Seat No.	

Set **P**

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

Day & Date: Saturday, 07-12-2019 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.
3) Use of calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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

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) $y=c_1+c_2x^2$

c) $y=c_1x+c_2$ d) $y=c_1+c_2\log x$

4) 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) $\frac{2}{s^2-2^2}+\frac{1}{s+2}$ d) $\frac{2}{s^2-2^2}-\frac{1}{s-2}$

5) The value of $\int_0^\infty e^{-st}\,sint\,dt$ is _____.

a) $\frac{1}{s^2-1^2}$ b) $\frac{1}{s^2+1^2}$

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

6) $L^{-1}\left\{\frac{s+2}{(s+2)^2-25}\right\}=$ _____.

a) $e^{2t}\cosh 5t$ b) $e^{-2t}\cosh 25t$

c) $e^{-2t}\sinh 5t$ d) $e^{-2t}\cosh 5t$

7) $L^{-1}\{\phi(s+a)\} =$ _____.

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

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

a) $|z| > 1$ b) $|z| < 1$

c) $|z| = 1$ d) None

11) In z transform of $z\{a^k\}$ is for $|z| > a$ _____.

a) $\frac{1}{a-z}$ b) $\frac{z}{a-z}$

c) $\frac{z}{z-a}$ d) $\frac{1}{z-a}$

12) 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) $u_x = v_y, u_y = v_x$

13) $\int_c \tan z\,dz,$ Where c is circle $|z| = \frac{1}{2}$ is _____.

a) 1 b) π

c) πi d) 0

14) Fourier expansion of $f(x) = x + x^2$ in (-1, 1) has _____.

a) sine terms only b) cosine terms only

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Seat No.	

Set **P**

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

Day & Date: Saturday,07-12-2019 Max. Marks: 56
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. **09**

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

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

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. **09**

a) It $L\{evf\sqrt{t}\} = \frac{1}{s\sqrt{s+1}}$ find

$L\{t\ erf2\sqrt{t}\}$

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. **10**

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 $t = 0$ & $cR^2 < 4L$.

Q.5 Solve any three of the following questions. **09**

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

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

c) Solve $pq = x^m y^n z^{2l}$

d) Find z transform of $z\{(k+1).a^k\}, k \geq 0$

e) Find half range sine series $f(x) = x^2$ in $(0,1)$.

Q.6 Solve any three of the following questions. **09**

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 $\frac{1}{2}\log(x^2+y^2) + i \tan^{-1}\frac{kx}{y}$ 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. **10**

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 $z\{2^k \cos(3k+2)\}$ $\quad for\ k \geq 0.$

Seat No.	

Set **Q**

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

Day & Date: Saturday, 07-12-2019 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.
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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) $|z| < 1$

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4) In z transform of $z\{a^k\}$ is for $|z| > a$ _____.

a) $\frac{1}{a - z}$ b) $\frac{z}{a - z}$

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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) $u_x = v_y, u_y = v_x$

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c) $e^x\left(x^2+\frac{x^3}{3}\right)$ d) $\frac{x^5}{20}$

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a) $e^{at}L^{-1}\{\phi(s)\}$ b) $e^{-at}L^{-1}\{\phi(s)\}$

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Seat No.	

Set **Q**

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

Day & Date: Saturday,07-12-2019 Max. Marks: 56
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. **09**

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

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

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. **09**

a) It $L\{evf\sqrt{t}\} = \frac{1}{s\sqrt{s+1}}$ find

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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. **10**

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.

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$$L\frac{d^2Q}{dt^2} + R\frac{dQ}{dt} + \frac{Q}{C} = 0$$

Solve the equation with initial conditions that $Q = Q_0$, and $\frac{dQ}{dt} = 0$. When $t = 0$ & $cR^2 < 4L$.

Q.5 Solve any three of the following questions. **09**

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

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

c) Solve $pq = x^m y^n z^{2l}$

d) Find z transform of $z\{(k+1).a^k\}, k \geq 0$

e) Find half range sine series $f(x) = x^2$ in $(0,1)$.

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a) Find Fourier Series of $f(x) = (4 - x^2)$ in $(0,2)$

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c) Find k such that $\frac{1}{2}\log(x^2+y^2) + i\tan^{-1}\frac{kx}{y}$ 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. **10**

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 $z\{2^k \cos(3k+2)\}$ $\quad for\ k \geq 0.$

Seat No.	

Set **R**

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

Day & Date: Saturday, 07-12-2019 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.
3) Use of calculator is allowed.

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 $\int_0^\infty e^{-st}\, sint\, dt$ is _____.

a) $\frac{1}{s^2-1^2}$ b) $\frac{1}{s^2+1^2}$

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

2) $L^{-1}\left\{\frac{s+2}{(s+2)^2-25}\right\} =$ _____.

a) $e^{2t}\cosh 5t$ b) $e^{-2t}\cosh 25t$

c) $e^{-2t}\sinh 5t$ d) $e^{-2t}\cosh 5t$

3) $L^{-1}\{\phi(s+a)\} =$ _____.

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 variables
b) two or more independent variables
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d) equal number of dependent and independent variables

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

a) $|z| > 1$ b) $|z| < 1$

c) $|z| = 1$ d) None

7) In z transform of $z\{a^k\}$ is for $|z| > a$ _____.

a) $\frac{1}{a-z}$ b) $\frac{z}{a-z}$

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8) The cauchy's Riemann equations are _____.

a) $u_x = u_y, v_y = -v_x$ b) $u_x = -v_x, v_y = u_y$

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9) $\int_c \tan z \, dz,$ Where c is circle $|z| = \frac{1}{2}$ is _____.

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c) $y = c_1 x + c_2$ d) $y = c_1 + c_2 \log x$

14) 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) $\frac{2}{s^2 - 2^2} + \frac{1}{s + 2}$ d) $\frac{2}{s^2 - 2^2} - \frac{1}{s - 2}$

Seat No.	

Set **R**

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

Day & Date: Saturday,07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory
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Q.2 Solve any three of the following questions. **09**

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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. **10**

a) Find $L\left\{\int_0^t u^{-1}e^{-u}\,\text{sinu}\,du\right\}$

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.

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Seat No.	

Set **S**

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

Day & Date: Saturday, 07-12-2019 Max. Marks: 70
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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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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 ROC of discrete unit step function in z transform _____.
   a) $|z| > 1$ b) $|z| < 1$
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2) In z transform of $z\{a^k\}$ is for $|z| > a$ _____.
   a) $\frac{1}{a-z}$ b) $\frac{z}{a-z}$
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3) The cauchy's Riemann equations are _____.
   a) $u_x = u_y, v_y = -v_x$ b) $u_x = -v_x, v_y = u_y$
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4) $\int_c \tan z \, dz,$ Where c is circle $|z| = \frac{1}{2}$ is _____.
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9) The Laplace of $e^{-2t}+\sin 2t$ is _____.

a) $\frac{2}{s^2+2^2}+\frac{1}{s-2}$ b) $\frac{2}{s^2+2^2}+\frac{1}{s+2}$

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

10) The value of $\int_0^\infty e^{-st}\,sint\,dt$ is _____.

a) $\frac{1}{s^2-1^2}$ b) $\frac{1}{s^2+1^2}$

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

11) $L^{-1}\left\{\frac{s+2}{(s+2)^2-25}\right\}=$ _____.

a) $e^{2t}\cosh 5t$ b) $e^{-2t}\cosh 25t$

c) $e^{-2t}\sinh 5t$ d) $e^{-2t}\cosh 5t$

12) $L^{-1}\{\phi(s+a)\}=$ _____.

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

14) 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

Seat No.	

Set **S**

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

Day & Date: Saturday,07-12-2019 Max. Marks: 56
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. **09**

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

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

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. **09**

a) It $L\{evf\sqrt{t}\} = \frac{1}{s\sqrt{s+1}}$ find

$L\{t\ erf2\sqrt{t}\}$

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. **10**

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 $t = 0$ & $cR^2 < 4L$.

Q.5 Solve any three of the following questions. **09**

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

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

c) Solve $pq = x^m y^n z^{2l}$

d) Find z transform of $z\{(k+1).a^k\}, k \geq 0$

e) Find half range sine series $f(x) = x^2$ in $(0,1)$.

Q.6 Solve any three of the following questions. **09**

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 $\frac{1}{2}\log(x^2+y^2) + i \tan^{-1}\frac{kx}{y}$ 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. **10**

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 $z\{2^k \cos(3k+2)\}$ $\quad for\ k \geq 0.$

SLR-FM-402

Seat No.	

Set P

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

Day & Date: Tuesday, 10-12-2019 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

Duration: 30 Minutes Marks: 14

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?
   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

3) 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 b) paper
   c) mica d) 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.

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

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 _____.
   a) less than 15 A
   b) more than 15 A
   c) 15 A
   d) none of the above

10) The efficiencies of transformers compared with that of electric motors of the same power are _____.
   a) about the same
   b) much smaller
   c) much higher
   d) somewhat smaller

11) The noise produced by a transformer is termed as _____.
   a) zoom
   b) hum
   c) ringing
   d) buzz

12) Which of the following protection is normally not provided on small distribution transformers?
   a) Overfluxing protection
   b) Buchholz relay
   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

Seat No.	

Set **P**

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

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Q.4 Solve any Four. **16**

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. **12**

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.

Seat No.	

Set **Q**

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

Day & Date: Tuesday, 10-12-2019 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

Duration: 30 Minutes Marks: 14

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

1) 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

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 b) more 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 smaller
   c) much higher d) somewhat smaller

4) The noise produced by a transformer is termed as _____.
   a) zoom b) hum
   c) ringing d) buzz

5) Which of the following protection is normally not provided on small distribution transformers?
   a) Overfluxing protection b) Buchholz relay
   c) Overcurrent protection d) All of the above

6) 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

7) 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

8) 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

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
   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.

Seat No.	

Set **Q**

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

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Q.4 Solve any Four. **16**

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. **12**

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.

Seat No.	

Set **R**

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

Day & Date: Tuesday, 10-12-2019 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

Duration: 30 Minutes Marks: 14

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

1) The insulating material used between the commutator segments is normally _____.
   a) graphite b) paper
   c) mica d) insulating varnish

2) 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

3) 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
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4) 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

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

6) The efficiencies of transformers compared with that of electric motors of the same power are _____.
   a) about the same b) much smaller
   c) much higher d) somewhat smaller

7) The noise produced by a transformer is termed as _____.
   a) zoom b) hum
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8) Which of the following protection is normally not provided on small distribution transformers?
   a) Overfluxing protection b) Buchholz relay
   c) Overcurrent protection d) All of the above

9) A good voltage regulation of a transformer means _____.
   a) output voltage fluctuation from no load to full load is least
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   c) difference between primary and secondary voltage is least
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11) No-load speed of which of the following motor will be highest?
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12) Starters are used with D.C. motors because _____.
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   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
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Seat No.	

Set **R**

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

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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
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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.

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f) Derive an expression for cross magnetizing and demagnetizing Ampere Turns due to armature reaction in DC machine.

Q.3 Solve any Two. **12**

a) Explain Armature reaction. What are the bad effects of armature reaction? And how they are overcome?

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1) copper losses
2) armature torque
3) shaft torque
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c) With the help of neat sketch explain the speed control methods of D.C. shunt motor.

Q.4 Solve any Four. **16**

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.
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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. **12**

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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.

Seat No.	

Set **S**

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

Day & Date: Tuesday, 10-12-2019 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

Duration: 30 Minutes Marks: 14

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 b) much smaller
   c) much higher 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 relay
   c) Overcurrent protection d) All of the above

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
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6) No-load speed of which of the following motor will be highest?
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7) Starters are used with D.C. motors because _____.
   a) these motors have high starting torque
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   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

8) 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

9) 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

10) The insulating material used between the commutator segments is normally _____.
   a) graphite
   b) paper
   c) mica
   d) insulating varnish

11) 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

12) 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.

13) 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

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.	

Set **S**

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

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Q.4 Solve any Four. **16**

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. **12**

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.

Seat No.	

Set **P**

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

Day & Date: Thursday, 12-12-2019 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 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) 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 instruments
   c) Recording instruments d) Integrating instruments

2) 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 errors b) Environmental errors
   c) Observational errors d) 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

8) 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

9) 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

10) Digital instruments have the input impedance of the order of: _____.
   a) Ω
   b) k Ω
   c) M Ω
   d) m Ω

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

12) Moving iron and PMMC instruments can be distinguished from each other by looking at: _____.
   a) Pointer
   b) Terminal size
   c) Scaled
   d) Scale range

13) An oscilloscope cannot be used to indicate _____.
   a) Frequency
   b) Peak signal voltage
   c) Energy
   d) Wave shape

14) 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

Seat No.	

Set **P**

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

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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 R_1 & inductance L_1
Arm bc :- A non-inductive resistance R_3
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. **16**

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. **12**

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 1.5Ω & 1Ω 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.

Seat No.	

Set **Q**

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

Day & Date: Thursday, 12-12-2019 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 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) 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

2) 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

3) Digital instruments have the input impedance of the order of: _____.
   a) Ω b) k Ω
   c) M Ω d) m Ω

4) 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

5) Moving iron and PMMC instruments can be distinguished from each other by looking at: _____.
   a) Pointer b) Terminal size
   c) Scaled d) Scale range

6) An oscilloscope cannot be used to indicate _____.
   a) Frequency b) Peak signal voltage
   c) Energy d) Wave shape

7) 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

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
   b) Indicating instruments
   c) Recording instruments
   d) Integrating instruments

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 _____.
   a) Unity
   b) 0.5
   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
   d) All of the above

12) Megger is used for the measurement of _____.
   a) Low valued resistances
   b) Medium valued resistances
   c) High valued resistances, particularly insulation resistance
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13) Which of the following are integrating instruments?
   a) Ammeters
   b) Voltmeters
   c) Wattcmeters
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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
   c) It can be used for the measurement of inductance of low Q coils
   d) None of the above

Seat No.	

Set **Q**

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

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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 R_1 & inductance L_1
Arm bc :- A non-inductive resistance R_3
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. **16**

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. **12**

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 1.5Ω & 1Ω 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.

Seat No.	

