faultc) line of ground fault	The b)	nature of fault is	
9)	The inertia constant of two groups of together are M1 and M2 such that M inertia to one of the two groups of m stability of the system. It should be a a) M1 b) M2 c) It does not matter whether to a d) none	/11 > nachi adde	M2. It is proposed to add some ines for improving the transient d to	
10)	The inertia constant H of a machine corresponding to 400 MVA will be _ a) 4.0 c) 1.0	b)	00 MVA is 2 p.u. its value 2.0 0.5	
11)	A synchronous machine isa) single excited machinec) made to run below Ns			
12)	The per unit value of a 2 ohm resist voltage is a) 4 pu c) 0.5 pu	b)	100 MVA base and 10 KV base 2 pu 0.2 pu	
13)	If a new line is added between the k of Y Bus affected by addition of this a) Y22, Y33 c) Y23, Y32	buse line b)	s 2 and 3 in a system, the elements	
14)	The bus admittance matrix (Ybus) c a) Symmetric b) a square matrix	f a p	ower system is not	

- b) a square matrixc) a full matrixd) generally having dominant diagonal elements

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019

Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Attempt any four of the following questions.

- a) What is per unit system? What are the advantages of per unit representation?
- **b)** Determine Ybus for the three bus system whose series impedances are as follows. Neglect shunt admittances.

Line (bus to bus)	Impedance (pu)			
1-2	0.06+j0.18			
1-3	0.03+j0.09			
2-3	0.08+j0.24			

- c) Classify various types of buses in a power system for load flow studies. Justify the classification.
- d) Derive an expression for the load flow analysis by gauss siedal method when.
 - 1) PQ buses are present in the system
 - 2) PV buses are present in system
- e) The plant capacity of a 3-phase generating station consists of two 8 MVA generators of reactance14.5% each and one 4 MVA generator of reactance 9.5%. These are connected to a common bus-bar from which loads are taken through a number of 3 MVA step-up transformers each having 4% reactance. Determine the MVA rating of the circuit breakers on L.V. side. Reactances given are based on the MVA of each equipment.
- f) A three phase 5 MVA,6.6 KV alternator with reactance of 8% is connected to a feeder of series impedance of (0.12+j0.48) ohm/ph/km. the transformer is rated at 3 MVA,6.6/33 KV and has a series reactance of 5%. determine the fault current supplied by the generator operating under no load, with a voltage of 6.9 KV when a 3 phase symmetrical fault occurs at a point 15 kms along the feeder.

Max. Marks: 56

SLR-FM-730

Set

Seat No.



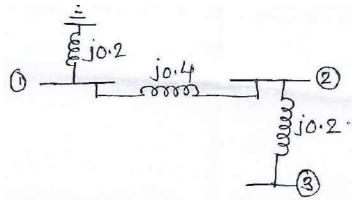
Q.3 Attempt any two of the following questions.

- 12
- a) The following is the system data for load flow solution along with schedule of real and reactive powers, determine the voltages at the end of first iteration using gauss seidel method.

0.3	Bus	Voltage	Gen	eration	Load		
0.01+10.03			MW	MVAr	MW	MVAr	
how	1 slack	1.05	-	-	0	0	
0 + 20.0125+ 10.025	2	1+j0	50	30	305.6	140.2	
0 0.0125+)	3	1+j0	0	0	138.6	45.2	
					Base M	VA=100	

- **b)** Explain clearly the computational procedure for load flow solution using Decoupled method when the system contains all types of buses.
- **c)** For the system shown in fig. build Zbus.

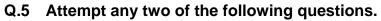
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Section – II

Q.4 Attempt any four of the following questions.

- a) Draw the zero sequence N/W of star/star transformer with star point grounded through reactance and delta/delta transformer.
- b) In a 3-phase system, the phase voltages are as under.
 ER = 1 ∠0° V; EB = 1 ∠ 120° V; EY = 0 V
 Find the zero, positive and negative phase sequence components in the R-phase.
- c) Explain with sequence network various open conductor faults in power system.
- d) A 30 MVA, 11 KV generator has Z1= Z2 = j0.2 pu and Z0 = j0.05 pu. A LG fault occurs at on the generator terminals find the fault current during the fault conditions. Assume that the generator neutral is solidly grounded and generator is operating at no load.
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a) A 3-phase, 4-wire system supplies loads which are unequally distributed in the three phases. An analysis of the circuit shows that positive and negative phase sequence components of the current in the red line are as under.

 $IR1 = (7 \cdot 89 + j 0 \cdot 732) A; IR2 = (2 \cdot 11 - j 2 \cdot 732) A$

The total observed current flowing back to supply in the neutral conductor is zero. Calculate the current in the three lines.

- **b)** Derive an expression for the system with sequence network when.
 - 1) line to line fault occurs on generator
 - 2) LLG fault occurs on generator
- c) The per unit values of positive, negative and zero sequence reactances of a network at fault are 0.08, 0.07 and 0.05 respectively. Determine the fault current if fault is line-to-line-to-ground.

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Day	& Dat	te: Friday, 06-12-2019 Max. Marks: 70									
		30 PM To 05:30 PM									
Instr	ructio	ons: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer									
	book. 2) Figures to the right indicate full marks.										
MCQ/Objective Type Questions											
	Duration: 30 Minutes Marks: 14										
Q.1	Chc 1)	A zero phase sequence is one in which all phasors are of14a) equal in magnitudeb) equal anglec) a and bd) all of above									
	2)	When a line-to-ground fault occurs, the current in a faulted phase is 100 A.The zero sequence current in this case will bea) zerob) 33.3 Ac) 66.6 Ad) 100 A									
	3)	 A power system is subjected to a fault which makes the zero sequence component of current equal to zero. The nature of fault is a) double line to ground fault b) double line fault c) line of ground fault d) three-phase to ground fault 									
	 4) The inertia constant of two groups of machines which do not swing together are M1 and M2 such that M1 > M2. It is proposed to add some inertia to one of the two groups of machines for improving the transient stability of the system. It should be added to a) M1 b) M2 c) It does not matter whether to add to M1 or M2 d) none 										
	5)	The inertia constant H of a machine of 200 MVA is 2 p.u. its valuecorresponding to 400 MVA will bea) 4.0b) 2.0c) 1.0d) 0.5									
	6)	A synchronous machine isa) single excited machineb) doubly excited machinec) made to run below Nsd) lagging power factor machine									
	7)	The per unit value of a 2 ohm resistor at 100 MVA base and 10 KV basevoltage isa) 4 pub) 2 puc) 0.5 pud) 0.2 pu									
	8)	If a new line is added between the buses 2 and 3 in a system, the elements of Y Bus affected by addition of this line are a) Y22, Y33 b) Y22, Y23, Y32, Y33 c) Y23, Y32 d) None of the above									

Seat No.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

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- 9) The bus admittance matrix (Ybus) of a power system is not _____.
 - a) Symmetric
 - b) a square matrix
 - c) a full matrix
 - d) generally having dominant diagonal elements
- 10) At a particular unbalanced node, the real powers specified are: Leaving the node 20 MW, 25 MW Entering the node 60 MW, 30 MW The balancing power will be _____.
 - a) 30 MW leaving the node
 - b) 45 MW leaving the node
 - c) 45 MW entering the node
 - d) 22.5 MW entering the node and 22.5 MW leaving the node
- 11) For a 15-bus power system with 3 voltage controlled bus, the size of Jacobian matrix is _____.
 - a) 11 × 11 b) 12 × 12
 - c) 24×24 d) 28×28
- 12) EMF source is present _____ sequence N/W.
 - a) positive b) zero
 - c) negative d) all of the above
- 13) Four identical alternators each rated for 20 MVA, 11 kV having a subtransient reactance of 16% are working in parallel. The short-circuit level at the bus-bars is _____.
 a) 500 MVA b) 400 MVA
 - a) 500 MVA c) 125 MVA
 - d) 80 MVA
- 14) The positive, negative and zero sequence impedances of a solidly grounded system under steady state condition always follow the relations
 - a) Z1>Z2>Z0
 - c) Z0<Z1<Z2

- b) Z1<Z2<Z0
- d) None of the above

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019

Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Attempt any four of the following questions.

- a) What is per unit system? What are the advantages of per unit representation?
- **b)** Determine Ybus for the three bus system whose series impedances are as follows. Neglect shunt admittances.

Line (bus to bus)	Impedance (pu)			
1-2	0.06+j0.18			
1-3	0.03+j0.09			
2-3	0.08+j0.24			

- c) Classify various types of buses in a power system for load flow studies. Justify the classification.
- d) Derive an expression for the load flow analysis by gauss siedal method when.
 - 1) PQ buses are present in the system
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- e) The plant capacity of a 3-phase generating station consists of two 8 MVA generators of reactance14.5% each and one 4 MVA generator of reactance 9.5%. These are connected to a common bus-bar from which loads are taken through a number of 3 MVA step-up transformers each having 4% reactance. Determine the MVA rating of the circuit breakers on L.V. side. Reactances given are based on the MVA of each equipment.
- f) A three phase 5 MVA,6.6 KV alternator with reactance of 8% is connected to a feeder of series impedance of (0.12+j0.48) ohm/ph/km. the transformer is rated at 3 MVA,6.6/33 KV and has a series reactance of 5%. determine the fault current supplied by the generator operating under no load, with a voltage of 6.9 KV when a 3 phase symmetrical fault occurs at a point 15 kms along the feeder.

Max. Marks: 56

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Set

Seat No.



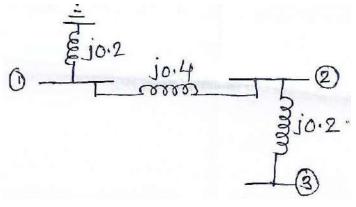
Q.3 Attempt any two of the following questions.

12

a) The following is the system data for load flow solution along with schedule of real and reactive powers, determine the voltages at the end of first iteration using gauss seidel method.

0 . 3	Bus	Voltage	Generation		Load	
T0:01+10:03 TT	- 0.0		MW	MVAr	MW	MVAr
hou	1 slack	1.05	-	-	0	0
+ 40.025	2	1+j0	50	30	305.6	140.2
0.0125+10	3	1+j0	0	0	138.6	45.2
2					Base M	VA=100

- **b)** Explain clearly the computational procedure for load flow solution using Decoupled method when the system contains all types of buses.
- **c)** For the system shown in fig. build Zbus.



Section – II

Q.4 Attempt any four of the following questions.

- a) Draw the zero sequence N/W of star/star transformer with star point grounded through reactance and delta/delta transformer.
- b) In a 3-phase system, the phase voltages are as under.
 ER = 1 ∠0° V; EB = 1 ∠ 120° V; EY = 0 V
 Find the zero, positive and negative phase sequence components in the R-phase.
- c) Explain with sequence network various open conductor faults in power system.
- d) A 30 MVA, 11 KV generator has Z1= Z2 = j0.2 pu and Z0 = j0.05 pu. A LG fault occurs at on the generator terminals find the fault current during the fault conditions. Assume that the generator neutral is solidly grounded and generator is operating at no load.
- e) Derive swing equation and discuss its importance in power system stability.
- f) Explain various internal and external causes of overvoltage.

12

Q.5 Attempt any two of the following questions.

a) A 3-phase, 4-wire system supplies loads which are unequally distributed in the three phases. An analysis of the circuit shows that positive and negative phase sequence components of the current in the red line are as under.

 $IR1 = (7 \cdot 89 + j 0 \cdot 732) A; IR2 = (2 \cdot 11 - j 2 \cdot 732) A$

The total observed current flowing back to supply in the neutral conductor is zero. Calculate the current in the three lines.

- **b)** Derive an expression for the system with sequence network when.
 - 1) line to line fault occurs on generator
 - 2) LLG fault occurs on generator
- c) The per unit values of positive, negative and zero sequence reactances of a network at fault are 0.08, 0.07 and 0.05 respectively. Determine the fault current if fault is line-to-line-to-ground.



SLR-FM-730

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** CONTROL SYSTEM - I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figure to the right indicates full marks.
- 3) Assume suitable data if necessary.
- 4) Use of only non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In an open loop control system 1)
 - a) Output is independent of control input
 - b) Output is dependent on control input
 - c) Only system parameters have effect on the control output
 - d) None of the above

2) A good control system has all the following features except .

- a) good stability
- b) slow response
- c) good accuracy
- d) sufficient power handling capacity
- 3) As a result of introduction of negative feedback which of the following will not decrease?
 - a) Band width b)
 - Instability Distortion c) d)
- A transfer function of a system is a Laplace transform of its . 4)
 - a) Square wave response Step response b) c) Ramp response
 - d) Impulse response

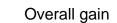
In a control system, the controller output is given to ____ 5)

- Sensor b) Comparator a)
- c) Amplifier d) **Final Control element**
- 6) Two blocks $G_1(s)$ and $G_2(s)$ can be cascaded to get resultant transfer function as
 - a) $G_1(s) + G_2(s)$ b) $G_1(s) / G_2(s)$
 - c) $G_1(s) G_2(s)$ d) $1 + G_1(s) G_2(s)$
- A node having only outgoing branches 7)
- a) Incoming node Output node b)
 - c) Input node d) Outgoing node
- The damping ratio and peak overshoot are measures of 8)
 - a) Relative stability c) Steady state error
- Speed of response b)
- Absolute stability d)

Max. Marks: 70

Marks: 14

Set





Seat

No.

	SLR-FM-731
	Set P
9)	Steady state accuracy is determined by suitable choice ofa) Steady errorb) Error constantsc) Dampingd) Transient error
10)	 In time domain, the settling time is the time it takes a) The system transients to diverge b) The system transients to decay c) The system to reach the vicinity of its new set point d) The systems to reach the max overshoot point
11)	For root loci which of the following are the starting pointa) Open loop zerosb) Closed loop zerosc) Open loop polesd) Closed loop poles
12)	Root locus is used to calculatea) Marginal stabilityb)b) Absolute stabilityc) Conditional stabilityd)c) Relative stability
13)	 Gain margin is a) It is a factor by which the system gain can be increased to drive it to the verge of instability b) It is calculated at gain cross over frequency c) It is calculated at phase cross over frequency d) Both a and c

- d) Both a and c
- 14) What should be the nature of bandwidth for a good control system?