Set **R**

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

Day & Date: Thursday, 12-12-2019 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 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
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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) 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
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7) An acqadag is used in a CRO to collect _____.
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8) Moving iron and PMMC instruments can be distinguished from each other by looking at: _____.
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9) An oscilloscope cannot be used to indicate _____.
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   b) Peak signal voltage
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10) The vertical amplifier should be designed for _____.
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13) The two pressure coil of a single phase power factor meter have _____.
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   d) None of the above

14) Systematic errors are _____.
   a) Instrumental errors
   b) Environmental errors
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   d) All of the above

Seat No.	

Set **R**

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

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

a) Write neat sketch explain 1 Φ electrodynamometer power factor meter.
b) Explain Kelvin's double bridge for measurement of low resistance.
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Arm ab :- A choke coil having resistance R_1 & inductance L_1
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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.

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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. **12**

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 1.5Ω & 1Ω 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.

Seat No.	

Set | S

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

Day & Date: Thursday, 12-12-2019 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 indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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SLR-FM-403

Seat No.	

Set S

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

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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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 R_1 & inductance L_1
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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. **16**

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. **12**

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 1.5Ω & 1Ω 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.

Seat No.	

Set **P**

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

Day & Date: Saturday,14-12-2019 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) 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 equipment installed in power plants to reduce air pollution due to smoke is _____.
   a) Induced draft fans b) De-super heaters
   c) Electrostatic precipitators d) Re-heaters

2) Which of the following enters the super heater of a boiler?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam

3) For high head and minimum discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine b) Francis turbine
   c) Pelton wheel d) None of the above

4) Which auxiliary of gas turbine consumes most of the power?
   a) Compressor b) Combustion chamber
   c) Burner d) Fuel pump

5) A Thermalpower plant works on _____.
   a) Carnot cycle b) Brayton cycle
   c) Dual cycle d) Rankine cycle

6) Diesel engines for power plants are usually _____.
   a) Horizontal b) Supercharged
   c) Slow speed d) Air cooled

7) A surge tank is provided near _____.
   a) Penstock b) Trash rack
   c) Spillway d) Turbine

8) Running cost of which plant is least?
   a) Hydroelectric plant b) Thermal power plant
   c) Nuclear power plant d) Gas turbine plant

9) Water is supplied to a boiler _____.
   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

10) 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

11) In a steam turbine cycle, the lowest pressure occurs in _____.
   a) turbine inlet
   b) condenser
   c) boiler
   d) super heater

12) A graphical representation of the discharge and time is known as: _____.
   a) Load curve
   b) Load-duration curve
   c) Monograph
   d) Hydrograph

13) In a steam power plant water is used for cooling purposes in _____.
   a) boiler
   b) economizer
   c) condenser
   d) super-heaters

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

Seat No.	

Set **P**

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

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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.

Q.5 Solve any two **12**

a) With brief layout explain solar thermal power plant.

b) 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 **Q**

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

Day & Date: Saturday,14-12-2019 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) 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) Running cost of which plant is least?
   a) Hydroelectric plant b) Thermal power plant
   c) Nuclear power plant d) Gas turbine plant

2) Water is supplied to a boiler _____.
   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

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 b) economizer
   c) condenser d) super-heaters

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

8) The equipment installed in power plants to reduce air pollution due to smoke is _____.
   a) Induced draft fans b) De-super heaters
   c) Electrostatic precipitators d) Re-heaters

9) Which of the following enters the super heater of a boiler?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam

10) For high head and minimum discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine b) Francis turbine
   c) Pelton wheel d) None of the above

11) Which auxiliary of gas turbine consumes most of the power?
   a) Compressor 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 _____.
   a) Horizontal b) Supercharged
   c) Slow speed d) Air cooled

14) A surge tank is provided near _____.
   a) Penstock b) Trash rack
   c) Spillway d) Turbine

Seat No.	

Set **Q**

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

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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.

Q.5 Solve any two **12**

a) With brief layout explain solar thermal power plant.

b) 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**

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

Day & Date: Saturday,14-12-2019 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) 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) A Thermalpower plant works on _____.
   a) Carnot cycle b) Brayton cycle
   c) Dual cycle d) Rankine cycle

2) Diesel engines for power plants are usually _____.
   a) Horizontal b) Supercharged
   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 _____.
   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

6) 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

7) In a steam turbine cycle, the lowest pressure occurs in _____.
   a) turbine inlet b) condenser
   c) boiler d) super heater

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

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

11) The equipment installed in power plants to reduce air pollution due to smoke is _____.
   a) Induced draft fans
   b) De-super heaters
   c) Electrostatic precipitators
   d) Re-heaters

12) Which of the following enters the super heater of a boiler?
   a) Cold water
   b) Hot water
   c) Wet steam
   d) Super-heated steam

13) For high head and minimum discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine
   b) Francis turbine
   c) Pelton wheel
   d) None of the above

14) Which auxiliary of gas turbine consumes most of the power?
   a) Compressor
   b) Combustion chamber
   c) Burner
   d) Fuel pump

Seat No.	

Set **R**

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

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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.

Q.5 Solve any two **12**

a) With brief layout explain solar thermal power plant.

b) 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 **S**

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

Day & Date: Saturday,14-12-2019 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) 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 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

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 b) Load-duration curve
   c) Monograph d) Hydrograph

4) In a steam power plant water is used for cooling purposes in _____.
   a) boiler b) economizer
   c) condenser d) super-heaters

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

6) The equipment installed in power plants to reduce air pollution due to smoke is _____.
   a) Induced draft fans b) De-super heaters
   c) Electrostatic precipitators d) Re-heaters

7) Which of the following enters the super heater of a boiler?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam

8) For high head and minimum discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine b) Francis turbine
   c) Pelton wheel d) None of the above

9) Which auxiliary of gas turbine consumes most of the power?
   a) Compressor b) Combustion chamber
   c) Burner d) Fuel pump

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 _____.
   a) Horizontal
   b) Supercharged
   c) Slow speed
   d) Air cooled

12) A surge tank is provided near _____.
   a) Penstock
   b) Trash rack
   c) Spillway
   d) Turbine

13) Running cost of which plant is least?
   a) Hydroelectric plant
   b) Thermal power plant
   c) Nuclear power plant
   d) Gas turbine plant

14) Water is supplied to a boiler _____.
   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.	

Set **S**

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

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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.

Q.5 Solve any two **12**

a) With brief layout explain solar thermal power plant.

b) 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 **P**

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

Day & Date: Tuesday,17-12-2019 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 Page No.3
2) Assume suitable data if required.
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**

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 _____.
   a) voltage divider biasing
   b) base resistance biasing
   c) emitter resistor biasing
   d) feedback resistor biasing

3) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
   a) True b) False

4) The unit of h_{ie} parameter is _____.
   a) Mho b) Farad
   c) Ohm d) Unitless

5) 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 b) II & III
   c) Only I d) None of these

6) An FET is _____.
   a) Bipolar transistor b) Unipolar transistor
   c) Tri-polar transistor d) None of these

7) The ideal value of input impedance of JFET is _____.
   a) Zero b) Infinite
   c) Non zero d) None of these

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) 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.	

Set P

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

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

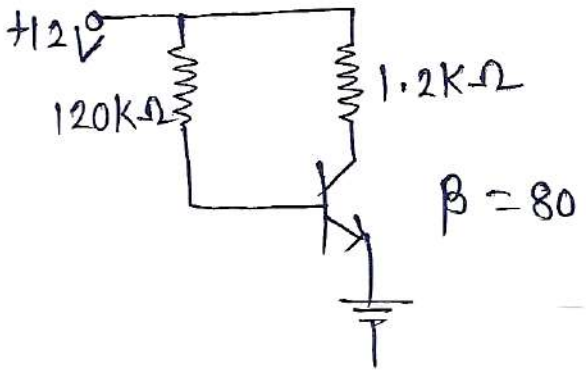
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four **16**

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.



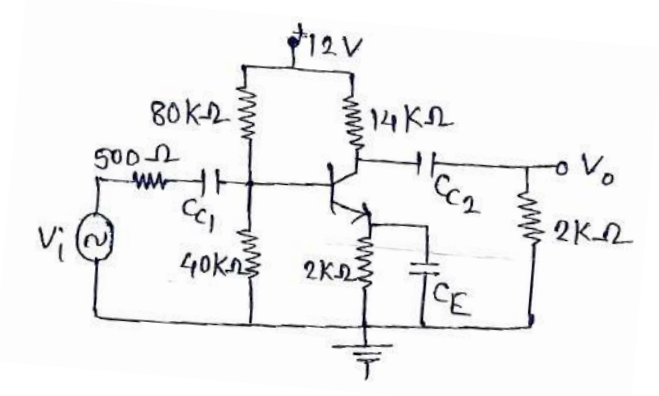
c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.

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 **12**

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.



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 **16**

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. **12**

a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at 2KΩ 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.

Seat No.	

Set **Q**

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

Day & Date: Tuesday,17-12-2019 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 Page No.3
2) Assume suitable data if required.
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**

1) The unit of h_{ie} parameter is _____.
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3) An FET is _____.
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4) The ideal value of input impedance of JFET is _____.
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5) In a bipolar junction transistor the base region is made very thin so that _____.
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   c) base can be easily biased
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6) The biasing circuit that gives best stability to Q point is _____.
   a) voltage divider biasing
   b) base resistance biasing
   c) emitter resistor biasing
   d) feedback resistor biasing

7) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
   a) True b) False

8 to 11: Match the correct pairs

Group A	Group B
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	e) Q in between middle of DC load line & cut off point
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   a) Decreases
   b) Becomes zero
   c) Increases
   d) Is unchanged

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.	

Set **Q**

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

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

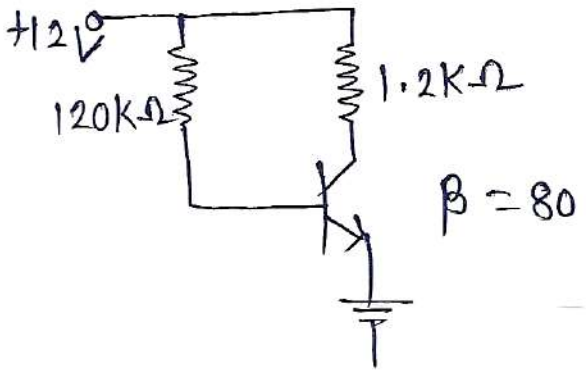
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four **16**

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.



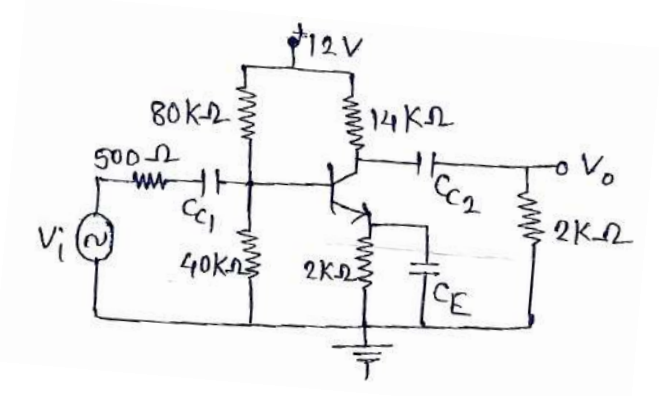
c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.

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 **12**

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.



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 **16**

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. **12**

a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at 2KΩ 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.

Seat No.	

Set **R**

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

Day & Date: Tuesday,17-12-2019 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 Page No.3
2) Assume suitable data if required.
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

1) An FET is _____.
   a) Bipolar transistor b) Unipolar transistor
   c) Tri-polar transistor d) None of these

2) The ideal value of input impedance of JFET is _____.
   a) Zero b) Infinite
   c) Non zero d) None of these

3) 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

4) The biasing circuit that gives best stability to Q point is _____.
   a) voltage divider biasing
   b) base resistance biasing
   c) emitter resistor biasing
   d) feedback resistor biasing

5) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
   a) True b) False

6) The unit of h_{ie} parameter is _____.
   a) Mho b) Farad
   c) Ohm d) Unitless

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 b) II & III
   c) Only I d) None of these

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) 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.	

Set **R**

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

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

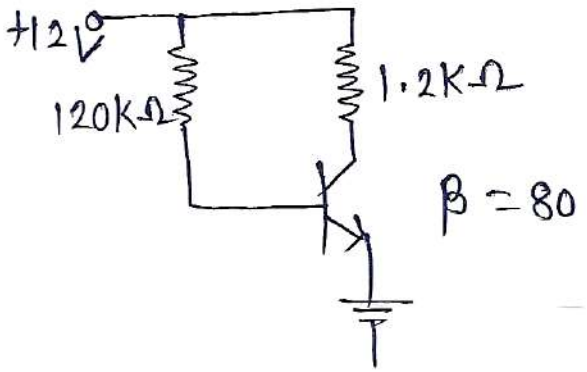
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four **16**

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.



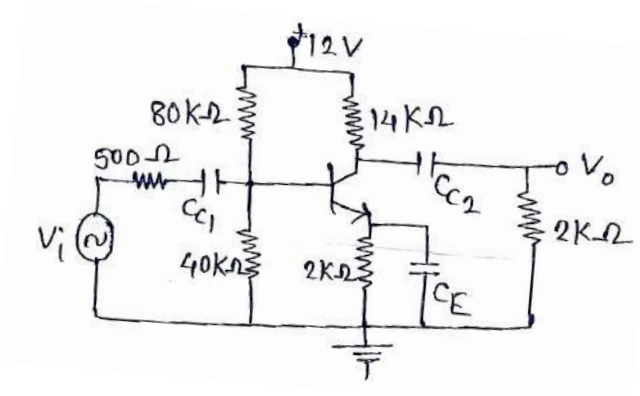
c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.

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 **12**

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.



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 **16**

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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?

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c) Define & determine overall efficiency and collector efficiency of RC coupled class A power amplifier with neat diagram.

Seat No.	

Set **S**

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

Day & Date: Tuesday,17-12-2019 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 Page No.3
2) Assume suitable data if required.
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

1) The biasing circuit that gives best stability to Q point is _____.
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   b) base resistance biasing
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   c) Increases
   d) Is unchanged

14) An oscillator employs _____ feedback.
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   c) Neither positive nor negative
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Seat No.	