- Small b)
- a) Largec) Medium d) All of the above

Seat No.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – I**

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

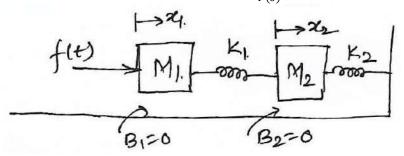
Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Use of only non-programmable calculator is allowed.

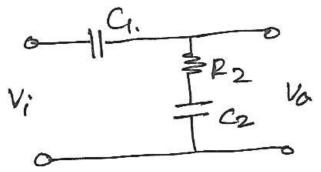
Section – I

Q.2 Solve any Four.

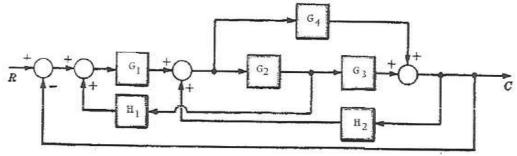
- Distinguish the open loop and closed loop control systems. a)
- For the mechanical system shown b)
 - 1) Draw the mechanical equivalent network
 - 2) Write the system differential equations
 - 3) Determine the transfer function $\frac{x_2(s)}{F(s)}$



c) Determine the T.F. for the electric network shown



d) For the block diagram shown, find C(s)/R(s) using block diagram reduction technique.



Max. Marks: 56

SLR-FM-731

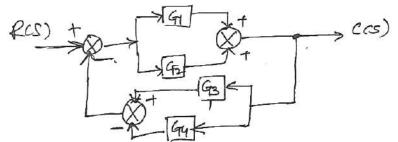
Set

Ρ

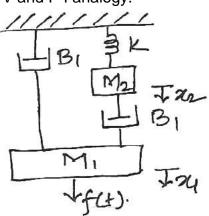
16



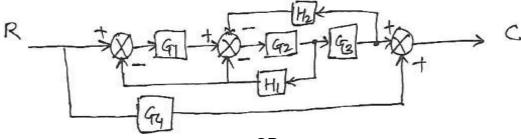
e) Obtain the Transfer Function C(s)/R(s).



Q.3 a) Draw equivalent mechanical system of the given system. Hence write the set of equilibrium equation for it and obtain electrical analogous circuit using F-V and F-I analogy.



b) Draw a SFG and find the closed loop transfer function of system as shown. 06



OR

Define sensitivity. Explain the effect of feedback on system parameters and system dynamics.

Section – II

Q.4 Solve any Four.

a) Determine the region of values for the parameter K so that the system is stable. Also compute the critical frequency of oscillation for the system with characteristic equation $s^4 + 7s^3 + 15s^2 + (25 + K)s + 2K = 0$.

b) A unity feedback system is given by $G(s) = \frac{K}{s(s+10)}$. Determine K so that the system will have damping ratio of 0.5. For this value of K, determine settling time, peak time and peak overshoot for a unit step input.

- c) Determine the breakaway point for a system with open loop transfer function $G(s) = \frac{K(s+1)}{s^2+4s+13}$
- d) Derive an expression for bandwidth of the closed loop control system.
- e) Derive the rise time and peak time for a second order underdamped system with unit step input.

16

SLR-FM-731

Set

Q.5 Solve any Two.

a) For the unity feedback system where $G(s) = \frac{5000}{s(s+75)}$

- 1) What is the expected percent overshoot for a unit step input?
- 2) What is the settling time for a unit step input?
- 3) What is the steady-state error for an input of 5u(t)?
- 4) What is the steady-state error for an input of 5tu(t)?
- 5) What is the steady-state error for an input of $5t^2u(t)$?
- **b)** Construct the Bode Plot for a unity feedback system whose OLTF is given by $G(s) = \frac{10}{s(1+s)(1+0.02s)}$. Also determine gain and phase crossover frequencies.
- **c)** Plot the root locus for the system with OLTF $G(s)H(s) = \frac{K}{s(s+6)(s^2+4s+13)}$ Show all the salient points on the locus.

Set P

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Duration: 30 Minutes

a)

Seat No.

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figure to the right indicates full marks.
- 3) Assume suitable data if necessary.
- 4) Use of only non-programmable calculator is allowed.

MCQ/Objective Type Questions

b)

Q.1 Choose the correct alternatives from the options and rewrite the sentence.

- The damping ratio and peak overshoot are measures of 1)
 - Relative stability a)

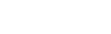
Steady error

- b) Speed of response c) Steady state error
 - d) Absolute stability

Error constants

- Steady state accuracy is determined by suitable choice of _____ 2)
 - Damping d) Transient error c)
- In time domain, the settling time is the time it takes _____. 3)
 - a) The system transients to diverge
 - The system transients to decay b)
 - c) The system to reach the vicinity of its new set point
 - d) The systems to reach the max overshoot point
- 4) For root loci which of the following are the starting point _
 - Closed loop zeros a) Open loop zeros b)
 - c) Open loop poles
- **Closed** loop poles d)
- Root locus is used to calculate ____ 5)
 - Marginal stability b) Absolute stability a)
 - Conditional stability Relative stability C) d)
- 6) Gain margin is
 - It is a factor by which the system gain can be increased to drive it to a) the verge of instability
 - It is calculated at gain cross over frequency b)
 - c) It is calculated at phase cross over frequency
 - d) Both a and c
- 7) What should be the nature of bandwidth for a good control system?
 - Large b) Small a)
 - Medium All of the above c) d)

SLR-FM-731



Max. Marks: 70

Marks: 14

14

a) Output is independent of control input b) Output is dependent on control input Only system parameters have effect on the control output c) d) None of the above A good control system has all the following features except _____. a) good stability b) slow response c) good accuracy d) sufficient power handling capacity As a result of introduction of negative feedback which of the following will not decrease? a) Band width Overall gain b) Instability c) Distortion d) A transfer function of a system is a Laplace transform of its .

- 11)
 - a) Square wave response

8)

9)

10)

- b) Step response
- c) Ramp response

In an open loop control system .

d) Impulse response

SLR-FM-731

Set Q

- 12) In a control system, the controller output is given to _
 - a) Sensor Comparator b)
 - d) **Final Control element**
- 13) Two blocks $G_1(s)$ and $G_2(s)$ can be cascaded to get resultant transfer function as ____
 - a) $G_1(s) + G_2(s)$ b) $G_1(s) / G_2(s)$
 - c) $G_1(s) G_2(s)$ d) $1 + G_1(s) G_2(s)$
- 14) A node having only outgoing branches
 - a) Incoming node c) Input node

c) Amplifier

- Output node b)
- d) Outgoing node

Seat No.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering CONTROL SYSTEM – I**

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

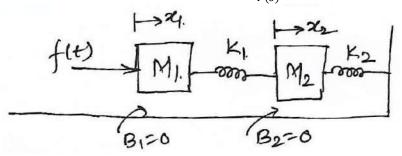
Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Use of only non-programmable calculator is allowed.

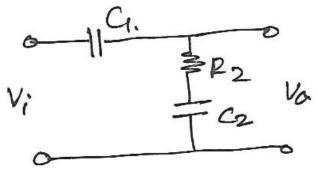
Section – I

Q.2 Solve any Four.

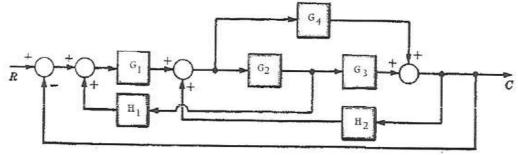
- Distinguish the open loop and closed loop control systems. a)
- For the mechanical system shown b)
 - 1) Draw the mechanical equivalent network
 - 2) Write the system differential equations
 - 3) Determine the transfer function $\frac{x_2(s)}{F(s)}$



c) Determine the T.F. for the electric network shown



d) For the block diagram shown, find C(s)/R(s) using block diagram reduction technique.

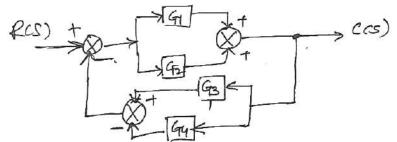


Max. Marks: 56

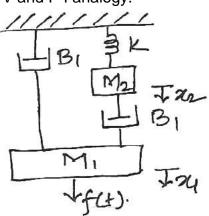
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16

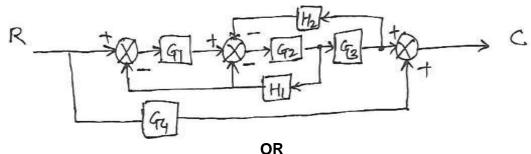
e) Obtain the Transfer Function C(s)/R(s).



Q.3 a) Draw equivalent mechanical system of the given system. Hence write the set of equilibrium equation for it and obtain electrical analogous circuit using F-V and F-I analogy.



b) Draw a SFG and find the closed loop transfer function of system as shown. 06



Define sensitivity. Explain the effect of feedback on system parameters and system dynamics.

Section – II

Q.4 Solve any Four.

a) Determine the region of values for the parameter K so that the system is stable. Also compute the critical frequency of oscillation for the system with characteristic equation $s^4 + 7s^3 + 15s^2 + (25 + K)s + 2K = 0$.

b) A unity feedback system is given by $G(s) = \frac{K}{s(s+10)}$. Determine K so that the system will have damping ratio of 0.5. For this value of K, determine settling time, peak time and peak overshoot for a unit step input.

- **c)** Determine the breakaway point for a system with open loop transfer function $G(s) = \frac{K(s+1)}{s^2+4s+13}$
- d) Derive an expression for bandwidth of the closed loop control system.
- e) Derive the rise time and peak time for a second order underdamped system with unit step input.

16

SLR-FM-731

Set | Q

SLR-FM-731 Set Q

Q.5 Solve any Two.

- **a)** For the unity feedback system where $G(s) = \frac{5000}{s(s+75)}$
 - 1) What is the expected percent overshoot for a unit step input?
 - 2) What is the settling time for a unit step input?
 - 3) What is the steady-state error for an input of 5u(t)?
 - 4) What is the steady-state error for an input of 5tu(t)?
 - 5) What is the steady-state error for an input of $5t^2u(t)$?
- **b)** Construct the Bode Plot for a unity feedback system whose OLTF is given by $G(s) = \frac{10}{s(1+s)(1+0.02s)}$. Also determine gain and phase crossover frequencies.
- **c)** Plot the root locus for the system with OLTF $G(s)H(s) = \frac{K}{s(s+6)(s^2+4s+13)}$ Show all the salient points on the locus.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figure to the right indicates full marks.
- 3) Assume suitable data if necessary.
- 4) Use of only non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In a control system, the controller output is given to _ 1)
 - Sensor a)
 - Amplifier C)
- Two blocks $G_1(s)$ and $G_2(s)$ can be cascaded to get resultant transfer 2) function as ____
 - a) $G_1(s) + G_2(s)$
 - c) $G_1(s) G_2(s)$ d)

A node having only outgoing branches 3) b)

- a) Incoming node
 - c) Input node d)
- 4) The damping ratio and peak overshoot are measures of _____
 - a) Relative stability b) Speed of response
 - c) Steady state error Absolute stability d)
- Steady state accuracy is determined by suitable choice of _____ 5)
 - Steady error b) Error constants a)
 - c) Damping d) Transient error
- In time domain, the settling time is the time it takes _____. 6)
 - The system transients to diverge a)
 - The system transients to decay b)
 - The system to reach the vicinity of its new set point c)
 - d) The systems to reach the max overshoot point
- 7) For root loci which of the following are the starting point _
 - a) Open loop zeros b) Closed loop zeros
 - c) Open loop poles Closed loop poles d)
- Root locus is used to calculate ____ 8) b) a) Marginal stability Absolute stability
 - c) Conditional stability Relative stability d)

SLR-FM-731

Set R

Marks: 14



Max. Marks: 70

Comparator b) d) **Final Control element**

- b) $G_1(s) / G_2(s)$ $1 + G_1(S) G_2(S)$
 - - Output node
 - Outgoing node

- 9) Gain margin is .
 - a) It is a factor by which the system gain can be increased to drive it to the verge of instability

SLR-FM-731

Set

- It is calculated at gain cross over frequency b)
- c) It is calculated at phase cross over frequency
- d) Both a and c
- What should be the nature of bandwidth for a good control system? 10)
 - Small a) Large b)
 - c) Medium All of the above d)
- 11) In an open loop control system ____
 - a) Output is independent of control input
 - b) Output is dependent on control input
 - c) Only system parameters have effect on the control output
 - d) None of the above
- A good control system has all the following features except _____. 12)
 - a) good stability
 - b) slow response
 - c) good accuracy
 - d) sufficient power handling capacity
- 13) As a result of introduction of negative feedback which of the following will not decrease?
 - a) Band width
- Overall gain b)
- c) Distortion d) Instability
- 14) A transfer function of a system is a Laplace transform of its .
 - a) Square wave response
- Step response b)
- c) Ramp response

- d) Impulse response

Seat No.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

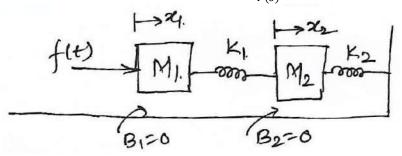
Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Use of only non-programmable calculator is allowed.

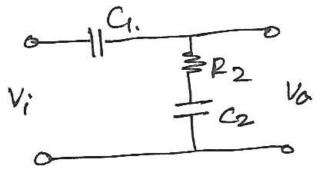
Section – I

Q.2 Solve any Four.