Set **S**

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

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

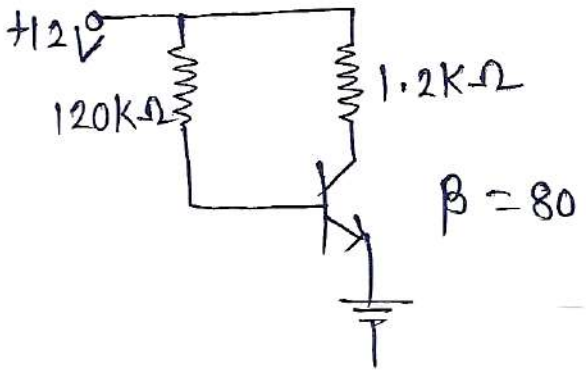
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four **16**

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.



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d) Explain Darlington pair configuration with neat diagram.

e) Define the following small signal parameters of JFET
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2) Amplification factor
3) DC drain resistance
4) Transconductance

Q.3 Solve any Two **12**

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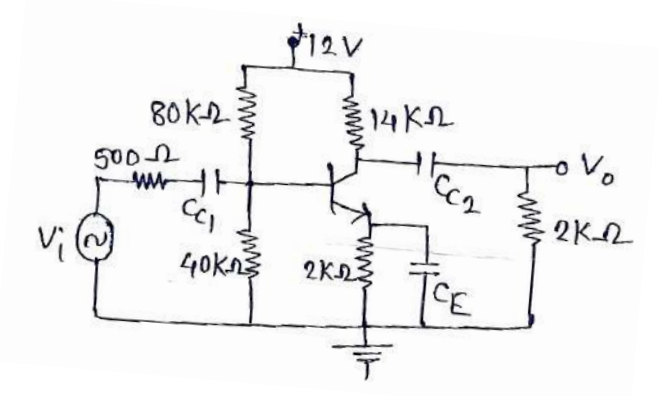

b) Derive expression for operating point voltage, current and stability factor of voltage divider biasing circuit.

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Section - II

Q.4 Solve any four **16**

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Seat No.	

Set P

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

Day & Date: Friday, 22-11-2019 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.
3) Use of non programmable calculator is allowed.

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 order of convergence of Newton-Raphson method is _____.
   a) 1 b) 3
   c) 0 d) 2

2) For solving set of equation $AX = B$, in which the matrix *A* is transformed to diagonal matrix _____.
   a) Gauss-Seidal method b) Gauss elimination method
   c) 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

4) 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

5) If $\frac{dy}{dx} = 1 + x$ and $y(0) = 1$ then Picard's first approximation y, is _____.
   a) $1 + x + \frac{x^2}{2}$ b) $-1 + x + \frac{x^2}{2}$
   c) $1 + x - \frac{x^2}{2}$ 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 b) Simpson one third rule
   c) Simpson three eight rule d) None of the above

7) 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

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 $V_1\ V_2$ 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

10) The rank of a matrix A. denoted by rank A, is the dimension of _____ of A.
   a) The matrix
   b) The null space
   c) The row space
   d) The column space

11) The eigen values of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 9 \end{bmatrix}$ are _____.
   a) 1,2,9
   b) 0,2,0
   c) 1,0,0
   d) 0,0,9

12) If the inner product of two vectors u and v is unity then vectors are _____.
   a) Orthogonal
   b) Orthonormal
   c) Linearly dependent
   d) Linearly independent

13) 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) $\|-b - A\hat{X}\|$

14) 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

Seat No.	

Set **P**

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

Day & Date: Friday,22-11-2019 Max. Marks: 56
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. **09**

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

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

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. **09**

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.

$x + 2y + z = 3$
$2x + 3y + 3z = 10$
$3x - y + 2z = 13$

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. **10**

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

$x + 5y + z = 14$
$2x + y + 3z = 13$
$3x + y + 4z = 17$

b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Romberg's Method. Hence obtain an approximate value of π.

c) Evaluate $\int_0^1 \int_0^1 e^{x+y} dxdy$ using $h = k = 0.5$ using Trapezoidal Rule. Also evaluate directly and compare the error.

Section – II

Q.5 Attempt any three of the following questions. **09**

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 $AX = b$

$A = \begin{bmatrix} 3 & 5 & -4 \\ -3 & -2 & 4 \\ 6 & 1 & -8 \end{bmatrix}$ 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

$V_1 = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} . V_2 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} . V_3 = \begin{bmatrix} -5 \\ -2 \\ 1 \end{bmatrix}$

Q.6 Attempt any three of the following questions. **09**

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. **10**

a) Find the largest eigen value of the matrix

$A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix}$ and $x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ 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 $A = \begin{bmatrix} 3 & -2 & 4 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$

Seat No.	

Set **Q**

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

Day & Date: Friday, 22-11-2019 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.
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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

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   b) Every row echelon matrix is also row reduced echelon matrix
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Seat No.	

Set **Q**

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

Day & Date: Friday,22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

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$8x + 3y + 2z = 13$
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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. **09**

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.

$x + 2y + z = 3$
$2x + 3y + 3z = 10$
$3x - y + 2z = 13$

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. **10**

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

$x + 5y + z = 14$
$2x + y + 3z = 13$
$3x + y + 4z = 17$

b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Romberg's Method. Hence obtain an approximate value of π.

c) Evaluate $\int_0^1 \int_0^1 e^{x+y} dxdy$ using $h = k = 0.5$ using Trapezoidal Rule. Also evaluate directly and compare the error.

Section – II

Q.5 Attempt any three of the following questions. **09**

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 $AX = b$

$A = \begin{bmatrix} 3 & 5 & -4 \\ -3 & -2 & 4 \\ 6 & 1 & -8 \end{bmatrix}$ 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

$V_1 = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} . V_2 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} . V_3 = \begin{bmatrix} -5 \\ -2 \\ 1 \end{bmatrix}$

Q.6 Attempt any three of the following questions. **09**

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. **10**

a) Find the largest eigen value of the matrix

$A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix}$ and $x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ 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 $A = \begin{bmatrix} 3 & -2 & 4 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$

Seat No.	

Set **R**

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

Day & Date: Friday, 22-11-2019 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.
3) Use of non programmable calculator is allowed.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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

1) If $\frac{dy}{dx} = 1 + x$ and $y(0) = 1$ then Picard's first approximation y, is _____.
   a) $1 + x + \frac{x^2}{2}$ b) $-1 + x + \frac{x^2}{2}$
   c) $1 + x - \frac{x^2}{2}$ d) $1 - x + \frac{x^2}{2}$

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
   c) Simpson three eight rule d) None of the above

3) 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

4) 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

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

6) The rank of a matrix A. denoted by rank A, is the dimension of _____ of A.
   a) The matrix b) The null space
   c) The row space d) The column space

7) The eigen values of the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 9 \end{bmatrix}$ are _____.
   a) 1,2,9 b) 0,2,0
   c) 1,0,0 d) 0,0,9

8) If the inner product of two vectors u and v is unity then vectors are _____.
   a) Orthogonal b) Orthonormal
   c) Linearly dependent d) Linearly independent

9) 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) $\|-b - A\hat{X}\|$

10) 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

11) The order of convergence of Newton-Raphson method is _____.
   a) 1 b) 3
   c) 0 d) 2

12) For solving set of equation $AX = B,$ in which the matrix *A* is transformed to diagonal matrix _____.
   a) Gauss-Seidal method b) Gauss elimination method
   c) Gauss Jordan method d) 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.	

Set **R**

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

Day & Date: Friday,22-11-2019 Max. Marks: 56
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. **09**

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

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

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. **09**

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.

$x + 2y + z = 3$
$2x + 3y + 3z = 10$
$3x - y + 2z = 13$

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. **10**

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

$x + 5y + z = 14$
$2x + y + 3z = 13$
$3x + y + 4z = 17$

b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Romberg's Method. Hence obtain an approximate value of π.

c) Evaluate $\int_0^1 \int_0^1 e^{x+y} dxdy$ using $h = k = 0.5$ using Trapezoidal Rule. Also evaluate directly and compare the error.

Section – II

Q.5 Attempt any three of the following questions. **09**

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 $AX = b$

$A = \begin{bmatrix} 3 & 5 & -4 \\ -3 & -2 & 4 \\ 6 & 1 & -8 \end{bmatrix}$ 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

$V_1 = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} . V_2 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} . V_3 = \begin{bmatrix} -5 \\ -2 \\ 1 \end{bmatrix}$

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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. **10**

a) Find the largest eigen value of the matrix

$A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix}$ and $x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ 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 $A = \begin{bmatrix} 3 & -2 & 4 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$

Seat No.	

Set **S**

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

Day & Date: Friday, 22-11-2019 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.
3) Use of non programmable calculator is allowed.

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 rank of a matrix A. denoted by rank A, is the dimension of _____ of A.
   a) The matrix b) The null space
   c) The row space d) The column space

2) The eigen values of the matrix $\begin{bmatrix}1 & 0 & 0\\0 & 2 & 0\\0 & 0 & 9\end{bmatrix}$ are _____.
   a) 1,2,9 b) 0,2,0
   c) 1,0,0 d) 0,0,9

3) If the inner product of two vectors u and v is unity then vectors are _____.
   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) $\|-b - A\hat{X}\|$

5) Let A be $n \times n$ symmetric, matrix then quadratic form $X'AX$ is positive definite _____.
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   c) iff all eigenvalues are nonzero
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   c) 0 d) 2

7) For solving set of equation $AX = B,$ in which the matrix *A* is transformed to diagonal matrix _____.
   a) Gauss-Seidal method b) Gauss elimination method
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8) 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 _____.
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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 _____.
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Seat No.	

Set **S**

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

Day & Date: Friday,22-11-2019 Max. Marks: 56
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. **09**

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

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

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. **09**

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.

$x + 2y + z = 3$
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$3x - y + 2z = 13$

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. **10**

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

$x + 5y + z = 14$
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$3x + y + 4z = 17$

b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ using Romberg's Method. Hence obtain an approximate value of π.

c) Evaluate $\int_0^1 \int_0^1 e^{x+y} dxdy$ using $h = k = 0.5$ using Trapezoidal Rule. Also evaluate directly and compare the error.

Section – II

Q.5 Attempt any three of the following questions. **09**

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 $AX = b$

$A = \begin{bmatrix} 3 & 5 & -4 \\ -3 & -2 & 4 \\ 6 & 1 & -8 \end{bmatrix}$ 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

$V_1 = \begin{bmatrix} 1 \\ -2 \\ 1 \end{bmatrix} . V_2 = \begin{bmatrix} 0 \\ 1 \\ 2 \end{bmatrix} . V_3 = \begin{bmatrix} -5 \\ -2 \\ 1 \end{bmatrix}$

Q.6 Attempt any three of the following questions. **09**

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. **10**

a) Find the largest eigen value of the matrix

$A = \begin{bmatrix} 5 & 0 & 1 \\ 0 & -2 & 0 \\ 1 & 0 & 5 \end{bmatrix}$ and $x_0 = \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ 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 $A = \begin{bmatrix} 3 & -2 & 4 \\ -2 & 6 & 2 \\ 4 & 2 & 3 \end{bmatrix}$

Seat No.	

Set **P**

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

Duration: 30 Minutes Marks: 14

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

1) 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

2) The circle diagram for an induction motor cannot be used to determine _____.
   a) efficiency b) power factor
   c) frequency d) Output

3) If the number of rotor slots is equal to number of stator slots, then motor refuses to start. Hence it is known as _____.
   a) cogging b) Crawling
   c) air gap d) relative speed

4) 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.

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 methods an induction motor draws high starting currents _____.
   a) Star-delta starter b) Auto transformer starter
   c) Direct on line starter d) Reduced voltage starter

7) Star-delta starting is equivalent to auto transformer starting with _____ tapping.
   a) 33.3% b) 50%
   c) 57.7% d) 83%

8) 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

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 _____.
   a) 5 kW b) 10 kW
   c) 20 kW d) 50 kW

10) Which torque is greater _____.
   a) Break down b) Full load
   c) No load d) Running

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.
   a) 50 b) 25
   c) 75 d) 57.7

12) 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

13) 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

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

Seat No.	

Set **P**

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

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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. **12**

a) Draw circle diagram for a 5 h.p., 200 V, 50 Hz, 4-pole, 3-phase, star-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:
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

Section –II

Q.4 Attempt any four of the following questions. **16**

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. **12**

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%

Seat No.	

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

Duration: 30 Minutes Marks: 14

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

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 kW b) 10 kW
   c) 20 kW d) 50 kW

3) 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

9) The circle diagram for an induction motor cannot be used to determine _____.
   a) efficiency b) power factor
   c) frequency d) Output

10) If the number of rotor slots is equal to number of stator slots, then motor refuses to start. Hence it is known as _____.
   a) cogging b) Crawling
   c) air gap d) relative speed

11) 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.

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

13) Under which of the following starting methods an induction motor draws high starting currents _____.
   a) Star-delta starter b) Auto transformer starter
   c) Direct on line starter d) Reduced voltage starter

14) Star-delta starting is equivalent to auto transformer starting with _____ tapping.
   a) 33.3% b) 50%
   c) 57.7% d) 83%

Seat No.	

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: 56
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. **16**

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. **12**

a) Draw circle diagram for a 5 h.p., 200 V, 50 Hz, 4-pole, 3-phase, star-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:
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

Section –II

Q.4 Attempt any four of the following questions. **16**

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. **12**

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%

Seat No.	

Set **R**

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

Duration: 30 Minutes Marks: 14

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

1) 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

2) Under which of the following starting methods an induction motor draws high starting currents _____.
   a) Star-delta starter b) 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) 50%
   c) 57.7% d) 83%

4) 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

5) 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 kW b) 10 kW
   c) 20 kW d) 50 kW

6) Which torque is greater _____.
   a) Break down b) Full load
   c) No load d) Running

7) 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

8) 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

9) 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

10) 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

11) 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

12) The circle diagram for an induction motor cannot be used to determine _____.
   a) efficiency b) power factor
   c) frequency d) Output

13) If the number of rotor slots is equal to number of stator slots, then motor refuses to start. Hence it is known as _____.
   a) cogging b) Crawling
   c) air gap d) relative speed

14) 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.

Seat No.	

Set **R**

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

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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. **12**

a) Draw circle diagram for a 5 h.p., 200 V, 50 Hz, 4-pole, 3-phase, star-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:
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

Section –II

Q.4 Attempt any four of the following questions. **16**

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. **12**

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%

Seat No.	

Set **S**

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

Duration: 30 Minutes Marks: 14

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

1) Which torque is greater _____.
   a) Break down b) Full load
   c) No load d) Running

2) 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

3) 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

4) 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

5) 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

6) 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

7) The circle diagram for an induction motor cannot be used to determine _____.
   a) efficiency b) power factor
   c) frequency d) Output

8) If the number of rotor slots is equal to number of stator slots, then motor refuses to start. Hence it is known as _____.
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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 _____.
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   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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12) Star-delta starting is equivalent to auto transformer starting with _____ tapping.
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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 kW b) 10 kW
   c) 20 kW d) 50 kW

Seat No.	

Set **S**

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

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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. **12**

a) Draw circle diagram for a 5 h.p., 200 V, 50 Hz, 4-pole, 3-phase, star-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:
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

Section –II

Q.4 Attempt any four of the following questions. **16**

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. **12**

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%

Seat No.	

Set **P**

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

Day & Date: Monday, 25-11-2019 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 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) 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

2) Maximum permissible span for wooden poles is _____.
   a) from 2 to 5 years b) 10 to 15 years
   c) 25 to 30 years d) 60 to 70 years

3) The rated voltage of a 3 phase power system is given as _____.
   a) rms phase voltage b) peak phase voltage
   c) peak line to line voltage d) rms line to line voltage

4) The underground system cannot be operated above _____.
   a) 440 V b) 11 Kv
   c) 33 kV d) 66 kV

5) 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

6) The voltage of the single phase supply to residential consumers is _____.
   a) 110 V b) 210 V
   c) 230 V d) 400 V

7) 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

8) In a substation the following equipment is not installed _____.
   a) Exciters b) series capacitors
   c) shunt reactors d) voltatre transformers

9) 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
   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.	

Set **P**

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

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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 **16**

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 **12**

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 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.

Section – II

Q.4 Solve Any Four **16**

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 0.1 Ω, 0.5 Ω 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

Seat No.	

Set **Q**

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

Day & Date: Monday, 25-11-2019 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 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) In a substation the following equipment is not installed _____.
   a) Exciters b) series capacitors
   c) shunt reactors d) voltatre transformers

2) 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

3) 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

4) 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

5) The effect of wind pressure is more predominant on _____.
   a) transmission lines b) neutral wires
   c) insulator d) Supporting tower

6) 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

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
   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

8) 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

9) Maximum permissible span for wooden poles is _____.
   a) from 2 to 5 years
   b) 10 to 15 years
   c) 25 to 30 years
   d) 60 to 70 years

10) The rated voltage of a 3 phase power system is given as _____.
   a) rms phase voltage
   b) peak phase voltage
   c) peak line to line voltage
   d) rms line to line voltage

11) The underground system cannot be operated above _____.
   a) 440 V
   b) 11 Kv
   c) 33 kV
   d) 66 kV

12) 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

13) The voltage of the single phase supply to residential consumers is _____.
   a) 110 V
   b) 210 V
   c) 230 V
   d) 400 V

14) 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

Seat No.	

Set **Q**

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

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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 **16**

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 **12**

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 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.

Section – II

Q.4 Solve Any Four **16**

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 0.1 Ω, 0.5 Ω 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

Seat No.	

Set **R**

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

Day & Date: Monday, 25-11-2019 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 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) 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 _____.
   a) 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
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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

6) 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 b) neutral wires
   c) insulator d) Supporting tower

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
   c) Losses in the metallic sheathings and armourings
   d) All of the above

10) 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

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
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12) Maximum permissible span for wooden poles is _____.
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13) The rated voltage of a 3 phase power system is given as _____.
   a) rms phase voltage
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   c) peak line to line voltage
   d) rms line to line voltage

14) The underground system cannot be operated above _____.
   a) 440 V
   b) 11 Kv
   c) 33 kV
   d) 66 kV

Seat No.	

Set **R**

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

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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 **16**

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 **12**

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
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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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1) The voltage across various units expressed as a percentage of total voltage across the string
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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
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2) Voltage on the intersheaths
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Section – II

Q.4 Solve Any Four **16**

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.

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e) A 3-phase, 50Hz, 150 km line has a resistance, inductive reactance and capacitive shunt admittance of 0.1 Ω, 0.5 Ω 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.

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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.	

Set **S**

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

Day & Date: Monday, 25-11-2019 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 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) ACSR conductors are used in transmission line in place of copper because _____.
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Seat No.		Set	S

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

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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 **16**

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Section – II

Q.4 Solve Any Four **16**

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b) Derive an expression for voltage regulation and efficiency of short transmission line along with the equivalent circuit and phasor diagram.

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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-414

Seat No.	

Set P

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

Day & Date: Tuesday, 26-11-2019 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.
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 a typical op-amp, which stage is supposed to be a dual-input unbalanced output or single-ended output differential amplifier?
   a) Input stage b) Intermediate stage
   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

3) 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.

4) For an inverting amplifier, if $R_f = 100k\Omega$ and $R_i = 1k\Omega$ then closed loop gain is _____.
   a) 1,00,000 b) 1,000
   c) 101 d) 100

5) 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
   c) Differential amplifier with three op-amps
   d) Differential amplifier with four op-amps

6) 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

7) Unity gain amplifier is also known as _____.
   a) difference amplifier b) comparator
   c) single ended d) voltage follower

8) A multiplexer is a combinational logic circuit used to perform the operation _____.
   a) AND-AND b) AND-OR
   c) NOR-OR d) XOR-NAND

9) The minterm designation for AB'C'D is_____
   a) m_0 b) m_9
   c) m_7 d) 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 b) Twisted ring counter
   c) Straight counter d) None of these

12) The main difference between JK and RS flip-flop is that _____
   a) JK flip-flop does not need a clock pulse
   b) here is feedback in JK flip-flop
   c) JK flip-flop accepts both inputs as 1
   d) JK flip-flop is acronym of junction cathode multivibrator

13) A digital circuit that can store on bit is a _____.
   a) XOR Gate b) Register
   c) Flipflop d) None of these

14) Twenty TTL loads per TTL driver is known as _____.
   a) noise immunity b) fan-out
   c) propagation delay d) power dissipation

Seat No.	

Set **P**

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

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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. $F(A,B,C,D) = \pi M(1,3,6,7,9,12)$

Seat No.	

Set **Q**

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

Day & Date: Tuesday, 26-11-2019 Max. Marks: 70
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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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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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

1) A multiplexer is a combinational logic circuit used to perform the operation _____.
   a) AND-AND b) AND-OR
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2) The minterm designation for AB'C'D is_____
   a) m_0 b) m_9
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3) Shifting a register content to right by one bit position is equivalent to_____.
   a) Division by two b) Multiplication by two
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   c) JK flip-flop accepts both inputs as 1
   d) JK flip-flop is acronym of junction cathode multivibrator

6) A digital circuit that can store on bit is a _____.
   a) XOR Gate b) Register
   c) Flipflop d) None of these

7) Twenty TTL loads per TTL driver is known as _____.
   a) noise immunity b) fan-out
   c) propagation delay d) power dissipation

8) In a typical op-amp, which stage is supposed to be a dual-input unbalanced output or single-ended output differential amplifier?
   a) Input stage b) Intermediate stage
   c) Output stage d) Level shifting stage

9) The large signal bandwidth of an op-amp is limited by its _____.
   a) loop gain
   b) slew rate
   c) output impedance
   d) input frequency

10) 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.

11) For an inverting amplifier, if $R_f = 100k\Omega$ and $R_i = 1k\Omega$ then closed loop gain is _____.
   a) 1,00,000
   b) 1,000
   c) 101
   d) 100

12) 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
   c) Differential amplifier with three op-amps
   d) Differential amplifier with four op-amps

13) 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

14) Unity gain amplifier is also known as _____.
   a) difference amplifier
   b) comparator
   c) single ended
   d) voltage follower

Seat No.	

Set **Q**

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

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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. $F(A,B,C,D) = \pi M(1,3,6,7,9,12)$

Seat No.	

Set **R**

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

Day & Date: Tuesday, 26-11-2019 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.
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) 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
   c) Differential amplifier with three op-amps
   d) Differential amplifier with four op-amps

2) 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

3) Unity gain amplifier is also known as _____.
   a) difference amplifier b) comparator
   c) single ended d) voltage follower

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

5) The minterm designation for AB'C'D is_____
   a) m_0 b) m_9
   c) m_7 d) m_{10}

6) 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

7) In _____ type of counter, the complementary output of the last stage is connected to the D input of first stage.
   a) Ring Counter b) Twisted ring counter
   c) Straight counter d) None of these

8) The main difference between JK and RS flip-flop is that _____
   a) JK flip-flop does not need a clock pulse
   b) here is feedback in JK flip-flop
   c) JK flip-flop accepts both inputs as 1
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9) A digital circuit that can store on bit is a _____.
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   c) Flipflop d) None of these

10) Twenty TTL loads per TTL driver is known as _____.
   a) noise immunity b) fan-out
   c) propagation delay d) power dissipation

11) In a typical op-amp, which stage is supposed to be a dual-input unbalanced output or single-ended output differential amplifier?
   a) Input stage b) Intermediate stage
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12) The large signal bandwidth of an op-amp is limited by its _____.
   a) loop gain b) slew rate
   c) output impedance d) input frequency

13) 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.

14) For an inverting amplifier, if $R_f = 100k\Omega$ and $R_i = 1k\Omega$ then closed loop gain is _____.
   a) 1,00,000 b) 1,000
   c) 101 d) 100

Seat No.	

Set **R**

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

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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. $F(A,B,C,D) = \pi M(1,3,6,7,9,12)$

Seat No.	

Set **S**

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

Day & Date: Tuesday, 26-11-2019 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.
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) 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

2) In _____ type of counter, the complementary output of the last stage is connected to the D input of first stage.
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   c) Straight counter d) None of these

3) The main difference between JK and RS flip-flop is that _____
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   c) Flipflop d) None of these

5) Twenty TTL loads per TTL driver is known as _____.
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   c) propagation delay d) power dissipation

6) In a typical op-amp, which stage is supposed to be a dual-input unbalanced output or single-ended output differential amplifier?
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7) The large signal bandwidth of an op-amp is limited by its _____.
   a) loop gain b) slew rate
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8) CMRR of a differential amplifier can be improved by decreasing _____.
   a) Differential voltage gain b) Common mode voltage gain
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9) For an inverting amplifier, if $R_f = 100k\Omega$ and $R_i = 1k\Omega$ then closed loop gain is _____.
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10) Which of the following is a combination of inverting and non-inverting amplifier?
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   c) single ended d) voltage follower

13) A multiplexer is a combinational logic circuit used to perform the operation _____.
   a) AND-AND b) AND-OR
   c) NOR-OR d) XOR-NAND

14) The minterm designation for AB'C'D is_____
   a) m_0 b) m_9
   c) m_7 d) m_{10}

SLR-FM-414

Seat No.	

Set S

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

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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. $F(A,B,C,D) = \pi M(1,3,6,7,9,12)$

Seat No.	

Set **P**

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

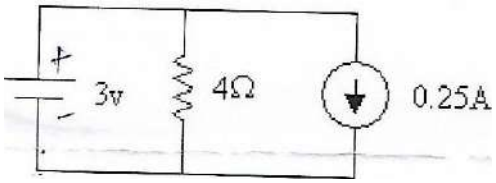
Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
2) Figures to the right indicates full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

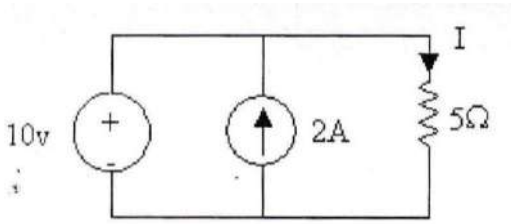
Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

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



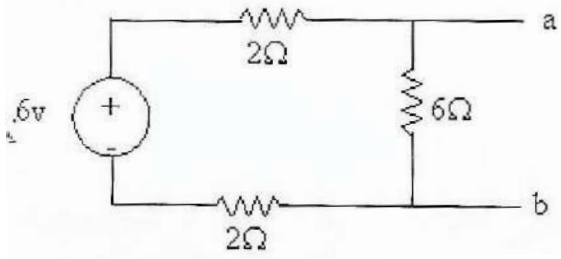
a) 0.25 A b) 0.75 A
c) 0.5 A d) 1.0 A

2) Calculate current I of the circuit shown below.



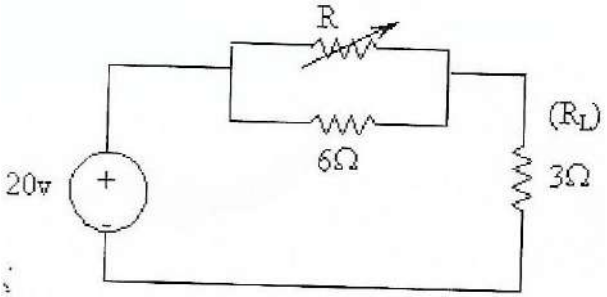
a) 4 A b) 2 A
c) -2 A d) -4 A

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



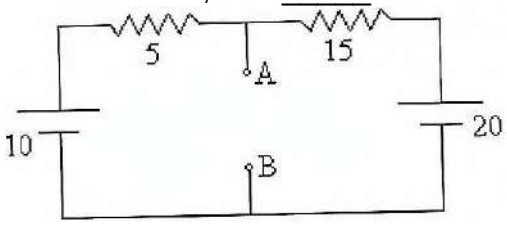
a) 6V, 2.4 Ω b) 3.6V, 2 Ω
c) 3.6V, 2.4 Ω d) 2V, 10 Ω

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



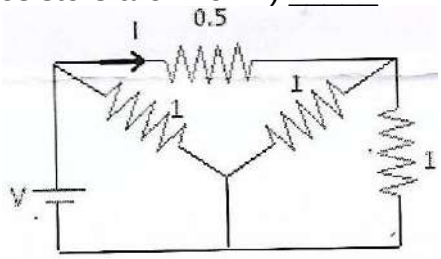
a) 0 Ω
b) 6 Ω
c) 9 Ω
d) 2 Ω

5) The Norton's equivalent across A, B is _____.



a) 3 A, 3 Ω
b) 2 A, 2.5 Ω
c) 3.3 A, 3.75 Ω
d) 3.3 A, 3.0 Ω

6) 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) _____.



a) 5 V
b) 3 V
c) 2 V
d) 1 V

7) 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

8) A capacitor does not allow sudden changes in _____.
a) currents
b) Voltages
c) both a and b
d) none of Above

9) 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*)

10) The time constant of a series RC circuit is _____.
a) 1/RC
b) R/C
c) RC
d) e^{-RC}

11) The Laplace transform of $t^3\delta(t-4)$ is _____.
   a) $4^3\ e^{-4s}$ b) 3^4e^{3s}
   c) $e^{4s}3^2$ d) None of these

12) $L[e^t]$ is: _____.
   a) 1/s-log2 b) 1/s+log2
   c) 1/s+2 d) none of these

13) 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) $Z_{11}\ Z_{22} - Z_{12}\ Z_{21} = 1$

14) 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

Seat No.	