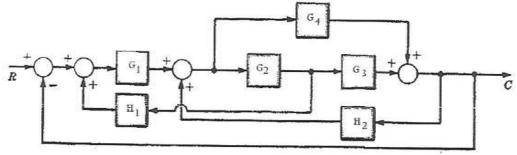
- a) Distinguish the open loop and closed loop control systems.
- b) For the mechanical system shown
 - 1) Draw the mechanical equivalent network
 - 2) Write the system differential equations
 - 3) Determine the transfer function $\frac{x_2(s)}{F(s)}$.



c) Determine the T.F. for the electric network shown



d) For the block diagram shown, find C(s)/R(s) using block diagram reduction technique.



Max. Marks: 56

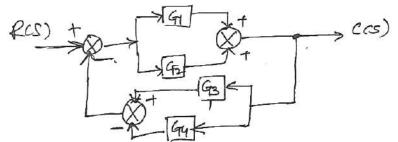
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SLR-FM-731

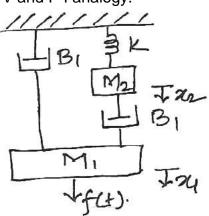
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R

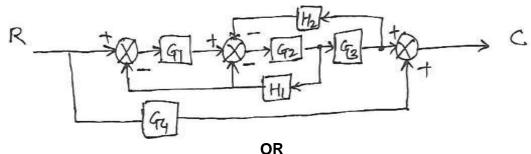
e) Obtain the Transfer Function C(s)/R(s).



Q.3 a) Draw equivalent mechanical system of the given system. Hence write the set of equilibrium equation for it and obtain electrical analogous circuit using F-V and F-I analogy.



b) Draw a SFG and find the closed loop transfer function of system as shown. 06



Define sensitivity. Explain the effect of feedback on system parameters and system dynamics.

Section – II

Q.4 Solve any Four.

a) Determine the region of values for the parameter K so that the system is stable. Also compute the critical frequency of oscillation for the system with characteristic equation $s^4 + 7s^3 + 15s^2 + (25 + K)s + 2K = 0$.

b) A unity feedback system is given by $G(s) = \frac{K}{s(s+10)}$. Determine K so that the system will have damping ratio of 0.5. For this value of K, determine settling time, peak time and peak overshoot for a unit step input.

- **c)** Determine the breakaway point for a system with open loop transfer function $G(s) = \frac{K(s+1)}{s^2+4s+13}$
- d) Derive an expression for bandwidth of the closed loop control system.
- e) Derive the rise time and peak time for a second order underdamped system with unit step input.

16

SLR-FM-731

Set | R

Q.5 Solve any Two.

a) For the unity feedback system where $G(s) = \frac{5000}{s(s+75)}$

- 1) What is the expected percent overshoot for a unit step input?
- 2) What is the settling time for a unit step input?
- 3) What is the steady-state error for an input of 5u(t)?
- 4) What is the steady-state error for an input of 5tu(t)?
- 5) What is the steady-state error for an input of $5t^2u(t)$?
- **b)** Construct the Bode Plot for a unity feedback system whose OLTF is given by $G(s) = \frac{10}{s(1+s)(1+0.02s)}$. Also determine gain and phase crossover frequencies.
- **c)** Plot the root locus for the system with OLTF $G(s)H(s) = \frac{K}{s(s+6)(s^2+4s+13)}$ Show all the salient points on the locus.

12

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Figure to the right indicates full marks.
- 3) Assume suitable data if necessary.
- 4) Use of only non-programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat No.

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- In time domain, the settling time is the time it takes _____. 1)
 - The system transients to diverge a)
 - The system transients to decay b)
 - c) The system to reach the vicinity of its new set point
 - d) The systems to reach the max overshoot point

For root loci which of the following are the starting point _____ 2)

- a) Open loop zeros Closed loop zeros b) Closed loop poles
- c) Open loop poles d)
- Root locus is used to calculate ____ 3)
 - a) Marginal stability b) Absolute stability
 - c) Conditional stability Relative stability d)
- 4) Gain margin is
 - a) It is a factor by which the system gain can be increased to drive it to the verge of instability
 - b) It is calculated at gain cross over frequency
 - c) It is calculated at phase cross over frequency
 - d) Both a and c
- What should be the nature of bandwidth for a good control system? 5)
 - a) Large Small b)
 - All of the above c) Medium d)
- In an open loop control system _____. 6)
 - a) Output is independent of control input
 - b) Output is dependent on control input
 - c) Only system parameters have effect on the control output
 - d) None of the above
- 7) A good control system has all the following features except _____.
 - a) good stability
 - b) slow response
 - good accuracy C)
 - d) sufficient power handling capacity

SLR-FM-731

Max. Marks: 70

Marks: 14

8) As a result of introduction of negative feedback which of the following will not decrease? a) Band width Overall gain b) d) Instability c) Distortion 9) A transfer function of a system is a Laplace transform of its _____. Square wave response b) Step response a) Ramp response d) Impulse response c) In a control system, the controller output is given to _____ 10) a) Sensor Comparator b) c) Amplifier d) **Final Control element** 11) Two blocks $G_1(s)$ and $G_2(s)$ can be cascaded to get resultant transfer function as ____ a) $G_1(s) + G_2(s)$ b) $G_1(s) / G_2(s)$ c) $G_1(s) G_2(s)$ d) $1 + G_1(s) G_2(s)$ 12) A node having only outgoing branches Incoming node Output node b) a) c) Input node d) Outgoing node 13) The damping ratio and peak overshoot are measures of _____ Relative stability Speed of response a) b) Steady state error d) Absolute stability c) 14) Steady state accuracy is determined by suitable choice of _____. Steady error b) Error constants a)

c)

SLR-FM-731

Set

S

Damping

d) Transient error

Seat No.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Time: 02:30 PM To 05:30 PM

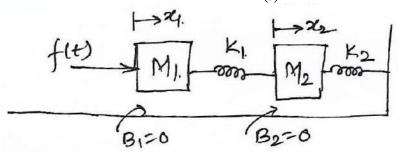
Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.
- 4) Use of only non-programmable calculator is allowed.

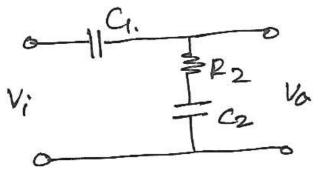
Section – I

Q.2 Solve any Four.

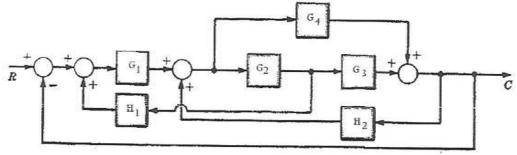
- a) Distinguish the open loop and closed loop control systems.
- b) For the mechanical system shown
 - 1) Draw the mechanical equivalent network
 - 2) Write the system differential equations
 - 3) Determine the transfer function $\frac{x_2(s)}{F(s)}$.



c) Determine the T.F. for the electric network shown



d) For the block diagram shown, find C(s)/R(s) using block diagram reduction technique.

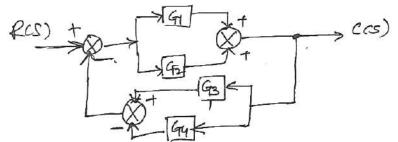


Max. Marks: 56

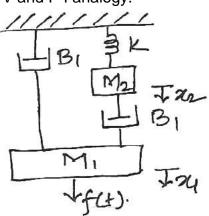
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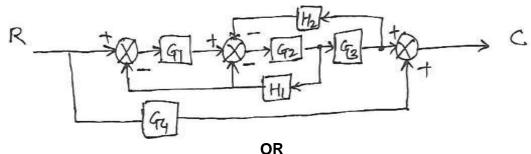
e) Obtain the Transfer Function C(s)/R(s).



Q.3 a) Draw equivalent mechanical system of the given system. Hence write the set of equilibrium equation for it and obtain electrical analogous circuit using F-V and F-I analogy.



b) Draw a SFG and find the closed loop transfer function of system as shown. 06



Define sensitivity. Explain the effect of feedback on system parameters and system dynamics.

Section – II

Q.4 Solve any Four.

a) Determine the region of values for the parameter K so that the system is stable. Also compute the critical frequency of oscillation for the system with characteristic equation $s^4 + 7s^3 + 15s^2 + (25 + K)s + 2K = 0$.

b) A unity feedback system is given by $G(s) = \frac{K}{s(s+10)}$. Determine K so that the system will have damping ratio of 0.5. For this value of K, determine settling time, peak time and peak overshoot for a unit step input.

- **c)** Determine the breakaway point for a system with open loop transfer function $G(s) = \frac{K(s+1)}{s^2+4s+13}$
- d) Derive an expression for bandwidth of the closed loop control system.
- e) Derive the rise time and peak time for a second order underdamped system with unit step input.

16

SLR-FM-731

Set S

Q.5 Solve any Two.

a) For the unity feedback system where $G(s) = \frac{5000}{s(s+75)}$

- 1) What is the expected percent overshoot for a unit step input?
- 2) What is the settling time for a unit step input?
- 3) What is the steady-state error for an input of 5u(t)?
- 4) What is the steady-state error for an input of 5tu(t)?
- 5) What is the steady-state error for an input of $5t^2u(t)$?
- **b)** Construct the Bode Plot for a unity feedback system whose OLTF is given by $G(s) = \frac{10}{s(1+s)(1+0.02s)}$. Also determine gain and phase crossover frequencies.
- **c)** Plot the root locus for the system with OLTF $G(s)H(s) = \frac{K}{s(s+6)(s^2+4s+13)}$ Show all the salient points on the locus.

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Set

	EN	T.E. (Part – I) (Old) (CGPA) Electrical GINEERING ECONOMICS A	Engin	eering	
-	& Dat	te: Friday, 13-12-2019 30 PM To 05:30 PM		Max. Marks:	70
Instr	uctio	ons: 1) Q. No.1 is compulsory and book.2) Figures to the right indicate		l be solved in first 30 minutes in answ arks.	ver
		MCQ/Objective	туре	Questions	
Dura	tion: 3	30 Minutes		Marks:	14
Q.1	Cho 1)	 bose the correct alternatives from Economics is the science which sa Moral things b) Human behavior with reference c) Only profits & loss in the bused d) Human psychology 	studies nce to h	·	14
	2)	PERT includes following a) Most likely time c) Optimistic time	b)	Pessimistic time all of above	
	3)	is utilization of organized i making.		tion for managerial decision	

- EOQ a) D) ABC MIS CPM c) d)
- 4) The break-even point represents ____

Seat

No.

- the most economical level of operation of any industry a)
- the time when unit can run without loss and profit b)
- time when industry will undergo loss C)
- the time when company can make maximum profits d)
- 5) Measures to tackle energy problem is _____.
 - To stepping up oil production a)
 - Control over consumption of coal b)
 - Expansion of electric power C)
 - d) All of the above
- 6) Function of Entrepreneur is
 - To bear risk & uncertainty a)
 - To increase co-ordination d) all of above C)
- is the father of principles of management. 7)
 - a) Peter Drucker c) William Hawtray
- b) Henry Fayol
- Joseph Schumpeter d)

To control and manage efficiently

- 8) Objective of Value Analysis ____
 - To increase profit a) C)
 - To reduce cost of product
- b) To increase efficiency
 - Both a) & c) d)

SLR-FM-732



b)

source would be cheaper and suitable _____? b) Solar power Tidal power a) Wind Power d) none of the above C) Improved technology shall bring about _____. 10) Increase in cost of Production a) Increase in Demand b) Increase in scale of production c) d) None of the above 11) technology is suitable for SSI. Labour intensive a) b) Complex technology Capital intensive d) No Technology C) Entrepreneurship development means and includes _____. 12) a) Creation of jobs for unemployed Starting new ventures b) Giving opportunities and facilities to entrepreneurs C) Imposing many new taxes on entrepreneurs d) 13) GST means _____ Growth Sales Tax b) Gross Sale Tax a) Goods & Service Tax d) Good Sale Tax c) Demonetization announced by Government of India on _ 14) 31st December 2016 b) 8th November 2016 a) 8th December 2016 d) 1st April 2016 c)

For growing needs of power sector in the country; which of the following

9)

SLR-FM-732

Set | P

Sea No.	t	Set	Ρ		
	T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT				
	& Da	te: Friday, 13-12-2019 Max. Marks 30 PM To 05:30 PM	s: 56		
Instr	uctio	2) Figure to the right indicates full marks.			
		Section – I			
Q.2	Wri a) b) c) d) e)	te short notes. (any four) Micro & Macro Economics Types of Energy Sources Private and Public limited company Characteristics Economic Order Quantity Payback Period	16		
Q.3	a) b)	Explain in detail Features of Indian Economy. Distinguish between Macro Economy and Micro Economy. Explain in detail the indicators of Macro Economy and Micro Economy. OR Discuss the different forms of Business organization.	06 06		
Q.4	Wri a) b) c) d) e)	te short notes. (any four) Key factors regarding location of Factory Functions of Management Characteristics of Good Management Information System Provisions in Factory Act Advantages of Small Scale Industry	16		
Q.5	List	the stages of setting of SSI.	06		
Q.6		lain PERT and CPM methods with suitable example. OR	06		
	Dise repe	cuss Functions of Entrepreneur. Explain the contents of Detailed project			

report.

Seat No.									Set	Q	
	EN			Electric	al Engin	nee	nation Nov/Dec- ring JSTRIAL MANA		NT		
	& Date	e: Fri	day, 13-12-2 To 05:30 P	2019				Max.		: 70	
Instru	uctio		book.	compulsory a the right indica			e solved in first 30 n	ninutes	in ans	wer	
				MCQ/Object	tive Type	Qu	estions				
Durat	tion: 3	30 Mir	nutes						Marks	: 14	
Q.1	Cho 1)		ective of Val To increase	ue Analysis	 b)	To	ons and rewrite the o increase efficiency oth a) & c)		nce.	14	
	2)		• •	e cheaper and	suitable _	So	ountry; which of the ? olar power one of the above	e followir	ng		
	3)	Impi a) b) c) d)	Increase in Increase in	scale of produ	ction						
	4)	a) c)	Labour inte Capital inte		for SSI. b) d)		omplex technology o Technology				
	5)	Entr a) b) c) d)	Creation of Starting new Giving oppo	jobs for unem	ployed facilities to	o er					
	6)	GST	means								

- Growth Sales Tax b) Gross Sale Tax a)
- C) Goods & Service Tax d) Good Sale Tax
- Demonetization announced by Government of India on _____. 7) b) 8th November 2016
 - a) 31st December 2016 d) 1st April 2016
 - c) 8th December 2016
- 8) Economics is the science which studies _____.
 - Moral things a)
 - b) Human behavior with reference to human needs and its means
 - Only profits & loss in the business c)
 - d) Human psychology

Seat No.

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3)

4)

- 9) PERT includes following _____.
 - a) Most likely time
- b) Pessimistic time

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Set Q

- c) Optimistic time
- d) all of above
- 10) _____ is utilization of organized information for managerial decision making.
 - a) EOQ b) ABC
 - c) MIS d) CPM
- 11) The break-even point represents _____
 - a) the most economical level of operation of any industry
 - b) the time when unit can run without loss and profit
 - c) time when industry will undergo loss
 - d) the time when company can make maximum profits
- 12) Measures to tackle energy problem is _____.
 - a) To stepping up oil production
 - b) Control over consumption of coal
 - c) Expansion of electric power
 - d) All of the above
- 13) Function of Entrepreneur is _
 - a) To bear risk & uncertainty
 - c) To increase co-ordination
- 14) _____ is the father of principles of management.
 - a) Peter Drucker
 - c) William Hawtray
- d) all of above

b) To control and manage efficiently

- b) Henry Fayol
- d) Joseph Schumpeter

			-			
Sea No.	t	Set	Q			
	T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT					
	& Da	te: Friday, 13-12-2019 Max. Marks 30 PM To 05:30 PM	56			
Instr	uctio	ons: 1) All questions are compulsory.2) Figure to the right indicates full marks.				
		Section – I				
Q.2	Wri a) b) c) d) e)	te short notes. (any four) Micro & Macro Economics Types of Energy Sources Private and Public limited company Characteristics Economic Order Quantity Payback Period	16			
Q.3	a) b)	Explain in detail Features of Indian Economy. Distinguish between Macro Economy and Micro Economy. Explain in detail the indicators of Macro Economy and Micro Economy. OR Discuss the different forms of Business organization.	06 06			
Q.4	Wri a) b) c) d) e)	te short notes. (any four) Key factors regarding location of Factory Functions of Management Characteristics of Good Management Information System Provisions in Factory Act Advantages of Small Scale Industry	16			
Q.5	List	the stages of setting of SSI.	06			
Q.6		lain PERT and CPM methods with suitable example. OR	06			
	Dise	cuss Functions of Entrepreneur. Explain the contents of Detailed project				

report.

	EN	T.E. (Part – I) (Old) (CGPA) Electrical E GINEERING ECONOMICS AN	
		te: Friday, 13-12-2019 30 PM To 05:30 PM	Max. Marks: 70
Inst	ructic	ns: 1) Q. No.1 is compulsory and s book. 2) Figures to the right indicate fu	hould be solved in first 30 minutes in answer Ill marks.
		MCQ/Objective	Type Questions
Dura	ation:	30 Minutes	Marks: 14
Q.1	Cho 1)	 ose the correct alternatives from the Measures to tackle energy problem a) To stepping up oil production b) Control over consumption of c c) Expansion of electric power d) All of the above 	
	2)	Function of Entrepreneur is a) To bear risk & uncertainty	 b) To control and manage efficiently

- a) To bear risk & uncertainty
 - To increase co-ordination C)
- is the father of principles of management. 3)
 - a) Peter Drucker
 - c) William Hawtray d)
- Objective of Value Analysis ____ 4)
 - To increase profit a) To reduce cost of product C)
- b) To increase efficiency d) Both a) & c)
- 5) For growing needs of power sector in the country; which of the following source would be cheaper and suitable ?
 - Tidal power b) Solar power a)
 - c) Wind Power d) none of the above
- 6) Improved technology shall bring about
 - Increase in cost of Production a)
 - Increase in Demand b)
 - Increase in scale of production C)
 - d) None of the above
- 7) technology is suitable for SSI.
 - a) Labour intensive b) Complex technology d) No Technology
 - Capital intensive C)
- 8) Entrepreneurship development means and includes _____.
 - Creation of jobs for unemployed a)
 - Starting new ventures b)
 - Giving opportunities and facilities to entrepreneurs C)
 - Imposing many new taxes on entrepreneurs d)

SLR-FM-732

Seat No.

- d) all of above
- b) Henry Fayol
- Joseph Schumpeter

SLR-FM-732 Set R

- 9) GST means _____.
 - a) Growth Sales Tax
- b) Gross Sale Tax
- c) Goods & Service Tax
- d) Good Sale Tax
- 10) Demonetization announced by Government of India on _____
 - a) 31st December 2016
- b) 8th November 2016

____-

- c) 8th December 2016
- d) 1st April 2016

b) Pessimistic time

- 11) Economics is the science which studies _____.
 - a) Moral things

c)

- b) Human behavior with reference to human needs and its means
- c) Only profits & loss in the business
- d) Human psychology

12) PERT includes following _____.

- a) Most likely time
 - Optimistic time d) all of above
- 13) _____ is utilization of organized information for managerial decision making.
 - a) EOQ b) ABC
 - c) MIS d) CPM
- 14) The break-even point represents _____
 - a) the most economical level of operation of any industry
 - b) the time when unit can run without loss and profit
 - c) time when industry will undergo loss
 - d) the time when company can make maximum profits

Seat No.	t	Set	R			
	T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT					
_						
		te: Friday, 13-12-2019 Max. Marks 30 PM To 05:30 PM	56 56			
Instr	uctio	ons: 1) All questions are compulsory.2) Figure to the right indicates full marks.				
		Section – I				
Q.2	Wri a) b) c) d) e)	te short notes. (any four) Micro & Macro Economics Types of Energy Sources Private and Public limited company Characteristics Economic Order Quantity Payback Period	16			
Q.3	a) b)	Explain in detail Features of Indian Economy. Distinguish between Macro Economy and Micro Economy. Explain in detail the indicators of Macro Economy and Micro Economy. OR Discuss the different forms of Business organization.	06 06			
Q.4	Wri a) b) c) d) e)	te short notes. (any four) Key factors regarding location of Factory Functions of Management Characteristics of Good Management Information System Provisions in Factory Act Advantages of Small Scale Industry	16			
Q.5	List	the stages of setting of SSI.	06			
Q.6		plain PERT and CPM methods with suitable example. OR	06			
	Dise	cuss Functions of Entrepreneur. Explain the contents of Detailed project				

report.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day & Date: Friday, 13-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No.1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - Improved technology shall bring about . 1)
 - Increase in cost of Production a)
 - Increase in Demand b)
 - Increase in scale of production c)
 - d) None of the above
 - 2) technology is suitable for SSI.
 - a) Labour intensive
 - Capital intensive c)
 - 3) Entrepreneurship development means and includes .
 - a) Creation of jobs for unemployed
 - Starting new ventures b)
 - Giving opportunities and facilities to entrepreneurs c)
 - Imposing many new taxes on entrepreneurs d)
 - 4) GST means
 - a) Growth Sales Tax
 - b) Gross Sale Tax Goods & Service Tax d) Good Sale Tax C)
 - Demonetization announced by Government of India on _____ 5)
 - a) 31st December 2016 b) 8th November 2016
 - c) 8th December 2016 d) 1st April 2016
 - 6) Economics is the science which studies _____.
 - Moral things a)
 - Human behavior with reference to human needs and its means b)
 - Only profits & loss in the business C)
 - d) Human psychology
 - 7) PERT includes following
 - Most likely time b) Pessimistic time a)
 - Optimistic time d) all of above c)

_ is utilization of organized information for managerial decision 8) making.

a)	EOQ	b)	ABC
C)	MIS	d)	CPM

SLR-FM-732

Max. Marks: 70



Marks: 14

- b) Complex technology
- d) No Technology

- 9) The break-even point represents _____.
 - the most economical level of operation of any industry a)
 - the time when unit can run without loss and profit b)
 - time when industry will undergo loss C)
 - the time when company can make maximum profits d)
- Measures to tackle energy problem is _____. 10)
 - To stepping up oil production a)
 - b) Control over consumption of coal
 - c) Expansion of electric power
 - d) All of the above
- 11) Function of Entrepreneur is _
 - To bear risk & uncertainty a)
 - To increase co-ordination C)
- 12) _ is the father of principles of management.
 - Peter Drucker a)
 - c) William Hawtray
- 14) Objective of Value Analysis _____.
 - To increase profit a)
 - To reduce cost of product C)
- 9) For growing needs of power sector in the country; which of the following source would be cheaper and suitable ?
 - a) Tidal power

c)

b) Solar power

d) Both a) & c)

- Wind Power
- d) none of the above

- d) all of above
- - b) To control and manage efficiently

SLR-FM-732

Set S

- b) Henry Fayol
- d) Joseph Schumpeter

b) To increase efficiency

			U -		
Sea No.	t	Set	S		
	T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT				
Day		te: Friday, 13-12-2019 Max. Marks	56 :		
Time	e: 02:	30 PM To 05:30 PM			
Instr	uctio	2) All questions are compulsory.2) Figure to the right indicates full marks.			
		Section – I			
Q.2	Wri a) b) c) d) e)	te short notes. (any four) Micro & Macro Economics Types of Energy Sources Private and Public limited company Characteristics Economic Order Quantity Payback Period	16		
Q.3	, а) b)	Explain in detail Features of Indian Economy. Distinguish between Macro Economy and Micro Economy. Explain in detail the indicators of Macro Economy and Micro Economy. OR Discuss the different forms of Business organization.	06 06		
Q.4	Wri a) b) c) d) e)	te short notes. (any four) Key factors regarding location of Factory Functions of Management Characteristics of Good Management Information System Provisions in Factory Act Advantages of Small Scale Industry	16		
Q.5	List	the stages of setting of SSI.	06		
Q.6		lain PERT and CPM methods with suitable example. OR	06		
	Dis rep	cuss Functions of Entrepreneur. Explain the contents of Detailed project			

report.

Seat No.			Set	Ρ
	T.E. (Part – I) (Old) (CGP Electrica ELECTROMAGI	al Engine	ering	
•	Pate: Monday, 16-12-2019 2:30 PM To 05:30 PM		Max. Mark	s: 70
Instruct	t ions: 1) Q. No. 1 is compulsory an book. 2) Figures to the right indicat			swer
	MCQ/Objecti			
Duratior	n: 30 Minutes	ve type (Mark	s: 14
	hoose the correct alternatives fr	-	tions.	14
1)	$\nabla \times H = (\sigma + j\omega\varepsilon)E$ is for a) Time varying field c) Harmonically varying field	b)		
2)	For static magnetic field a) $\nabla \times B = \rho$ c) $\nabla \cdot B = \mu o J$	b)	$ abla \times B = \mu J$ $ abla \times B = 0$	
3)	Displacement current density i a) D c) ∂D / ∂t	b)	J ∂J / ∂t	
4)	Energy shared in a magneto s	tatic field is	·	
	a) $\frac{1}{4}\mu H^2$	b)	$\frac{1}{4}\mu H$	
	c) $\frac{1}{2}\mu H^2$	d)	None of these	
5)	The unit of magnetic susceptib			
	a) Nil c) H/M	b) d)	Amp Wb	
6)		o coils is _	;	
	a) $M = \frac{N2\Phi 1}{I1}$	b)	$M = \frac{N1\Phi2}{I2}$	
	c) $M = \frac{N111}{\Phi 1}$	d)	$M = \frac{N111}{\Phi 2}$	
7)	Ampere's circuital law in differe a) ∇ × H = J c) ∇ × H = I	ential form i b) d)	is $\nabla \cdot H = J$ $\nabla \cdot H = I$	
8)				
	a) $\sqrt{x^2 + y^2}$ c) $\tan^{-1}(y/x)$	b) d)	$\sqrt{x^2 + y^2 + z^2}$ None	

9) Find the nature of the given vector field defined by

 $A = 30a_x - 2xy a_y + 5xz^2a_z$

- Neither Solenoidal nor irrotational a)
- b) Solenoidal & irrotational
- c) Only Solenoidal
- d) Only irrotational
- 10) Consider the following statements regarding field boundary conditions
 - i) The tangential component of electric field is continuous across the boundary between two dielectrics.
 - The tangential component of electric field at a dielectric conductor ii) boundary is non -zero.
 - iii) The discontinuity in the normal component of the flux density at a dielectric conductor boundary is equal to the surface charge density on the conductor.
 - iv) The normal component of the flux density is continuous across the charge free boundary between two dielectrics. Of these statements
 - i), ii) & iii) are correct a) i), ii) & iv) are correct
- ii), iii) & iv) are correct b) i), iii) & iv) are correct d)

SLR-FM-733

Set F

- 11) Capacitance C of parallel plate capacitor is
 - $\epsilon A / d^2$ a) $\epsilon A / d$ b) c) $\epsilon A^2/d$ $\epsilon A / s^2$ d)
- 12) The Electric charges are _____.
 - Conserved i)

C)

- Quantised ii)
- Exist in pair iii)
- Have circular field iv)
- i) only b) a)
- i), ii), iii) i), iv) d) c)
- The Work in Moving charge between two points depending on _____. 13)
 - Q,E, and the path b)
 - c) Q and E Only

a) The Path Only

d) Q,E, and the end point

i), ii)

- 14) The surface over which Gauss's law is applied must be _____.
 - Open a) Ps c)

- Closed b) none of these
- d)

SLR-FM-733

Seat	
No.	

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any three

- a) Derive Expression for capacitance of parallel plate Capacitor.
- b) Derive Expression for find potential due to infinite Line charge.
- c) Explain Electric Dipole and derive Expression for E.
- **d**) Transform the given vector $\bar{A} = 3\bar{a}_x 2\bar{a}_y 3\bar{a}_z at p$ (-2, -3, 4) into spherical coordinate.
- e) A charge of uniform density $\rho s = 0.3 \ nC \ / \ m^2$ covering the plane 2x 3y + z = 6. Find \overline{E} on the side of the plane containing the Origin.