Set **P**

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

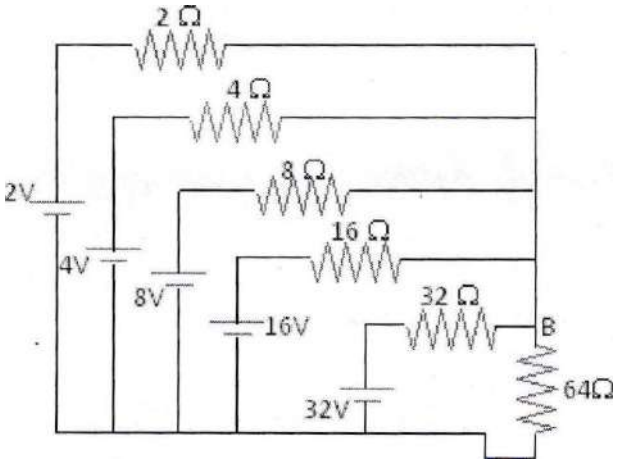
Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

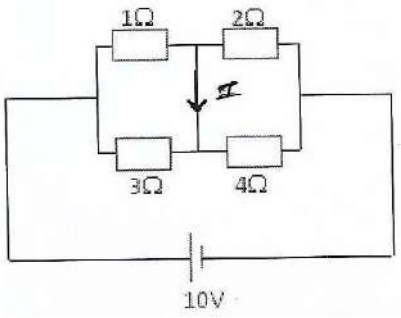
Section – I

Q.2 Solve any four. **16**

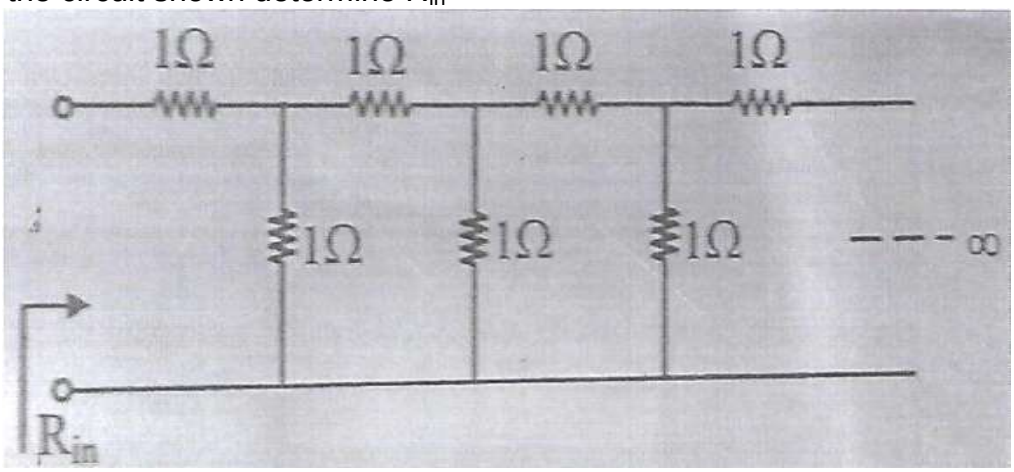
a) Obtain potential of node B with respect to node G in the network shown in the fig.



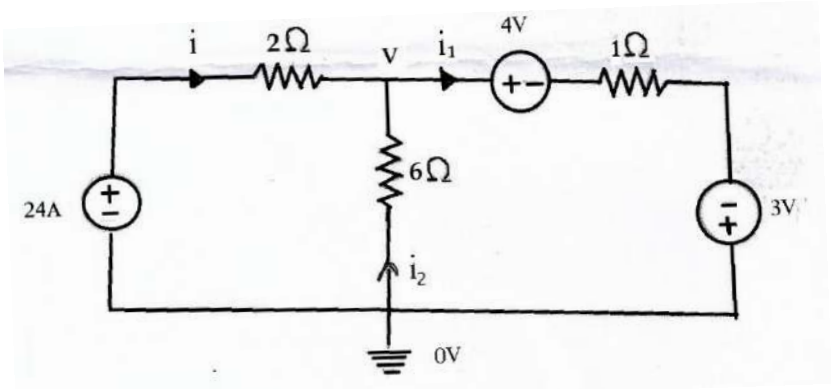
b) In the circuit shown in the given fig. determine Current I using Thevenin's Theorem.



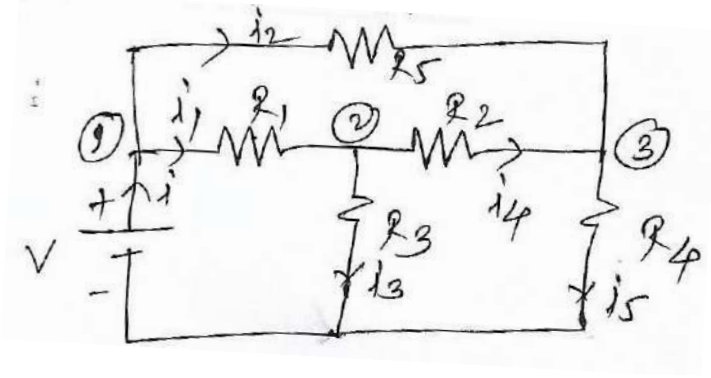
c) In the circuit shown determine R_{in}



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

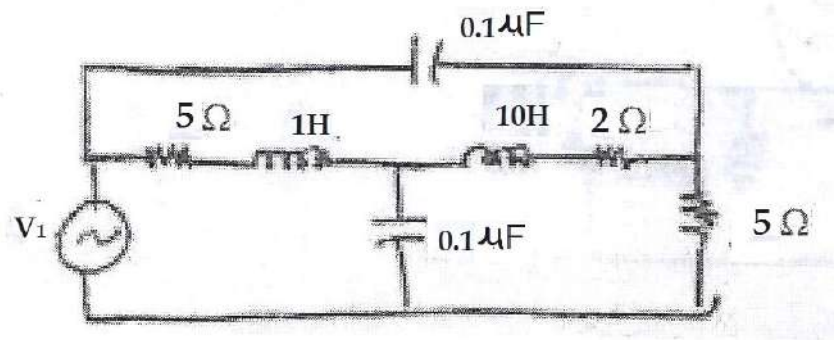


e) Draw graph of a network and Write incident matrix.

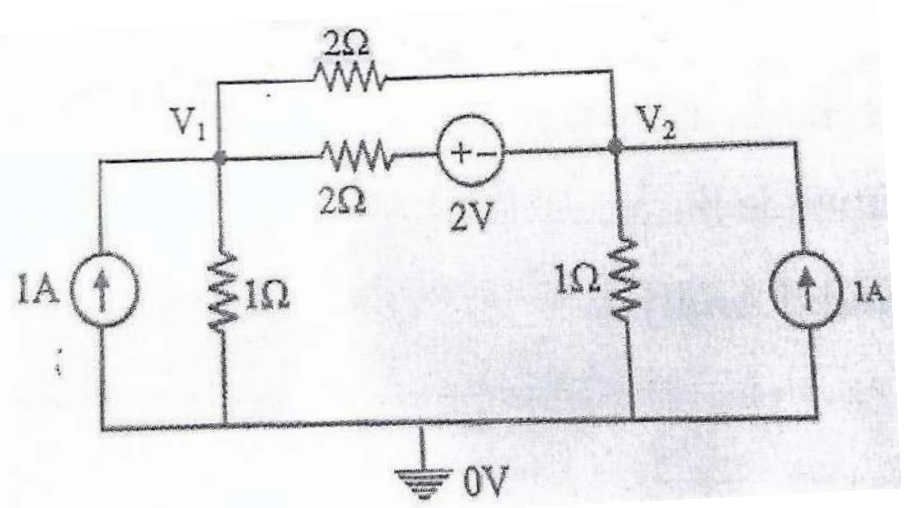


Q.3 Solve any two. **12**

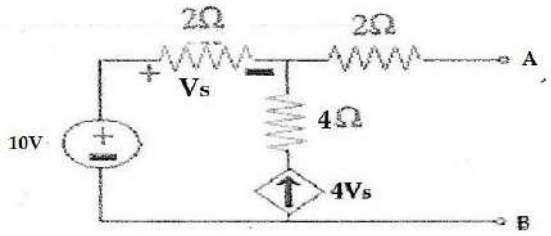
a) Find the duel network of the network shown.



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



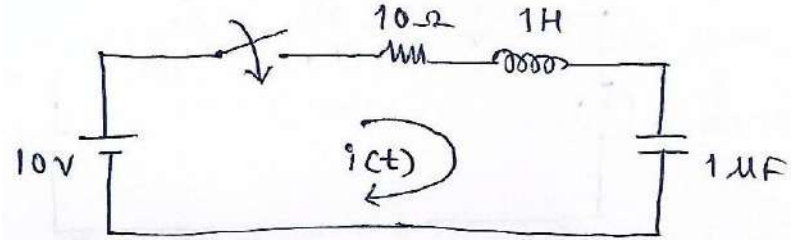
c) Find Norton's equivalent of the circuit shown in the given fig.



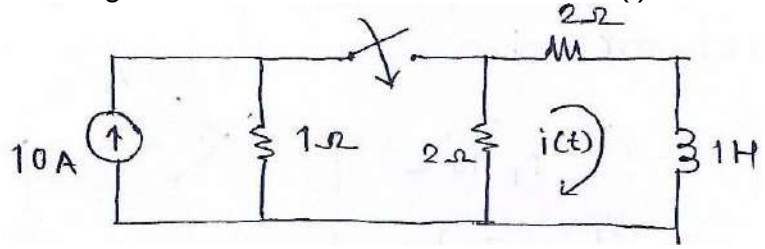
Section – II

Q.4 Solve any four. **16**

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

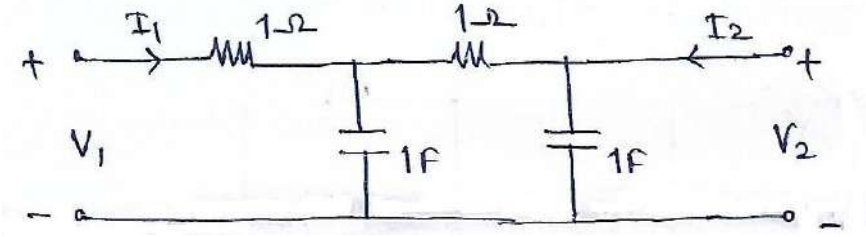


b) In the fig. the switch is closed at t = 0. Find i(t) for t>0.

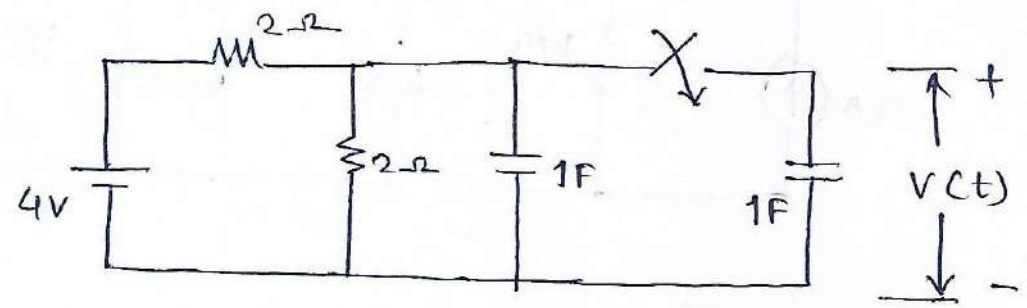


c) Derive ABCD parameter in terms of Y-parameter.

d) Determine admittance parameters of the network.

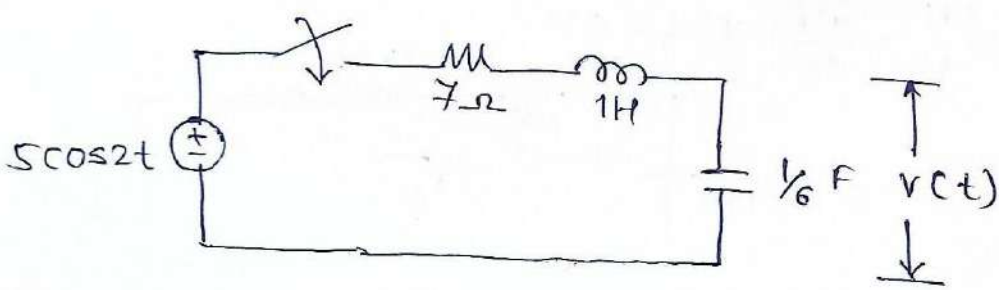


e) The network shown has acquired steady state at t < 0 with switch open. The switch is closed at t = 0. Determine v(t) using Laplace transform.

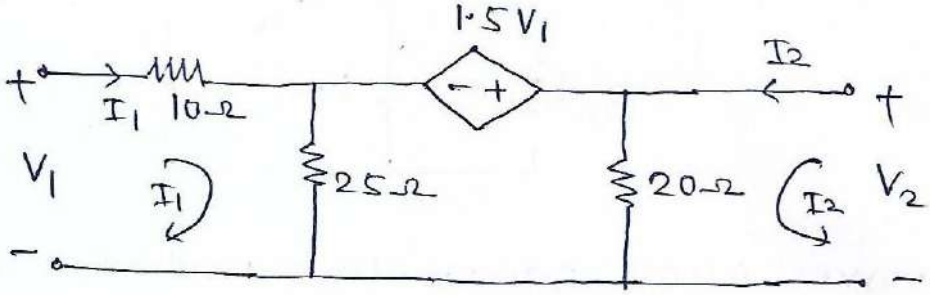


Q.5 Solve any two. **12**

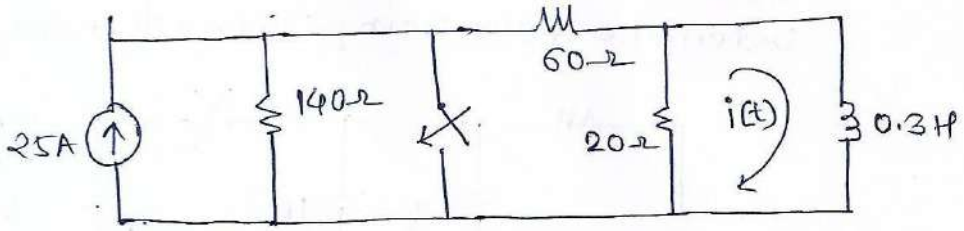
a) In the network shown, find voltage v(t) for t > 0 using Laplace transform.



b) Find transmission parameters for two port network shown.