Q.3 Solve any two.

- a) Explain Boundary Condition for Electrostatic Field? Conductor free space Boundary.
- **b)** Find the work done in moving a point charge $Q = 5 \,\mu C$ from (0,0,0) to $(2, \pi / 4, \pi / 2)$ in the field $\overline{E} = 5 \, e^{-r/4} \overline{a}_r + \frac{10}{r \sin \theta} \overline{a}_{\Phi} v/m$.
- c) Derive expression on electric field due to infinite sheet charge.

Section – II

Q.4 Solve any three.

- a) A current filament of 5.0 A in a_y direction is parallel to y axis at x= 2,z= 2. Find \overline{H} at origin.
- **b)** State and prove Ampere's work law.
- c) Derive the Lorentz force equation for moving charge which consist both electric and magnetic field.
- d) State the Maxwell's equation in point form for static electric fields.
- e) Explain the different types of magnetic material with suitable example according to the nature of material.

Q.5 Solve any two.

a) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = (y^2 z/x)\overline{a}_x + (0.5y^2 z^2/x^2)\overline{a}_z$$

Also find current in the a_y direction crossing the square surface in the plane y = 2 bounded by x = z = 1 & x = z = 2.

- **b)** Derive the Maxwell's equation in point and integral form from Gauss's law for time varying field.
- c) Let $\mu_1 = 4 \mu_0$ H/m in the region 1 where z > 0 while $\mu_2 = 7\mu_0$ H/m wherever z < 0. In region 1 the magnetic flux density $\bar{B}_1 = 2\bar{a}_x 3\bar{a}_y + 2\bar{a}_z$ (mT), surface current density is 60 \bar{a}_x A/m on the surface Z = 0. Find the value of H_{t2} in region 2.

Max. Marks: 56

16

12

12

16

Seat No. T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering**

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

ELECTROMAGNETIC ENGINEERING

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

b)

 $\sqrt{x^2 + v^2 + z^2}$

None

Q.1 Choose the correct alternatives from the options.

- 1) r' in cylindrical Coordinate _____.
 - a) $\sqrt{x^2 + v^2}$

Duration: 30 Minutes

- c) $\tan^{-1}(y/x)$ d)
- Find the nature of the given vector field defined by 2)
 - $A = 30a_x 2xy a_y + 5xz^2a_z$
 - a) Neither Solenoidal nor irrotational
 - b) Solenoidal & irrotational
 - c) Only Solenoidal
 - d) Only irrotational
- 3) Consider the following statements regarding field boundary conditions
 - i) The tangential component of electric field is continuous across the boundary between two dielectrics.
 - The tangential component of electric field at a dielectric conductor ii) boundary is non -zero.
 - The discontinuity in the normal component of the flux density at a iii) dielectric conductor boundary is equal to the surface charge density on the conductor.
 - The normal component of the flux density is continuous across the iv) charge free boundary between two dielectrics. Of these statements
 - i), ii) & iii) are correct ii), iii) & iv) are correct b) a)
 - i), ii) & iv) are correct d) i), iii) & iv) are correct C)
- 4) Capacitance C of parallel plate capacitor is _
 - $\epsilon A / d^2$ a) $\epsilon A / d$ b) c) $\epsilon A^2/d$ $\epsilon A / s^2$ d)
- The Electric charges are . 5)
 - Conserved i)
 - Quantised ii)
 - iii) Exist in pair
 - Have circular field iv)
 - i) only a) b) i), ii)
 - i), iv) C)
- d) i), ii), iii)



Set

Max. Marks: 70

14

C)	The Mort in Maying charge between t	ve pointe dependi	
6)	, ,	Q,E, and the Q,E , and the Q,E , and the Q,E , and the Q,E	oath
7)	, .	applied must be _) Closed) none of these	
8)	,) Static field) None-time va	rying field
9)	$(\mathbf{C}) \nabla \mathbf{B} = \mathbf{u} \mathbf{O} \mathbf{I}$) $\nabla \times B = \mu J$) $\nabla \times B = 0$	
10)	Displacement current density is a) D c) $\partial D / \partial t$) J) ∂J / ∂t	
11)	4 · 1	t is b) $\frac{1}{4}\mu$ H d) None of these)
12)) Amp) Wb	
13)	11	$M = \frac{N1\Phi 2}{I2}$	
14)	Ampere's circuital law in differential fo a) $\nabla \times H = J$	d) $M = \frac{N1I1}{\Phi 2}$ m is) $\nabla . H = J$) $\nabla . H = I$	

SLR-FM-733

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Set Q

Seat	
No.	

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any three

- a) Derive Expression for capacitance of parallel plate Capacitor.
- b) Derive Expression for find potential due to infinite Line charge.
- c) Explain Electric Dipole and derive Expression for E.
- **d**) Transform the given vector $\bar{A} = 3\bar{a}_x 2\bar{a}_y 3\bar{a}_z at p$ (-2, -3, 4) into spherical coordinate.
- e) A charge of uniform density $\rho s = 0.3 \ nC \ / \ m^2$ covering the plane 2x 3y + z = 6. Find \overline{E} on the side of the plane containing the Origin.

Q.3 Solve any two.

- a) Explain Boundary Condition for Electrostatic Field? Conductor free space Boundary.
- **b)** Find the work done in moving a point charge $Q = 5 \,\mu C$ from (0,0,0) to $(2, \pi / 4, \pi / 2)$ in the field $\overline{E} = 5 \, e^{-r/4} \overline{a}_r + \frac{10}{r \sin \theta} \overline{a}_{\Phi} v/m$.
- c) Derive expression on electric field due to infinite sheet charge.

Section – II

Q.4 Solve any three.

- a) A current filament of 5.0 A in a_y direction is parallel to y axis at x= 2,z= 2. Find \overline{H} at origin.
- **b)** State and prove Ampere's work law.
- c) Derive the Lorentz force equation for moving charge which consist both electric and magnetic field.
- d) State the Maxwell's equation in point form for static electric fields.
- e) Explain the different types of magnetic material with suitable example according to the nature of material.

Q.5 Solve any two.

a) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = (y^2 z/x)\overline{a}_x + (0.5y^2 z^2/x^2)\overline{a}_z$$

Also find current in the a_y direction crossing the square surface in the plane y = 2 bounded by x = z = 1 & x = z = 2.

- **b)** Derive the Maxwell's equation in point and integral form from Gauss's law for time varying field.
- c) Let $\mu_1 = 4 \mu_0$ H/m in the region 1 where z > 0 while $\mu_2 = 7\mu_0$ H/m wherever z < 0. In region 1 the magnetic flux density $\bar{B}_1 = 2\bar{a}_x 3\bar{a}_y + 2\bar{a}_z$ (mT), surface current density is 60 \bar{a}_x A/m on the surface Z = 0. Find the value of H_{t2} in region 2.

Max. Marks: 56

16

12

12

	1						
Seat No.			Set R				
T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING							
		: Monday, 16-12-2019 PM To 05:30 PM	Max. Marks: 70				
Instru	ctions	 s: 1) Q. No. 1 is compulsory and should be solved in book. 2) Figures to the right indicates full marks. 	first 30 minutes in answer				
Duratio	on: 30	MCQ/Objective Type Questions O Minutes	Marks: 14				
		se the correct alternatives from the options.	14				
		The unit of magnetic susceptibility is	14				
		a) Nil b) Amp c) H/M d) Wb					
2	2)	Mutual inductance between two coils is					
		a) $M = \frac{N2\Phi 1}{I1}$ b) $M = \frac{N1\Phi 2}{I2}$) - -				
	1	c) $M = \frac{N1I1}{\Phi 1}$ d) $M = \frac{N1I1}{\Phi 2}$					
3		Ampere's circuital law in differential form is					
		a) $\nabla \times H = J$ b) $\nabla \cdot H = J$ c) $\nabla \times H = I$ d) $\nabla \cdot H = I$					
2		r' in cylindrical Coordinate a) $\sqrt{x^2+y^2}$ b) $\sqrt{x^2+y^2}$.	$\overline{+z^2}$				
	(c) $\tan^{-1}(y/x)$ d) None					
Ę	5) 	Find the nature of the given vector field defined by $A = 30a_x - 2xy a_y + 5xz^2a_z$ a) Neither Solenoidal nor irrotational b) Solenoidal & irrotational c) Only Solenoidal d) Only irrotational					
6	6) (Consider the following statements regarding field bou	undary conditions				
	i	 The tangential component of electric field is con boundary between two dielectrics 	tinuous across the				
	i	ii) boundary between two dielectrics.ii) The tangential component of electric field at a d boundary is non –zero.	ielectric - conductor				
iii) The discontinuity in the normal component of the flux density at a dielectric conductor boundary is equal to the surface charge density							
	i	 on the conductor. iv) The normal component of the flux density is cor charge free boundary between two dielectrics. Or 					
		a) i), ii) & iii) are correct b) ii), iii) & iv)	are correct				

Page **7** of **12**

Set R 7) Capacitance C of parallel plate capacitor is _ $\epsilon A / d^2$ a) $\epsilon A / d$ b) c) $\epsilon A^2/d$ $\epsilon A / s^2$ d) The Electric charges are _____. 8) Conserved i) ii) Quantised iii) Exist in pair Have circular field iv) a) i) only b) i), ii) i), iv) d) i), ii), iii) C) The Work in Moving charge between two points depending on _____. 9) The Path Only b) Q,E, and the path a) c) Q and E Only Q,E, and the end point d) 10) The surface over which Gauss's law is applied must be _____. a) Open Closed b) c) Ps d) none of these 11) $\nabla \times H = (\sigma + j\omega\varepsilon)E$ is for _____. a) Time varying field b) Static field c) Harmonically varying field None-time varying field d) For static magnetic field _____. 12) b) $\nabla \times B = \mu J$ a) $\nabla \times B = \rho$ c) $\nabla \cdot B = \mu o J$ $\nabla \times B = 0$ d) 13) Displacement current density is _ b) J a) D c) $\partial D / \partial t$ d) $\partial J / \partial t$ 14) Energy shared in a magneto static field is _ a) $\frac{1}{4}\mu H^2$ 1 $\overline{4}^{\mu H}$ b) c) $\frac{1}{2}\mu H^2$ None of these d)

Seat	
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T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any three

- a) Derive Expression for capacitance of parallel plate Capacitor.
- b) Derive Expression for find potential due to infinite Line charge.
- c) Explain Electric Dipole and derive Expression for E.
- **d**) Transform the given vector $\bar{A} = 3\bar{a}_x 2\bar{a}_y 3\bar{a}_z at p$ (-2, -3, 4) into spherical coordinate.
- e) A charge of uniform density $\rho s = 0.3 \ nC \ / \ m^2$ covering the plane 2x 3y + z = 6. Find \overline{E} on the side of the plane containing the Origin.

Q.3 Solve any two.

- a) Explain Boundary Condition for Electrostatic Field? Conductor free space Boundary.
- **b)** Find the work done in moving a point charge $Q = 5 \,\mu C$ from (0,0,0) to $(2, \pi / 4, \pi / 2)$ in the field $\overline{E} = 5 \, e^{-r/4} \overline{a}_r + \frac{10}{r \sin \theta} \overline{a}_{\Phi} v/m$.
- c) Derive expression on electric field due to infinite sheet charge.

Section – II

Q.4 Solve any three.

- a) A current filament of 5.0 A in a_y direction is parallel to y axis at x= 2,z= 2. Find \overline{H} at origin.
- **b)** State and prove Ampere's work law.
- c) Derive the Lorentz force equation for moving charge which consist both electric and magnetic field.
- d) State the Maxwell's equation in point form for static electric fields.
- e) Explain the different types of magnetic material with suitable example according to the nature of material.

Q.5 Solve any two.

a) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = (y^2 z/x) \overline{a}_x + (0.5y^2 z^2/x^2) \overline{a}_z$$

Also find current in the a_y direction crossing the square surface in the plane y = 2 bounded by x = z = 1 & x = z = 2.

- **b)** Derive the Maxwell's equation in point and integral form from Gauss's law for time varying field.
- c) Let $\mu_1 = 4 \mu_0$ H/m in the region 1 where z > 0 while $\mu_2 = 7\mu_0$ H/m wherever z < 0. In region 1 the magnetic flux density $\bar{B}_1 = 2\bar{a}_x 3\bar{a}_y + 2\bar{a}_z$ (mT), surface current density is 60 \bar{a}_x A/m on the surface Z = 0. Find the value of H_{t2} in region 2.

Max. Marks: 56

16

12

12

Set

Max. Marks: 70

No.	
Seat	

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering** ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

- Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.
 - 2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- 1) Consider the following statements regarding field boundary conditions
 - i) The tangential component of electric field is continuous across the boundary between two dielectrics.
 - ii) The tangential component of electric field at a dielectric - conductor boundary is non -zero.
 - iii) The discontinuity in the normal component of the flux density at a dielectric conductor boundary is equal to the surface charge density on the conductor.
 - The normal component of the flux density is continuous across the iv) charge free boundary between two dielectrics. Of these statements
 - i), ii) & iii) are correct b) ii), iii) & iv) are correct a) i), iii) & iv) are correct
 - i), ii) & iv) are correct d) C)
- 2) Capacitance C of parallel plate capacitor is _____.

		 •	•		
a)	εA / d		b) $\epsilon A / d^2$	2
\sim	a 12/d		4	$\lambda = A / a^2$	2

- c) $\epsilon A^2/d$ d) $\epsilon A / s^2$
- 3) The Electric charges are _____.
 - Conserved i)
 - ii) Quantised
 - Exist in pair iii)
 - Have circular field iv)
 - i) only i), ii) a) b) i), iv) i), ii), iii) d) c)
- The Work in Moving charge between two points depending on _____. 4)
 - a) The Path Only c) Q and E Only
- Q.E. and the path b)
 - d) Q,E, and the end point
- 5) The surface over which Gauss's law is applied must be _____.
 - a) Open c) Ps

- Closed b)
- none of these d)
- 6) $\nabla \times H = (\sigma + j\omega\varepsilon)E$ is for ____
 - a) Time varying field
 - c) Harmonically varying field
- b) Static field
- d) None-time varying field

Marks: 14

7)	For static magnetic field		
	a) $\nabla \times B = \rho$		$\nabla \times \mathbf{B} = \mu \mathbf{J}$
	c) $\nabla \cdot B = \mu o J$	a)	$\nabla \times \mathbf{B} = 0$
8)	Displacement current density is	·	
	a) D	b)	J
	c) $\partial D / \partial t$,	<i>∂J / ∂t</i>
9)	Energy shared in a magneto static fi	eld is	·
	a) $\frac{1}{4}\mu H^2$	b)	$\frac{1}{4}\mu H$
	c) $\frac{1}{2}\mu H^2$	d)	None of these
10)	The unit of magnetic susceptibility is		
10)	a) Nil	b)	 Amp
	c) H/M Mutual inductance between two coils a) $M = \frac{N2\Phi 1}{I1}$	d)	Wb
11)	Mutual inductance between two coils	s is	
,	N2Φ1	ـــــــــــــــــــــــــــــــــــــ	Ν1Φ2
	a) $M = \frac{11}{11}$	D)	M = -I2
	c) $M = \frac{N1I1}{\Phi 1}$	d)	$M = \frac{N1I1}{\Phi 2}$
	c) $M = \frac{1}{\Phi 1}$	u)	$M = \frac{1}{\Phi^2}$
12)	Ampere's circuital law in differential	form	is
	a) $\nabla \times H = J$	b)	$\nabla . H = J$
	c) $\nabla \times H = I$	d)	$\nabla \cdot \mathbf{H} = \mathbf{I}$
13)	r' in cylindrical Coordinate		
	a) $\sqrt{x^2 + y^2}$	b)	$\sqrt{x^2 + y^2 + z^2}$
	c) $\tan^{-1}(y/x)$	d)	None
14)	Find the nature of the given vector fi	eld d	efined by
	$A = 30a_x - 2xy a_y + 5xz^2a_z$		
	a) Neither Solenoidal nor irrotation	al	
	 b) Solenoidal & irrotational 		

- b) Solenoidal & irrotationalc) Only Solenoidald) Only irrotational

Set S

Seat	
No.	

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figures to the right indicates full marks.

Section – I

Q.2 Solve any three

- a) Derive Expression for capacitance of parallel plate Capacitor.
- b) Derive Expression for find potential due to infinite Line charge.
- c) Explain Electric Dipole and derive Expression for E.
- **d**) Transform the given vector $\bar{A} = 3\bar{a}_x 2\bar{a}_y 3\bar{a}_z at p (-2, -3, 4)$ into spherical coordinate.
- e) A charge of uniform density $\rho s = 0.3 \ nC \ / \ m^2$ covering the plane 2x 3y + z = 6. Find \overline{E} on the side of the plane containing the Origin.

Q.3 Solve any two.

- a) Explain Boundary Condition for Electrostatic Field? Conductor free space Boundary.
- **b)** Find the work done in moving a point charge $Q = 5 \,\mu C$ from (0,0,0) to $(2, \pi / 4, \pi / 2)$ in the field $\overline{E} = 5 \, e^{-r/4} \overline{a}_r + \frac{10}{r \sin \theta} \overline{a}_{\Phi} v/m$.
- c) Derive expression on electric field due to infinite sheet charge.

Section – II

Q.4 Solve any three.

- a) A current filament of 5.0 A in a_y direction is parallel to y axis at x= 2,z= 2. Find \overline{H} at origin.
- **b)** State and prove Ampere's work law.
- c) Derive the Lorentz force equation for moving charge which consist both electric and magnetic field.
- d) State the Maxwell's equation in point form for static electric fields.
- e) Explain the different types of magnetic material with suitable example according to the nature of material.

Q.5 Solve any two.

a) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = (y^2 z/x) \overline{a}_x + (0.5y^2 z^2/x^2) \overline{a}_z$$

Also find current in the a_y direction crossing the square surface in the plane y = 2 bounded by x = z = 1 & x = z = 2.

- **b)** Derive the Maxwell's equation in point and integral form from Gauss's law for time varying field.
- **c)** Let $\mu_1 = 4 \mu_0$ H/m in the region 1 where z > 0 while $\mu_2 = 7\mu_0$ H/m wherever z < 0. In region 1 the magnetic flux density $\bar{B}_1 = 2\bar{a}_x 3\bar{a}_y + 2\bar{a}_z$ (mT), surface current density is 60 \bar{a}_x A/m on the surface Z = 0. Find the value of H_{t2} in region 2.

Max. Marks: 56

16

12

12

No.	
Seat	

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – III**

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Marks: 14

Max. Marks: 70

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - The disadvantage of short pitched coil is that . 1)
 - harmonics are introduced a)
 - waveform becomes non-sinusoidal b)
 - voltage around the coil is reduced c)
 - d) none of these
 - 2) When number of alternators are operating in parallel, the power factor at which each operates is determined by _ b) driving torque of the prime mover
 - a) power factor of the load
 - c) its field excitation
- d) none of these
- At lagging loads, armature reaction in an alternator is 3) .
 - Cross magnetizing a) c) Non - effective
- b) Demagnetizing d) Magnetizing
- 4) The Potier's triangle separates the _____.
 - iron losses and copper losses a)
 - field mmf and armature mmf b)
 - c) stator voltage and rotor voltage
 - armature leakage reactance and armature reaction mmf d)
- 5) For proper parallel operation, a.c. polyphase alternators must have the same ___
 - speed b) voltage rating a)
 - kVA rating d) excitation c)
- Of the following conditions, the one which does not have to be met by 6) alternators working in parallel is ____
 - terminal voltage each machine must be same a)
 - the machines must have same phase rotation b)
 - the machines must operate at the same frequency c)
 - the machines must have equal ratings d)
- 7) Synchronous motor can operate at _____.
 - Lagging power factor only a)
 - b) Leading power factor only
 - c) Unity power factor only
 - d) Lagging, leading and unity power factor only



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	Set P
8)	An unexcited single phase synchronous motor is a) reluctance motor b) repulsion motor c) universal motor d) AC series motor
9)	Zero power factor method of an alternator is used to find its a) efficiency b) voltage regulation c) armature resistance d) synchronous impedance
10)	 The regulation of an alternator is a) the reduction in terminal voltage when alternator is loaded b) the variation of terminal voltage under the conditions of maximum and minimum excitation c) the increase in terminal voltage when load is thrown off d) the change in terminal voltage from lagging power factor to leading power factor
11)	The rotational speed of a given stepper motor is determined solely by thea) shaft loadb) step pulse frequencyc) polarity of stator currentd) magnitude of stator current
12)	A stepper motor may be considered as a converter. a) dc to dc
13)	The rotor of a stepper motor has no a) windings
14)	Wave excitation of a stepper motor results in

- 14) Wave excitation of a stepper motor results in _____
- ___· b) half-stepping
- a) microsteppingc) increased step angle d) reduced resolution

Seat	
No.	

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve any four.

- a) Explain MMF method for Calculation of voltage regulation of an alternator.
- **b)** Derive an e.m.f. equation of an alternator.
- c) A 12-pole 3-phase 50Hz star connected alternator has 72 slots. The flux per pole is 0.0988 Wb. Calculate.
 - 1) terminal e.m.f. for full pitch coils and 8 conductors per slot
 - 2) the terminal e.m.f. if the coil span is reduced to 2/3 of the pole pitch
- d) Derive the expression for pitch factor and distribution factor.
- e) Explain the methods of synchronization of an alternator.
- f) Explain ZPF method for calculation of voltage regulation of an alternator.

Q.3 Solve any two.

a) A 25 kVA, single phase 500V alternator gave following O.C. & S.C. values.

Field current	2	4	6	8	10	12	14	16
O.C. (V)	105	208	304	380	435	480	518	550
S.C. current	26	52.5	80	-	-	-	-	-

Effective armature resistance is 0.4 ohm / phase. Calculate the voltage regulation at 0.9 p.f. leading by

1) synchronous impedance method

- 2) ampere turn method
- **b)** Derive an expression for power developed in.
 - 1) salient pole type alternator
 - 2) non salient pole type alternator
- c) With neat sketch explain the construction, types and working principle of an alternator.

Section - II

Q.4 Solve any four

- a) With neat sketch and phasor diagram explain synchronous condenser.
- **b)** With neat sketch explain PMDC motor.
- c) Explain V and inverted V curves for synchronous motor.
- d) With neat sketch explain hysteresis motor.
- e) Draw and explain the construction of low inertia DC motor.
- f) With neat sketch explain construction and working of universal motor.

Max. Marks: 56

Set

12

16

12

Q.5 Solve any two

- a) Explain in detail.
 - 1) Single stack variable reluctance stepper motor
 - 2) Multi stack variable reluctance stepper motor
- **b)** Explain construction and working principle of AC & DC servomotor.
- c) Why synchronous motor is not self-starting? How to make it start? Explain the methods in detail.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – III**

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat No.

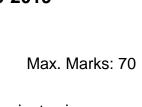
Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- An unexcited single phase synchronous motor is . 1) b) repulsion motor
 - a) reluctance motor
 - c) universal motor
- 2) Zero power factor method of an alternator is used to find its _____.
 - efficiency a) armature resistance C)
- b) voltage regulation d) synchronous impedance

d) AC series motor

- 3) The regulation of an alternator is _____.
 - the reduction in terminal voltage when alternator is loaded a)
 - the variation of terminal voltage under the conditions of maximum and b) minimum excitation
 - the increase in terminal voltage when load is thrown off C)
 - the change in terminal voltage from lagging power factor to leading d) power factor
- The rotational speed of a given stepper motor is determined solely by the _____. 4)
 - shaft load step pulse frequency a) b)
 - polarity of stator current C)
- 5) A stepper motor may be considered as a _____ __ converter.
 - a) dc to dc b) ac to ac
 - dc to ac d) digital-to-analogue C)
- 6) The rotor of a stepper motor has no
 - windings b) commutator a)
 - brushes all of the above C) d)
- Wave excitation of a stepper motor results in _____ 7)
 - microstepping b) half-stepping a) c)
 - increased step angle d) reduced resolution
- The disadvantage of short pitched coil is that . 8)
 - harmonics are introduced a)
 - waveform becomes non-sinusoidal b)
 - voltage around the coil is reduced C)
 - none of these d)

Marks: 14



- d) magnitude of stator current

At la	agging loads, armature reacti	on in an	alternator is
a)	Cross - magnetizing	b)	Demagnetizing
C)	Non - effective	d)	Magnetizing

d) none of these

b) driving torque of the prime mover

When number of alternators are operating in parallel, the power factor at

SLR-FM-734

Set C

11) The Potier's triangle separates the _____.

its field excitation

a) iron losses and copper losses

which each operates is determined by _ power factor of the load

- b) field mmf and armature mmf
- stator voltage and rotor voltage c)
- d) armature leakage reactance and armature reaction mmf
- 12) For proper parallel operation, a.c. polyphase alternators must have the same
 - speed a)

9)

10)

a)

c)

- b) voltage rating
- kVA rating d) excitation C)
- Of the following conditions, the one which does not have to be met by 13) alternators working in parallel is _ .
 - terminal voltage each machine must be same a)
 - b) the machines must have same phase rotation
 - the machines must operate at the same frequency C)
 - d) the machines must have equal ratings
- Synchronous motor can operate at _____. 14)
 - a) Lagging power factor only
 - b) Leading power factor only
 - c) Unity power factor only
 - d) Lagging, leading and unity power factor only

Seat No.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve any four.

- a) Explain MMF method for Calculation of voltage regulation of an alternator.
- **b)** Derive an e.m.f. equation of an alternator.
- c) A 12-pole 3-phase 50Hz star connected alternator has 72 slots. The flux per pole is 0.0988 Wb. Calculate.
 - 1) terminal e.m.f. for full pitch coils and 8 conductors per slot
 - 2) the terminal e.m.f. if the coil span is reduced to 2/3 of the pole pitch
- d) Derive the expression for pitch factor and distribution factor.
- e) Explain the methods of synchronization of an alternator.
- f) Explain ZPF method for calculation of voltage regulation of an alternator.

Q.3 Solve any two.

a) A 25 kVA, single phase 500V alternator gave following O.C. & S.C. values.

Field current	2	4	6	8	10	12	14	16
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S.C. current	26	52.5	80	-	-	-	-	-

Effective armature resistance is 0.4 ohm / phase. Calculate the voltage regulation at 0.9 p.f. leading by

1) synchronous impedance method

- 2) ampere turn method
- **b)** Derive an expression for power developed in.
 - 1) salient pole type alternator
 - 2) non salient pole type alternator
- c) With neat sketch explain the construction, types and working principle of an alternator.

Section - II

Q.4 Solve any four

- a) With neat sketch and phasor diagram explain synchronous condenser.
- **b)** With neat sketch explain PMDC motor.
- c) Explain V and inverted V curves for synchronous motor.
- d) With neat sketch explain hysteresis motor.
- e) Draw and explain the construction of low inertia DC motor.
- f) With neat sketch explain construction and working of universal motor.

SLR-FM-734

Max. Marks: 56



12

16

Set Q

12

Q.5 Solve any two

- a) Explain in detail.
 - 1) Single stack variable reluctance stepper motor
 - 2) Multi stack variable reluctance stepper motor
- **b)** Explain construction and working principle of AC & DC servomotor.
- c) Why synchronous motor is not self-starting? How to make it start? Explain the methods in detail.