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



SLR-FM-415

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

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) 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 _____.
   a) 1/RC b) R/C
   c) RC d) e^{-RC}

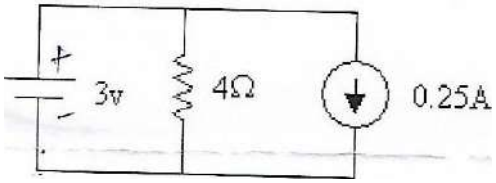
4) The Laplace transform of $t^3\delta(t-4)$ is _____.
   a) $4^3\ e^{-4s}$ b) 3^4e^{3s}
   c) $e^{4s}3^2$ d) None of these

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) $Z_{11}\ Z_{22} - Z_{12}\ Z_{21} = 1$

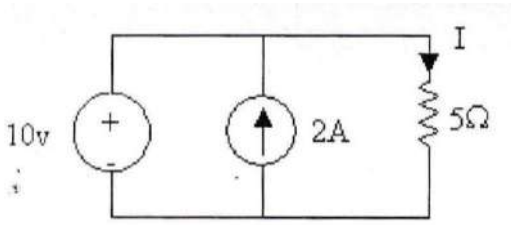
7) The number of possible combination generated by four variables taken to at a time in a two port network is: _____.
   a) 4 b) 2
   c) 6 d) none of these

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



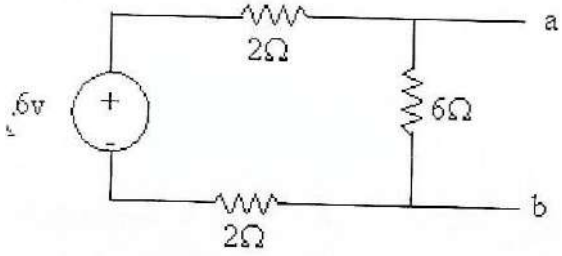
a) 0.25 A
b) 0.75 A
c) 0.5 A
d) 1.0 A

9) Calculate current I of the circuit shown below.



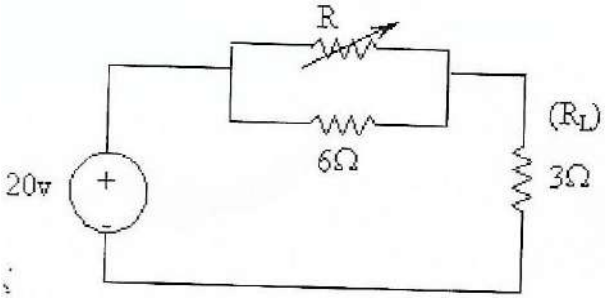
a) 4 A
b) 2 A
c) -2 A
d) -4 A

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



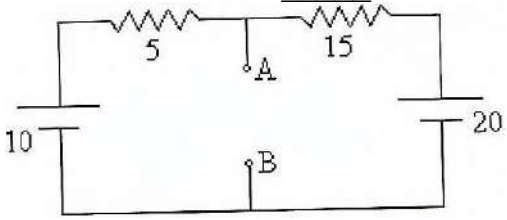
a) 6V, 2.4 Ω
b) 3.6V, 2 Ω
c) 3.6V, 2.4 Ω
d) 2V, 10 Ω

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



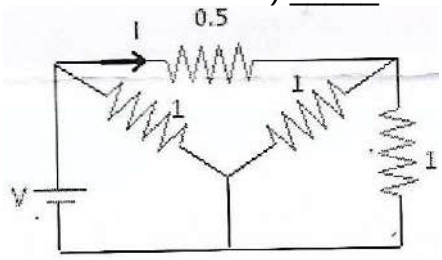
a) 0 Ω
b) 6 Ω
c) 9 Ω
d) 2 Ω

12) The Norton's equivalent across A, B is _____.



a) 3 A, 3 Ω
b) 2 A, 2.5 Ω
c) 3.3 A, 3.75 Ω
d) 3.3 A, 3.0 Ω

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) _____.



a) 5 V
b) 3 V
c) 2 V
d) 1 V

14) 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

Seat No.	

Set **Q**

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

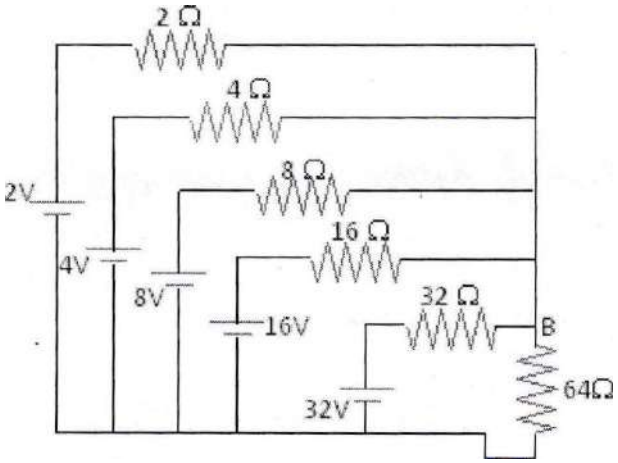
Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

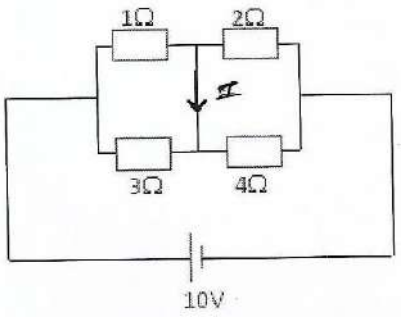
Section – I

Q.2 Solve any four. **16**

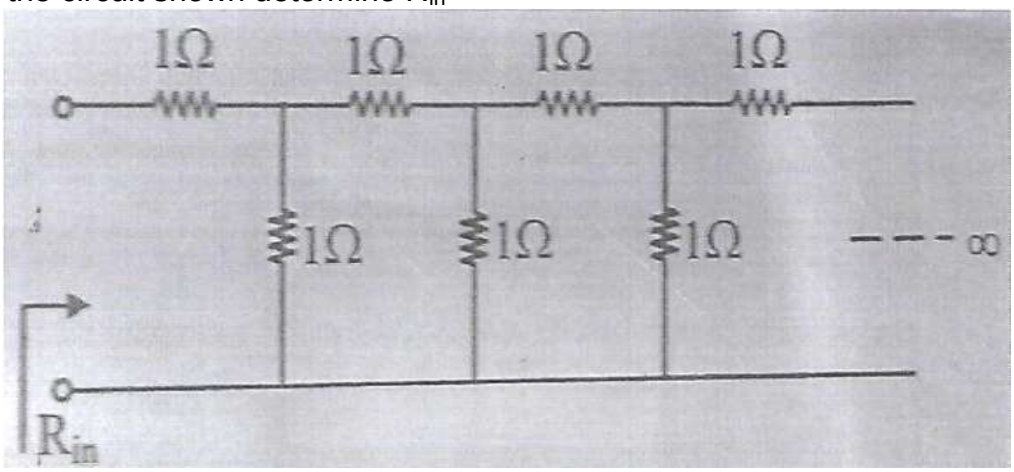
a) Obtain potential of node B with respect to node G in the network shown in the fig.



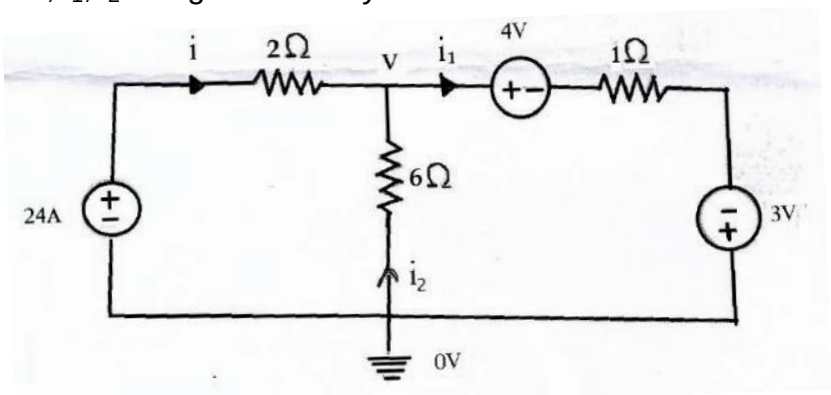
b) In the circuit shown in the given fig. determine Current I using Thevenin's Theorem.



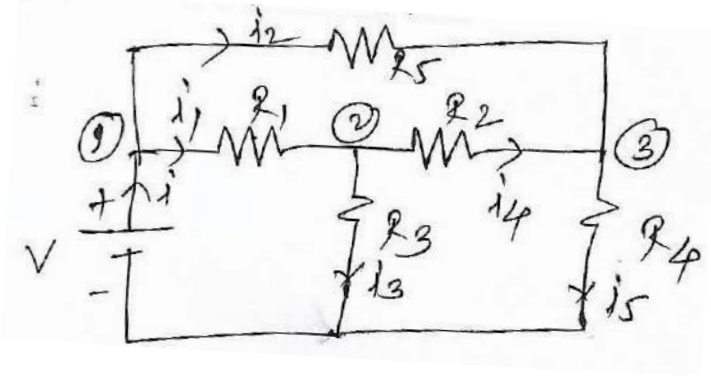
c) In the circuit shown determine R_{in}



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

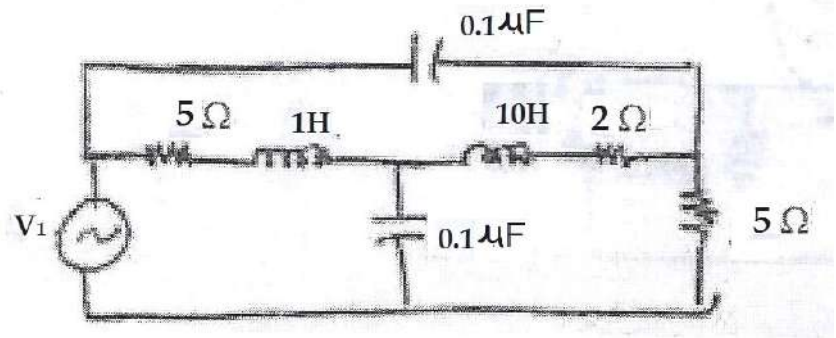


e) Draw graph of a network and Write incident matrix.

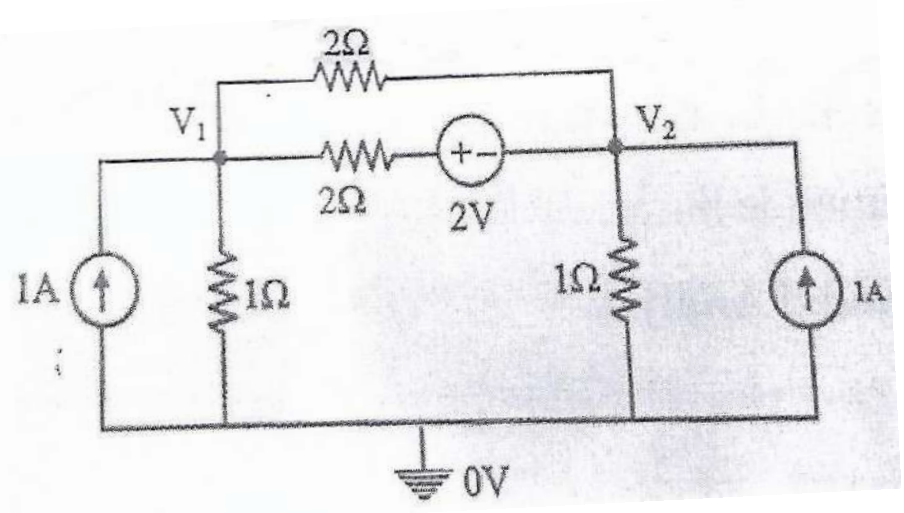


Q.3 Solve any two. **12**

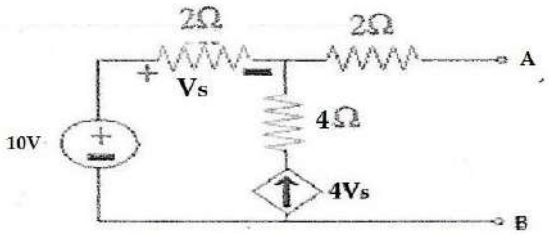
a) Find the duel network of the network shown.



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



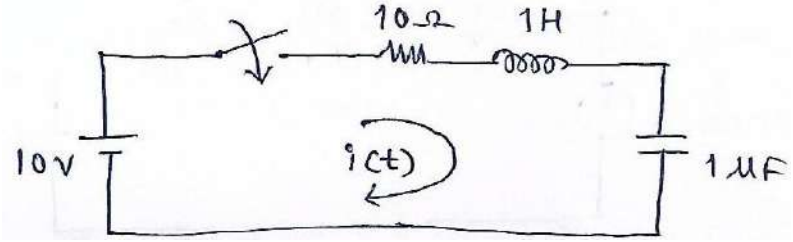
c) Find Norton's equivalent of the circuit shown in the given fig.