Set

Max. Marks: 70

T.E. (Part – I) (Old) (CG	PA) Examination Nov/Dec-2019
Electri	cal Engineering
ELECTRI	CAL MACHINE - III

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

- Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14
 - For proper parallel operation, a.c. polyphase alternators must have the 1) same ___
 - a) speed

- b) voltage rating
- d) excitation C) kVA rating
- 2) Of the following conditions, the one which does not have to be met by alternators working in parallel is _ ____-•
 - terminal voltage each machine must be same a)
 - the machines must have same phase rotation b)
 - the machines must operate at the same frequency c)
 - d) the machines must have equal ratings
- 3) Synchronous motor can operate at _____.
 - a) Lagging power factor only
 - b) Leading power factor only
 - c) Unity power factor only
 - d) Lagging, leading and unity power factor only
- 4) An unexcited single phase synchronous motor is _____
 - a) reluctance motor b) repulsion motor
 - universal motor d) AC series motor c)
- 5) Zero power factor method of an alternator is used to find its _____.
 - efficiencv b) voltage regulation a)
 - d) synchronous impedance c) armature resistance
- The regulation of an alternator is 6)
 - the reduction in terminal voltage when alternator is loaded a)
 - the variation of terminal voltage under the conditions of maximum and b) minimum excitation
 - the increase in terminal voltage when load is thrown off C)
 - d) the change in terminal voltage from lagging power factor to leading power factor
- The rotational speed of a given stepper motor is determined solely by the _____. 7)
 - shaft load a) polarity of stator current c)
 - b) step pulse frequency d) magnitude of stator current

Marks: 14

Set R A stepper motor may be considered as a _____ converter. b) ac to ac dc to dc a) c) dc to ac d) digital-to-analogue The rotor of a stepper motor has no _____ a) windings b) commutator c) brushes d) all of the above 10) Wave excitation of a stepper motor results in ____ b) half-stepping microstepping a) d) reduced resolution increased step angle C) The disadvantage of short pitched coil is that . 11) a) harmonics are introduced b) waveform becomes non-sinusoidal c) voltage around the coil is reduced d) none of these When number of alternators are operating in parallel, the power factor at 12) which each operates is determined by a) power factor of the load b) driving torque of the prime mover its field excitation d) none of these c) At lagging loads, armature reaction in an alternator is _____. 13) a) Cross - magnetizing

- b) Demagnetizing
- c) Non effective

- d) Magnetizing
- 14) The Potier's triangle separates the _____
 - a) iron losses and copper losses
 - field mmf and armature mmf b)
 - stator voltage and rotor voltage C)
 - d) armature leakage reactance and armature reaction mmf

9)

8)

Seat No.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve any four.

- a) Explain MMF method for Calculation of voltage regulation of an alternator.
- **b)** Derive an e.m.f. equation of an alternator.
- c) A 12-pole 3-phase 50Hz star connected alternator has 72 slots. The flux per pole is 0.0988 Wb. Calculate.
 - 1) terminal e.m.f. for full pitch coils and 8 conductors per slot
 - 2) the terminal e.m.f. if the coil span is reduced to 2/3 of the pole pitch
- d) Derive the expression for pitch factor and distribution factor.
- e) Explain the methods of synchronization of an alternator.
- f) Explain ZPF method for calculation of voltage regulation of an alternator.

Q.3 Solve any two.

a) A 25 kVA, single phase 500V alternator gave following O.C. & S.C. values.

Field current	2	4	6	8	10	12	14	16
O.C. (V)	105	208	304	380	435	480	518	550
S.C. current	26	52.5	80	-	-	-	-	-

Effective armature resistance is 0.4 ohm / phase. Calculate the voltage regulation at 0.9 p.f. leading by

- 1) synchronous impedance method
- 2) ampere turn method
- b) Derive an expression for power developed in.
 - 1) salient pole type alternator
 - 2) non salient pole type alternator
- c) With neat sketch explain the construction, types and working principle of an alternator.

Section - II

Q.4 Solve any four

- a) With neat sketch and phasor diagram explain synchronous condenser.
- **b)** With neat sketch explain PMDC motor.
- c) Explain V and inverted V curves for synchronous motor.
- d) With neat sketch explain hysteresis motor.
- e) Draw and explain the construction of low inertia DC motor.
- f) With neat sketch explain construction and working of universal motor.

Max. Marks: 56

12

16

16

12

Q.5 Solve any two

- a) Explain in detail.
 - 1) Single stack variable reluctance stepper motor
 - 2) Multi stack variable reluctance stepper motor
- **b)** Explain construction and working principle of AC & DC servomotor.
- c) Why synchronous motor is not self-starting? How to make it start? Explain the methods in detail.

Seat	
No.	

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 Electrical Engineering ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 14

- 1) The regulation of an alternator is _____
 - a) the reduction in terminal voltage when alternator is loaded
 - b) the variation of terminal voltage under the conditions of maximum and minimum excitation
 - c) the increase in terminal voltage when load is thrown off
 - d) the change in terminal voltage from lagging power factor to leading power factor
- The rotational speed of a given stepper motor is determined solely by the _____.
 - a) shaft load b) step pulse frequency
 - c) polarity of stator current d) magnitude of stator current
- 3) A stepper motor may be considered as a _____ converter.
 - a) dc to dc b) ac to ac
 - c) dc to ac d) digital-to-analogue
- 4) The rotor of a stepper motor has no _____.
 - a) windings b) commutator
 - c) brushes d) all of the above

5) Wave excitation of a stepper motor results in ____

- a) microstepping b) half-stepping
- c) increased step angle d) reduced resolution
- 6) The disadvantage of short pitched coil is that _____.
 - a) harmonics are introduced
 - b) waveform becomes non-sinusoidal
 - c) voltage around the coil is reduced
 - d) none of these
- 7) When number of alternators are operating in parallel, the power factor at which each operates is determined by _____.
 - a) power factor of the load
- b) driving torque of the prime mover
- c) its field excitation
- d) none of these
- 8) At lagging loads, armature reaction in an alternator is _____
 - a) Cross magnetizingc) Non effective
- b) Demagnetizingd) Magnetizing

Max. Marks: 70

Marks: 14

- 9) The Potier's triangle separates the .
 - a) iron losses and copper losses
 - b) field mmf and armature mmf
 - stator voltage and rotor voltage C)
 - armature leakage reactance and armature reaction mmf d)
- 10) For proper parallel operation, a.c. polyphase alternators must have the same _____.
 - a) speed

b) voltage rating

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Set

- kVA rating d) excitation c)
- Of the following conditions, the one which does not have to be met by 11) alternators working in parallel is
 - terminal voltage each machine must be same a)
 - b) the machines must have same phase rotation
 - the machines must operate at the same frequency c)
 - d) the machines must have equal ratings
- 12) Synchronous motor can operate at _____.
 - a) Lagging power factor only
 - b) Leading power factor only
 - c) Unity power factor only
 - d) Lagging, leading and unity power factor only
- An unexcited single phase synchronous motor is _____. 13)
 - a) reluctance motor
- b) repulsion motor d) AC series motor
- c) universal motor
- 14) Zero power factor method of an alternator is used to find its .
 - a) efficiency

- b) voltage regulation
- c) armature resistance
- d) synchronous impedance

Seat No.

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019 **Electrical Engineering ELECTRICAL MACHINE – III**

Day & Date: Wednesday, 11-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

2) Figure to the right indicates full marks.

Section – I

Q.2 Solve any four.

- Explain MMF method for Calculation of voltage regulation of an alternator. a)
- Derive an e.m.f. equation of an alternator. b)
- A 12-pole 3-phase 50Hz star connected alternator has 72 slots. The flux c) per pole is 0.0988 Wb. Calculate.
 - 1) terminal e.m.f. for full pitch coils and 8 conductors per slot
 - 2) the terminal e.m.f. if the coil span is reduced to 2/3 of the pole pitch
- Derive the expression for pitch factor and distribution factor. d)
- Explain the methods of synchronization of an alternator. e)
- Explain ZPF method for calculation of voltage regulation of an alternator. **f**)

Q.3 Solve any two.

A 25 kVA, single phase 500V alternator gave following O.C. & S.C. values. a)

Field current	2	4	6	8	10	12	14	16
O.C. (V)	105	208	304	380	435	480	518	550
S.C. current	26	52.5	80	-	-	-	-	-

Effective armature resistance is 0.4 ohm / phase. Calculate the voltage regulation at 0.9 p.f. leading by

- 1) synchronous impedance method
- 2) ampere turn method
- Derive an expression for power developed in. b)
 - 1) salient pole type alternator
 - 2) non salient pole type alternator
- With neat sketch explain the construction, types and working principle of c) an alternator.

Section - II

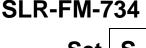
Solve any four Q.4

- With neat sketch and phasor diagram explain synchronous condenser. a)
- With neat sketch explain PMDC motor. b)
- Explain V and inverted V curves for synchronous motor. c)
- With neat sketch explain hysteresis motor. d)
- Draw and explain the construction of low inertia DC motor. e)
- With neat sketch explain construction and working of universal motor. **f**)

Max. Marks: 56

12

16





12

Q.5 Solve any two

- a) Explain in detail.
 - 1) Single stack variable reluctance stepper motor
 - 2) Multi stack variable reluctance stepper motor
- **b)** Explain construction and working principle of AC & DC servomotor.
- c) Why synchronous motor is not self-starting? How to make it start? Explain the methods in detail.

T.E. (Part – I) (Old) Examination Nov/Dec-2019

Day & Date: Friday, 20-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

Electrical Engineering LINEAR INTEGRATED CIRCUIT

- Assume suitable data if necessary but mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Seat

No.

Choose the correct alternatives from the options. Q.1

- When the step I/P is given to op-amp integrator the output will be . 1)
 - b) Sine Wave Ramp a)
 - c) Rectangular wave d) Triangular wave
- 2) The ideal op-amp has following characteristics
 - a) $R_i = \infty, A = \infty, R_o = 0$ b) $R_i = 0, A = \infty, R_o = 0$
 - c) $R_i = \infty, A = \infty, R_o = \infty$ d) $R_i = 0, A = \infty, R_o = \infty$
- 3) The input off set current equals the
 - a) Difference between two base current
 - b) Average of two base current
 - c) Collector current divided by current gain
 - d) None of above
- 4) Negative feedback .
 - a) Increases the I/P and O/P impedances
 - b) Increases the I/P impedance & Bandwidth
 - c) Decreases the O/P impedance & Bandwidth
 - d) Does not affect impedance & Bandwidth
- 5) The differential gain is _____.
 - very law b) above 100 a)
 - c) depend on I/P Voltage d) very high
- For a op-amp differential gain (Av) and common mode gain (Ac) then 6) CMRR is _____. AV b)

c)
$$I + \left(\frac{AV}{AC}\right)$$

- 7) A voltage follower _____.
 - a) has a voltage gain of I
 - c) has no feedback register
- For IC 714C SVRR is . 8)
 - a) 100 dB
 - c) infinite

- b) is non-inverting
- d) has all of these
- 104 dB b)
- d) zero

SLR-FM-780



Max. Marks: 100

Marks: 20

20

AC

AC

AV

d)

	Set P
9)	Find the O/P vtg of ideal op- amp. If V_1 and V_2 are two inputs a) $V_0 = V_1 - V_2$ b) $V_0 = A(V_1 - V_2)$ c) $V_0 = A(V_1 + V_2)$ d) $V_0 = A(V_1)$
10)	A differential amplifier is capable for a) DC Input signal only b) AC Input signal only c) AC and DC Input signal only d) None of above
11)	An electrical filter is aa) Phase selective circuitb) Filter selective circuitc) Frequence selective circuitd) None of above
12)	Filters are classified as audio or radioa) Analog or digitalb) Passive or activec) All of the aboved) None of the above
13)	Given lower and higher cut off frequency, of band- pass filter are 2.5 KHz to 10 KHz determined bandwidth. a) 750 Hz b) 7500 Hz c) 75000 Hz d) 750 KHz
14)	The output voltage of phase defector is
	a) Phase voltageb) Free running voltagec) Error Voltaged) None of above
15)	At what range the PLL can maintain the lock in the circuit? a) Lock range b) Input range c) Feedback loop d) Out put range
16)	 How does a monostable multivibrator used as frequency divider? a) using square wave as trigger b) using triangular as trigger c) using sawtooth as trigger d) using sine as trigger
17)	 Which among the following are regarded as three pin voltage regulator ICS? a) Fixed voltage regulator b) Adjustable voltage regulator c) Both a) and b) d) None of these
18)	In LM317, what is minimum value of vtg required between its I/P & O/P? a) 5 V b) 10 V c) 15 V d) 3 V
19)	IC 7808 is fixed regulator of a) 7 Volt b) 8 Volt c) 9 Volt d) 10 Volt
20)	Integrated circuit that are three terminal devices and provide a fixed negative voltage has series. a) LM XX b) 78 XX c) 79 XX d) 40 XX

Seat	
No.	

T.E. (Part – I) (Old) Examination Nov/Dec-2019 Electrical Engineering LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) Draw and explain the block diagram of op-Amp.
- **b**) Explain inverting amplifier.
- c) Explain with circuit diagram differential amplifier.
- d) Write a short note on window detector.
- e) Draw and explain Comparators.

Q.3 Attempt any two.

- a) Explain with circuit diagram voltage to current and current to voltage convertor.
- b) Explain log and antilog amplifier.

OR

Explain inverting configuration of three input summing amplifier, scaling amplifier or averaging amplifier.

Section – II

Q.4 Attempt any four.

- a) Explain law pass first order butter worth filter.
- b) Explain mono-stable Multivibrator using IC 555.
- c) Write a short note on phase- locked loops.
- **d**) Explain with circuit diagram PD controller.
- e) Design the band pass filter so that $F_c = 1$ KHz, Q = 3, and $A_f = 10$. (Assume suitable data)

Q.5 Attempt any two.

- a) Draw and explain audio power amplifier.
- b) Write a short note on square wave generator using op- amp and also generate square wave of 1KHz frequency. (Assume suitable data).
- c) Write a short note on positive fixed voltage regulation and negative fixed voltage regulation.

Max. Marks: 80

20

20

20

T.E. (Part – I) (Old) Examination Nov/Dec-2019

Electrical Engineering LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- Assume suitable data if necessary but mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

7)

Seat

No.

Choose the correct alternatives from the options. Q.1

- For a op-amp differential gain (Av) and common mode gain (Ac) then 1) CMRR is AV
 - a) AV + ACb) AC AC d)

c)
$$I + \left(\frac{AV}{AC}\right)$$

- 2) A voltage follower ____
 - a) has a voltage gain of I
 - c) has no feedback register
- For IC 714C SVRR is _____. 3)
 - a) 100 dB
 - c) infinite
- 4) Find the O/P vtg of ideal op- amp. If V_1 and V_2 are two inputs . b) $V_0 = A(V_1 - V_2)$
 - a) $V_0 = V_1 V_2$ d) $V_0 = A(V_1)$ c) $V_0 = A(V_1 + V_2)$
- A differential amplifier is capable for 5)
 - a) DC Input signal only b) AC Input signal only c) AC and DC Input signal only d) None of above
- 6)
 - An electrical filter is a a) Phase selective circuit
 - b) Filter selective circuit c) Frequence selective circuit
 - d) None of above Filters are classified as audio or radio
 - a) Analog or digital Passive or active b)
 - c) All of the above d) None of the above
- Given lower and higher cut off frequency, of band- pass filter are 2.5 KHz 8) to 10 KHz determined bandwidth.
 - a) 750 Hz 7500 Hz b)
 - c) 75000 Hz d) 750 KHz
- 9) The output voltage of phase defector is
 - Phase voltage Free running voltage b) a) Error Voltage C)
 - None of above d)

SLR-FM-780



Max. Marks: 100

Marks: 20

20

- 104 dB
- d) zero

b) is non-inverting

d) has all of these

b)

AV

				F	
			S	et	Q
10)	At what range the PLL can maintai a) Lock range c) Feedback loop	b)	e lock in the circuit? Input range Out put range		
11)	 How does a monostable multivibra a) using square wave as trigger b) using triangular as trigger c) using sawtooth as trigger d) using sine as trigger 	tor u	sed as frequency divider?		
12)	 Which among the following are reg ICS? a) Fixed voltage regulator b) Adjustable voltage regulator c) Both a) and b) d) None of these 	jarde	ed as three pin voltage regulator		
13)	In LM317, what is minimum value (a) 5 V c) 15 V	b)	g required between its I/P & O/P 10 V 3 V	?	
14)	IC 7808 is fixed regulator of a) 7 Volt c) 9 Volt	b) d)	8 Volt 10 Volt		
15)	Integrated circuit that are three tern negative voltage has series a) LM XX c) 79 XX	b)	l devices and provide a fixed 78 XX 40 XX		
16)	When the step I/P is given to op-ar a) Ramp c) Rectangular wave				
17)	The ideal op-amp has following characteristic a) $R_i = \infty, A = \infty, R_o = 0$		teristics $R_i = 0, A = \infty, R_o = 0$		
	c) $R_i = \infty, A = \infty, R_o = \infty$	d)	$R_i = 0, A = \infty, R_o = \infty$		
18)	 The input off set current equals the a) Difference between two base of b) Average of two base current c) Collector current divided by cu d) None of above 	curre	ent		
19)	 Negative feedback a) Increases the I/P and O/P imp b) Increases the I/P impedance & c) Decreases the O/P impedance & d) Does not affect impedance & I 	& Bai e & E	ndwidth Bandwidth		
20)	The differential gain is a) very law	b)	above 100		

a) very lawb) above 100c) depend on I/P Voltaged) very high

Seat No.

T.E. (Part – I) (Old) Examination Nov/Dec-2019 Electrical Engineering LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) Draw and explain the block diagram of op-Amp.
- **b)** Explain inverting amplifier.
- c) Explain with circuit diagram differential amplifier.
- d) Write a short note on window detector.
- e) Draw and explain Comparators.

Q.3 Attempt any two.

- a) Explain with circuit diagram voltage to current and current to voltage convertor.
- b) Explain log and antilog amplifier.

OR

Explain inverting configuration of three input summing amplifier, scaling amplifier or averaging amplifier.

Section – II

Q.4 Attempt any four.

- a) Explain law pass first order butter worth filter.
- b) Explain mono-stable Multivibrator using IC 555.
- c) Write a short note on phase- locked loops.
- d) Explain with circuit diagram PD controller.
- e) Design the band pass filter so that $F_c = 1$ KHz, Q = 3, and $A_f = 10$. (Assume suitable data)

Q.5 Attempt any two.

- a) Draw and explain audio power amplifier.
- b) Write a short note on square wave generator using op- amp and also generate square wave of 1KHz frequency. (Assume suitable data).
- c) Write a short note on positive fixed voltage regulation and negative fixed voltage regulation.

20

20

Max. Marks: 80

20

T.E. (Part – I) (Old) Examination Nov/Dec-2019 **Electrical Engineering** LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- Assume suitable data if necessary but mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- 1) An electrical filter is a
 - a) Phase selective circuit
 - c) Frequence selective circuit d) None of above
- 2) Filters are classified as audio or radio
 - a) Analog or digital Passive or active b) c) All of the above
 - d) None of the above

b) Filter selective circuit

Given lower and higher cut off frequency, of band- pass filter are 2.5 KHz 3) to 10 KHz determined bandwidth.

- 7500 Hz a) 750 Hz b)
- c) 75000 Hz 750 KHz d)
- 4) The output voltage of phase defector is
 - Phase voltage a)

- b) Free running voltage
- c) Error Voltage
- At what range the PLL can maintain the lock in the circuit? 5)
 - a) Lock range b) Input range
 - Feedback loop d) Out put range c)

How does a monostable multivibrator used as frequency divider? 6)

- a) using square wave as trigger
- b) using triangular as trigger
- c) using sawtooth as trigger
- d) using sine as trigger
- 7) Which among the following are regarded as three pin voltage regulator ICS?
 - a) Fixed voltage regulator
 - b) Adjustable voltage regulator
 - c) Both a) and b)
 - d) None of these
- In LM317, what is minimum value of vtg required between its I/P & O/P? 8) a) 5 V
 - b) 10 V
 - c) 15 V 3 V d)

Max. Marks: 100

20

Marks: 20

- - d) None of above

Set R

Seat No.

			SLR-FM-780
			Set R
9)	IC 7808 is fixed regulator of a) 7 Volt c) 9 Volt	 b) d)	8 Volt 10 Volt
10)	Integrated circuit that are three term negative voltage has series a) LM XX c) 79 XX	b)	al devices and provide a fixed 78 XX 40 XX
11)	When the step I/P is given to op-an a) Ramp c) Rectangular wave	b)	ntegrator the output will be Sine Wave Triangular wave
12)	The ideal op-amp has following ch a) $R_i = \infty, A = \infty, R_o = 0$ c) $R_i = \infty, A = \infty, R_o = \infty$	b)	$R_i = 0, A = \infty, R_o = 0$
13)	 The input off set current equals the a) Difference between two base b) Average of two base current c) Collector current divided by cu d) None of above 	curre	ent
14)	 Negative feedback a) Increases the I/P and O/P imp b) Increases the I/P impedance & c) Decreases the O/P impedance d) Does not affect impedance & I 	& Ba e & E	ndwidth 3andwidth
15)	The differential gain is a) very law c) depend on I/P Voltage	b) d)	above 100 very high
16)	For a op-amp differential gain (Av) CMRR is a) $AV + AC$ c) $I + \left(\frac{AV}{AC}\right)$	and b) d)	AV AC
17)	A voltage follower a) has a voltage gain of I c) has no feedback register	,	AC AV is non- inverting has all of these
18)	For IC 714C SVRR is a) 100 dB c) infinite	b) d)	104 dB zero
19)	Find the O/P vtg of ideal op- amp. a) $V_0 = V_1 - V_2$ c) $V_0 = A(V_1 + V_2)$	b)	and V_2 are two inputs $V_0 = A(V_1 - V_2)$ $V_0 = A(V_1)$
20)	A differential amplifier is capable fora) DC Input signal onlyc) AC and DC Input signal only	b)	AC Input signal only

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T.E. (Part – I) (Old) Examination Nov/Dec-2019 Electrical Engineering LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) Draw and explain the block diagram of op-Amp.
- **b**) Explain inverting amplifier.
- c) Explain with circuit diagram differential amplifier.
- d) Write a short note on window detector.
- e) Draw and explain Comparators.

Q.3 Attempt any two.

- a) Explain with circuit diagram voltage to current and current to voltage convertor.
- b) Explain log and antilog amplifier.

OR

Explain inverting configuration of three input summing amplifier, scaling amplifier or averaging amplifier.

Section – II

Q.4 Attempt any four.

- a) Explain law pass first order butter worth filter.
- b) Explain mono-stable Multivibrator using IC 555.
- c) Write a short note on phase- locked loops.
- **d**) Explain with circuit diagram PD controller.
- e) Design the band pass filter so that $F_c = 1$ KHz, Q = 3, and $A_f = 10$. (Assume suitable data)

Q.5 Attempt any two.

- a) Draw and explain audio power amplifier.
- b) Write a short note on square wave generator using op- amp and also generate square wave of 1KHz frequency. (Assume suitable data).
- c) Write a short note on positive fixed voltage regulation and negative fixed voltage regulation.

Max. Marks: 80

20

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T.E. (Part – I) (Old) Examination Nov/Dec-2019 Electrical Engineering LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer book.

- 2) Assume suitable data if necessary but mention it clearly.
- 3) Figures to the right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes

Q.1 Choose the correct alternatives from the options.

- 1) How does a monostable multivibrator used as frequency divider?
 - a) using square wave as trigger
 - b) using triangular as trigger
 - c) using sawtooth as trigger
 - d) using sine as trigger
- 2) Which among the following are regarded as three pin voltage regulator ICS?
 - a) Fixed voltage regulator
 - b) Adjustable voltage regulator
 - c) Both a) and b)
 - d) None of these
- 3) In LM317, what is minimum value of vtg required between its I/P & O/P?
 - a) 5 V b) 10 V c) 15 V d) 3 V
 - $\begin{array}{c} c_{j} & c_{j} & c_{j} \\ c_{j} & c_{j} & c_{j} \\ c_{j} &$
- 4) IC 7808 is fixed regulator of _____.
 a) 7 Volt b'
 - a) 7 Volt b) 8 Volt c) 9 Volt d) 10 Volt

5) Integrated circuit that are three terminal devices and provide a fixed negative voltage has _____ series.

- a) LM XX b) 78 XX c) 79 XX d) 40 XX
- 6) When the step I/P is given to op-amp integrator the output will be _____.
 - a) Ramp b) Sine Wave
 - c) Rectangular wave d) Triangular wave
- 7) The ideal op-amp has following characteristics _____.
 - a) $R_i = \infty, A = \infty, R_o = 0$ b) $R_i = 0, A = \infty, R_o = 0$

c)
$$R_i = \infty, A = \infty, R_o = \infty$$
 d) $R_i = 0, A = \infty, R_o = \infty$

- 8) The input off set current equals the _____.
 - a) Difference between two base current
 - b) Average of two base current
 - c) Collector current divided by current gain
 - d) None of above

Max. Marks: 100

Marks: 20

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9)	 Negative feedback a) Increases the I/P and O/P impedances b) Increases the I/P impedance & Bandwidth c) Decreases the O/P impedance & Bandwidth d) Does not affect impedance & Bandwidth 				
10)	The differential gain is a) very law c) depend on I/P Voltage		above 100 very high		
11)	For a op-amp differential gain (Av) CMRR is a) $AV + AC$ c) $I + \left(\frac{AV}{AC}\right)$	and b) d)	- · · ·		
12)	A voltage follower		is non- inverting		
13)	For IC 714C SVRR is a) 100 dB c) infinite	b) d)	104 dB zero		
14)		b)	and V_2 are two inputs $V_0 = A(V_1 - V_2)$ $V_0 = A(V_1)$		
15)	A differential amplifier is capable fora) DC Input signal onlyc) AC and DC Input signal only	b)	AC Input signal only		
16)	An electrical filter is a a) Phase selective circuit c) Frequence selective circuit	b) d)	Filter selective circuit None of above		
17)	Filters are classified as audio or raa) Analog or digitalc) All of the above	-	Passive or active None of the above		
18)	Given lower and higher cut off freq to 10 KHz determined bandwidth. a) 750 Hz c) 75000 Hz	b) d)	cy, of band- pass filter are 2.5 KHz 7500 Hz 750 KHz		
19)	The output voltage of phase defector is				
20)	 a) Phase voltage c) Error Voltage At what range the PLL can maintai a) Lock range c) Feedback loop 		Free running voltage None of above e lock in the circuit? Input range Out put range		
	, -1	,			

Max. Marks: 80

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20

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Seat No.

T.E. (Part – I) (Old) Examination Nov/Dec-2019 Electrical Engineering LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.

- 2) Figures to the right indicate full marks.
- 3) Assume suitable data if necessary.

Section – I

Q.2 Attempt any four.

- a) Draw and explain the block diagram of op-Amp.
- **b)** Explain inverting amplifier.
- c) Explain with circuit diagram differential amplifier.
- d) Write a short note on window detector.
- e) Draw and explain Comparators.

Q.3 Attempt any two.

- a) Explain with circuit diagram voltage to current and current to voltage convertor.
- b) Explain log and antilog amplifier.

OR

Explain inverting configuration of three input summing amplifier, scaling amplifier or averaging amplifier.

Section – II

Q.4 Attempt any four.

- a) Explain law pass first order butter worth filter.
- b) Explain mono-stable Multivibrator using IC 555.
- c) Write a short note on phase- locked loops.
- d) Explain with circuit diagram PD controller.
- e) Design the band pass filter so that $F_c = 1$ KHz, Q = 3, and $A_f = 10$. (Assume suitable data)

Q.5 Attempt any two.

- a) Draw and explain audio power amplifier.
- b) Write a short note on square wave generator using op- amp and also generate square wave of 1KHz frequency. (Assume suitable data).
- c) Write a short note on positive fixed voltage regulation and negative fixed voltage regulation.

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