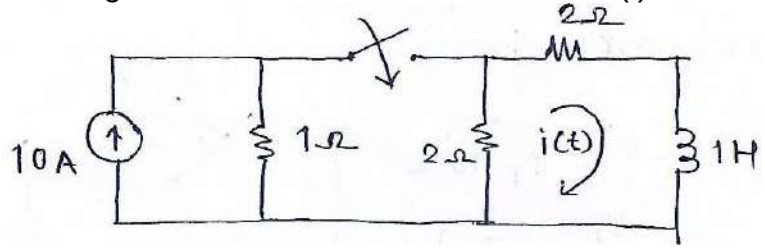
Section – II

Q.4 Solve any four. **16**

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

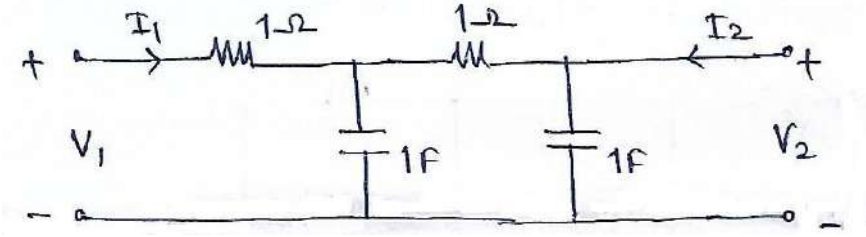


b) In the fig. the switch is closed at t = 0. Find i(t) for t>0.

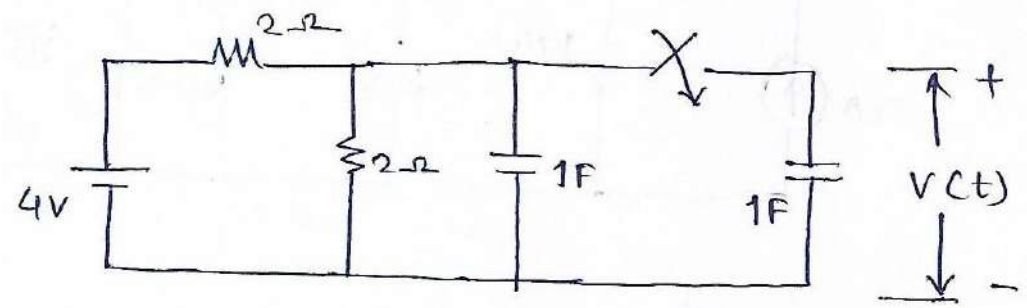


c) Derive ABCD parameter in terms of Y-parameter.

d) Determine admittance parameters of the network.

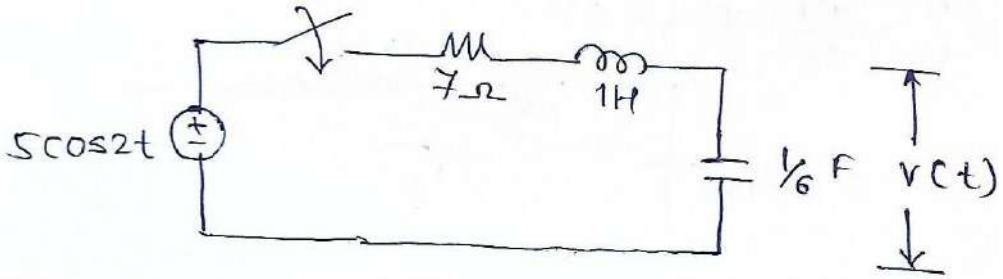


e) The network shown has acquired steady state at t < 0 with switch open. The switch is closed at t = 0. Determine v(t) using Laplace transform.

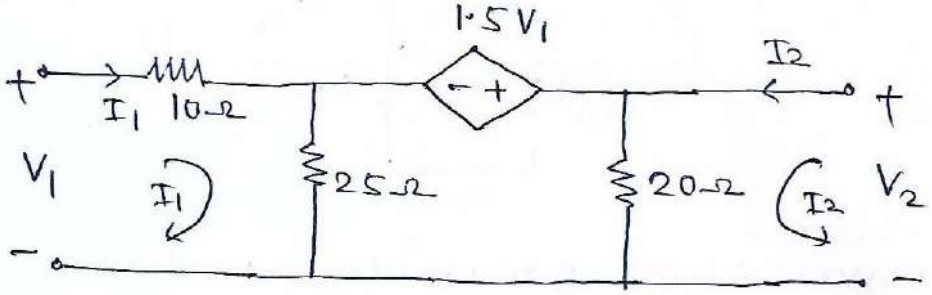


Q.5 Solve any two. **12**

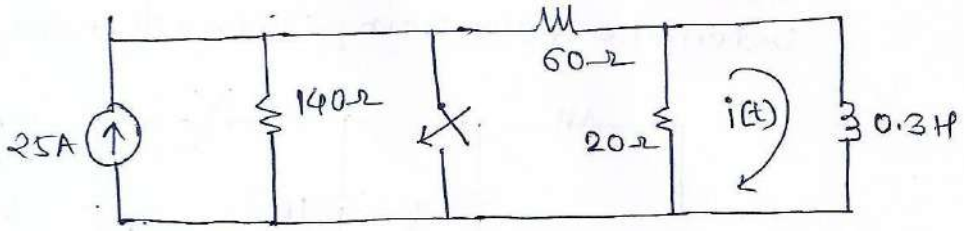
a) In the network shown, find voltage v(t) for t > 0 using Laplace transform.



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 **R**

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

Instructions: 1) Q. No. 1 is compulsory and should be solved in first 30 minutes in answer Book.
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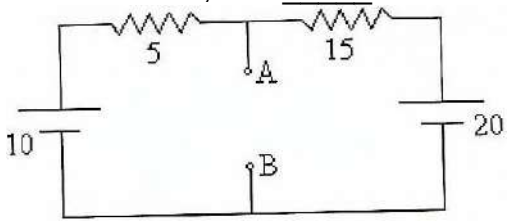
MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

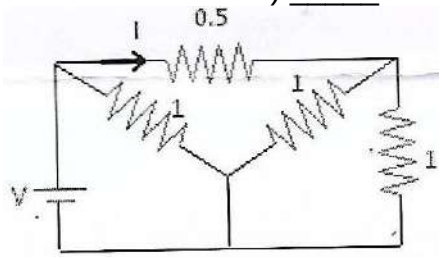
Q.1 Choose the correct alternatives from the options and rewrite the sentence. **14**

1) The Norton's equivalent across A, B is _____.



a) 3 A, 3 Ω b) 2 A, 2.5 Ω
c) 3.3 A, 3.75 Ω d) 3.3 A, 3.0 Ω

2) 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) _____.



a) 5 V b) 3 V
c) 2 V d) 1 V

3) The superposition theorem is valid for _____.
a) All linear networks
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4) 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?
a) $t(0)^+$ b) $t(0)^-$
c) t* d) t(0*)

6) The time constant of a series RC circuit is _____.
   a) 1/RC b) R/C
   c) RC d) e^{-RC}

7) The Laplace transform of $t^3\delta(t-4)$ is _____.
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8) L[e^t] is: _____.
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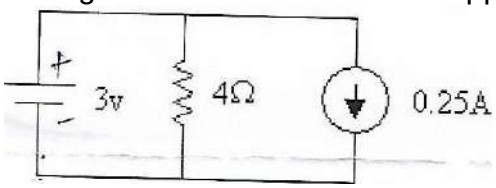
9) A 2-port network using z-parameter representation is said to be reciprocal if _____.
   a) $Z_{11} = Z_{22}$ b) $Z_{12} = Z_{21}$
   c) $Z_{12} = -Z_{21}$ d) $Z_{11} Z_{22} - Z_{12} Z_{21} = 1$

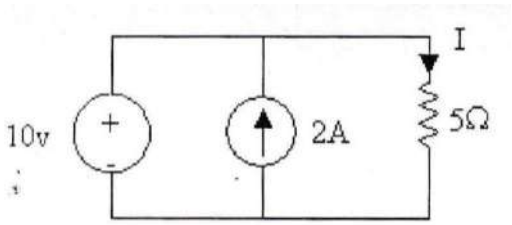
10) The number of possible combination generated by four variables taken to at a time in a two port network is: _____.
   a) 4 b) 2
   c) 6 d) none of these

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



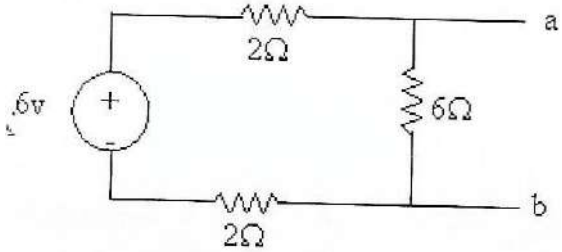
   a) 0.25 A b) 0.75 A
   c) 0.5 A d) 1.0 A

12) Calculate current I of the circuit shown below.



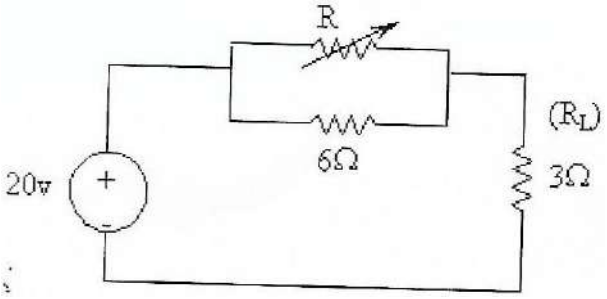
   a) 4 A b) 2 A
   c) -2 A d) -4 A

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



   a) 6V, 2.4 Ω b) 3.6V, 2 Ω
   c) 3.6V, 2.4 Ω d) 2V, 10 Ω

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



a) 0 Ω
b) 6 Ω
c) 9 Ω
d) 2 Ω

Seat No.	

Set **R**

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

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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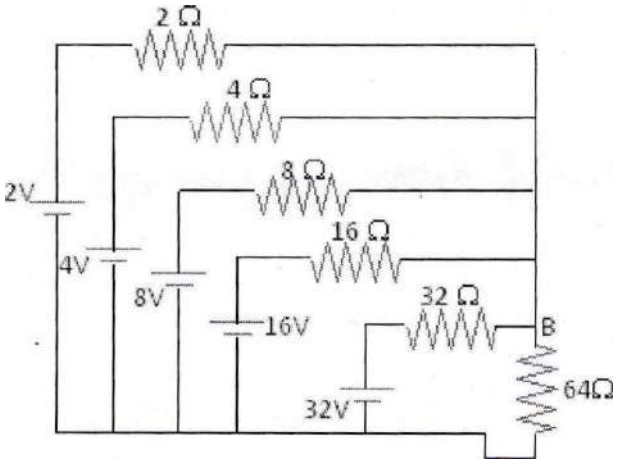
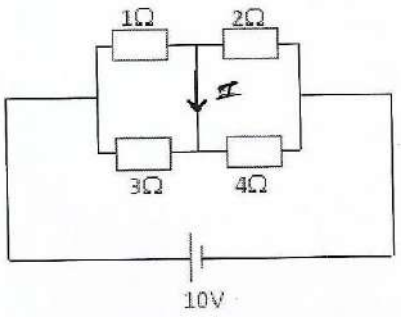
Section – I

Q.2 Solve any four. **16**

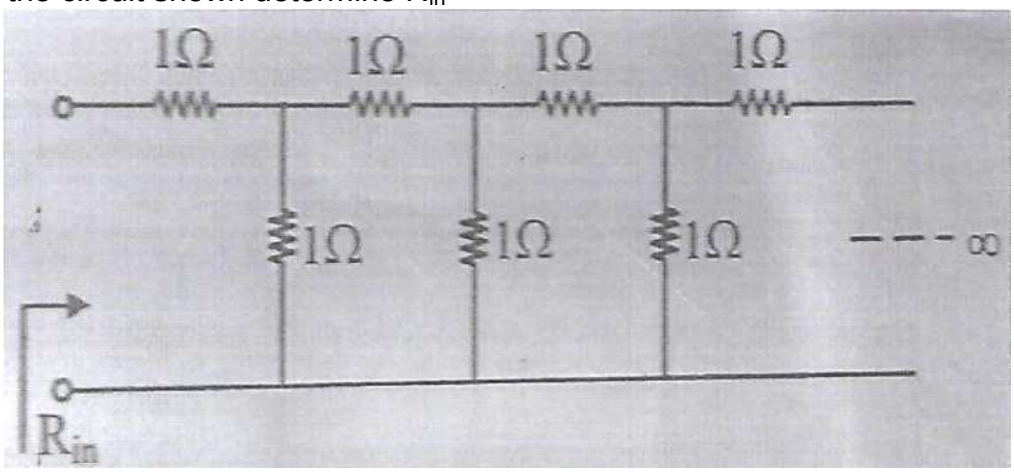
a) Obtain potential of node B with respect to node G in the network shown in the fig.



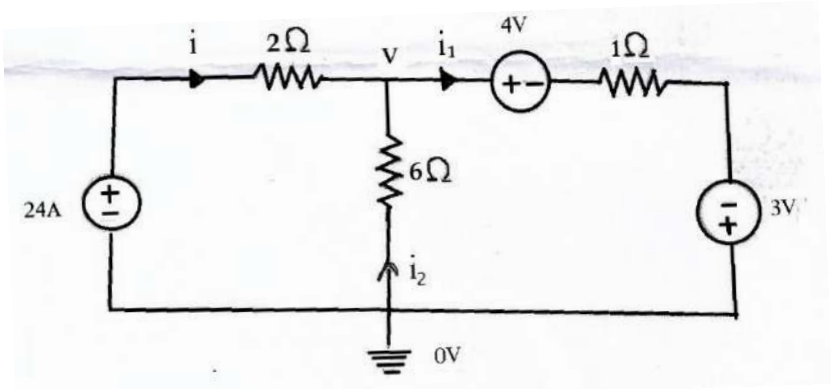
b) In the circuit shown in the given fig. determine Current I using Thevenin's Theorem.



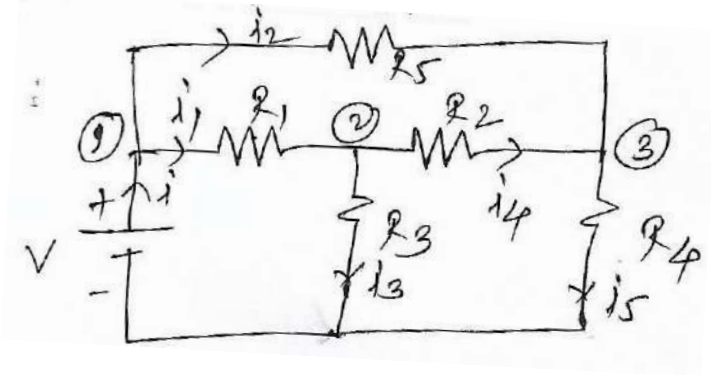
c) In the circuit shown determine R_{in}



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

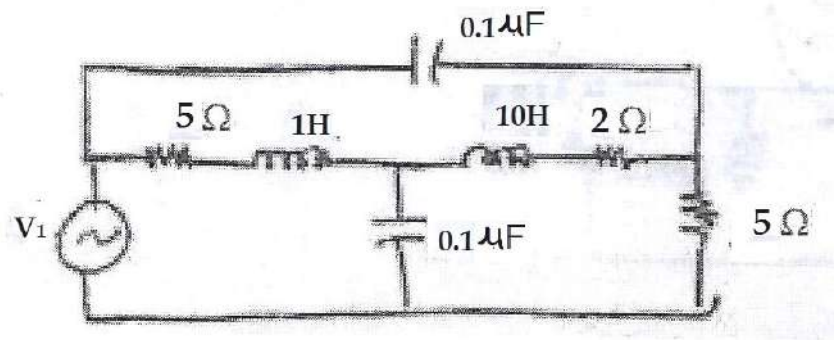


e) Draw graph of a network and Write incident matrix.

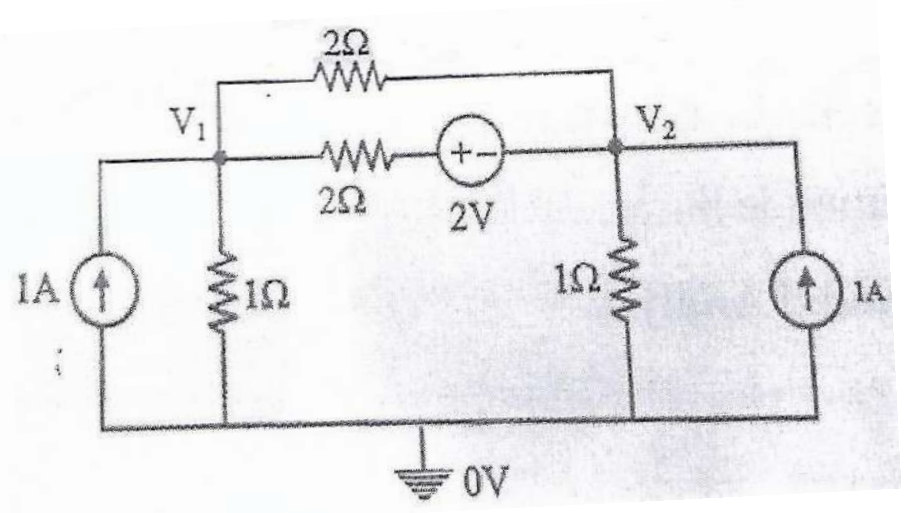


Q.3 Solve any two. **12**

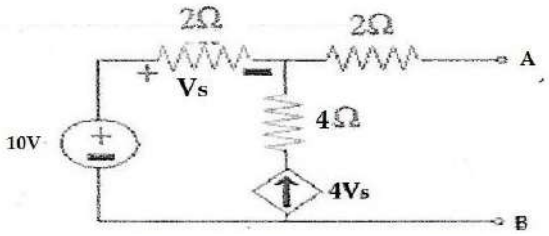
a) Find the duel network of the network shown.



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



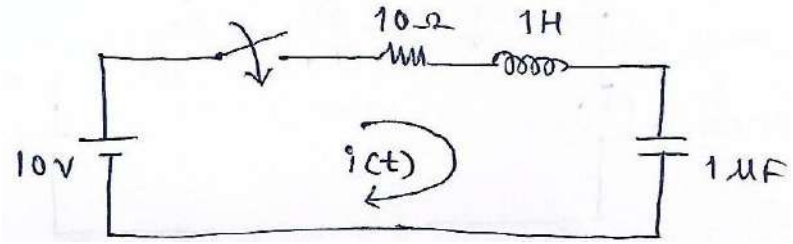
c) Find Norton's equivalent of the circuit shown in the given fig.



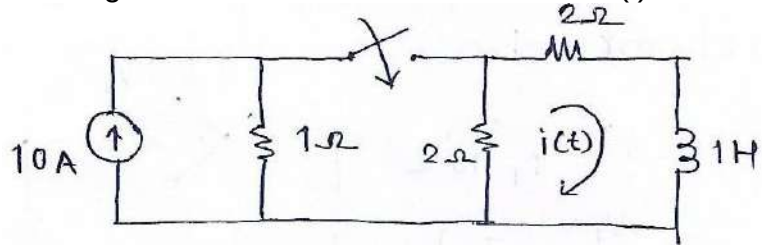
Section – II

Q.4 Solve any four. **16**

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

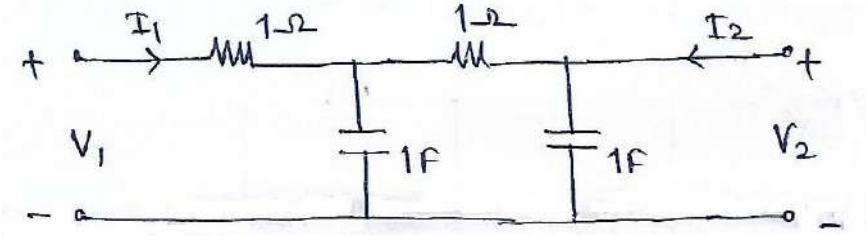


b) In the fig. the switch is closed at t = 0. Find i(t) for t>0.

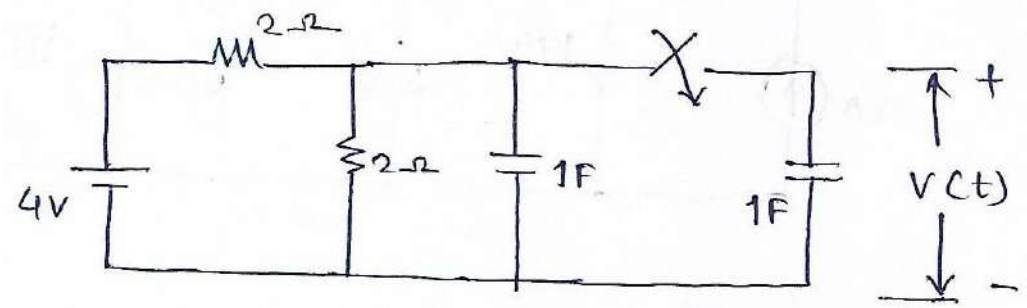


c) Derive ABCD parameter in terms of Y-parameter.

d) Determine admittance parameters of the network.

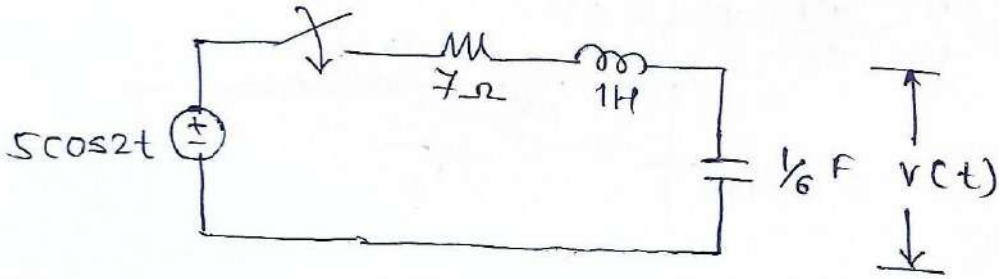


e) The network shown has acquired steady state at t < 0 with switch open. The switch is closed at t = 0. Determine v(t) using Laplace transform.

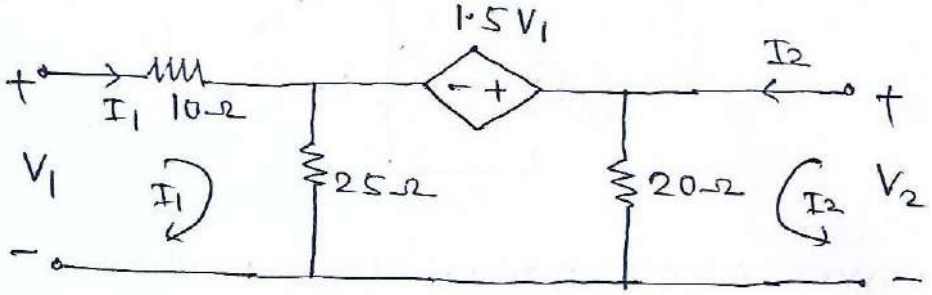


Q.5 Solve any two. **12**

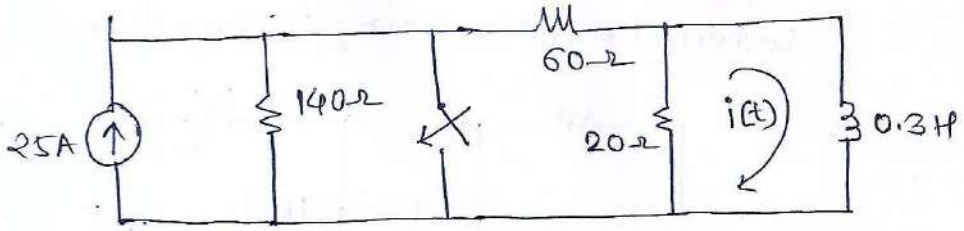
a) In the network shown, find voltage v(t) for t > 0 using Laplace transform.



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	S

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

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) The time constant of a series RC circuit is _____.
   a) 1/RC b) R/C
   c) RC d) e^{-RC}

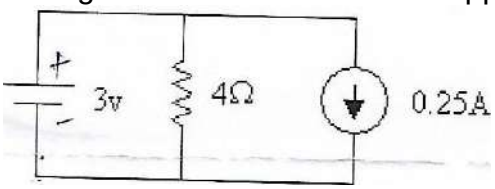
2) The Laplace transform of $t^3\delta(t-4)$ is _____.
   a) $4^3 e^{-4s}$ b) $3^4 e^{3s}$
   c) $e^{4s}3^2$ d) None of these

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 reciprocal if _____.
   a) $Z_{11} = Z_{22}$ b) $Z_{12} = Z_{21}$
   c) $Z_{12} = -Z_{21}$ d) $Z_{11} Z_{22} - Z_{12} Z_{21} = 1$

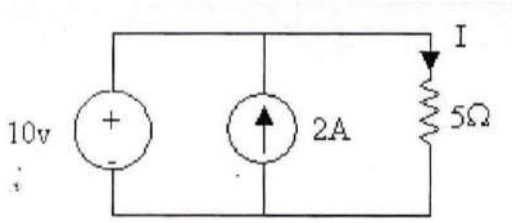
5) The number of possible combination generated by four variables taken to at a time in a two port network is: _____.
   a) 4 b) 2
   c) 6 d) none of these

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



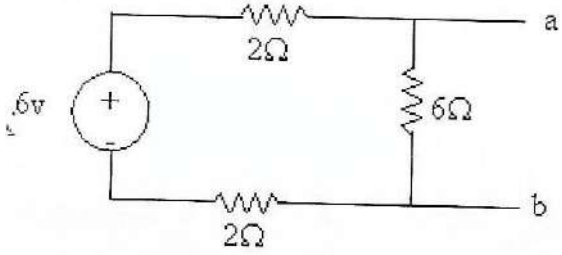
   a) 0.25 A b) 0.75 A
   c) 0.5 A d) 1.0 A

7) Calculate current I of the circuit shown below.



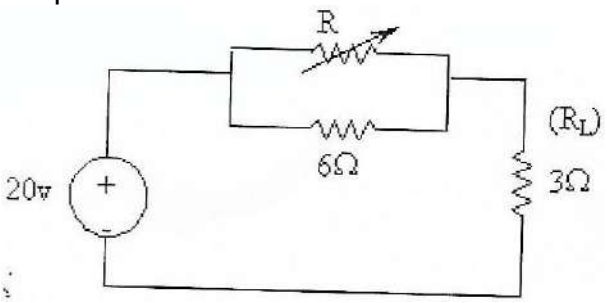
a) 4 A
b) 2 A
c) -2 A
d) -4 A

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



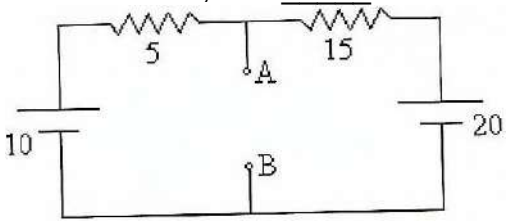
a) 6V, 2.4 Ω
b) 3.6V, 2 Ω
c) 3.6V, 2.4 Ω
d) 2V, 10 Ω

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



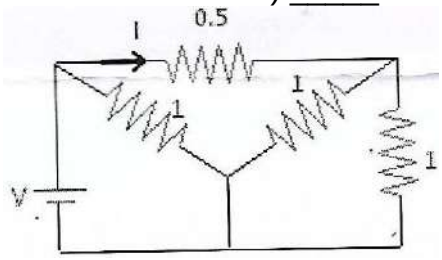
a) 0 Ω
b) 6 Ω
c) 9 Ω
d) 2 Ω

10) The Norton's equivalent across A, B is _____.



a) 3 A, 3 Ω
b) 2 A, 2.5 Ω
c) 3.3 A, 3.75 Ω
d) 3.3 A, 3.0 Ω

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) _____.



a) 5 V
b) 3 V
c) 2 V
d) 1 V

12) 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

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*)

Seat No.	

Set **S**

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

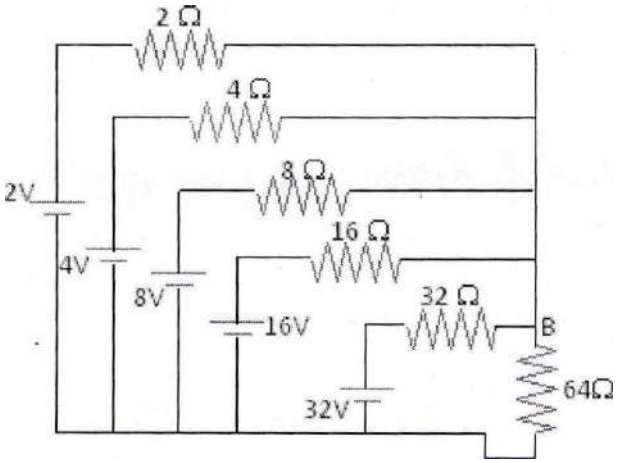
Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

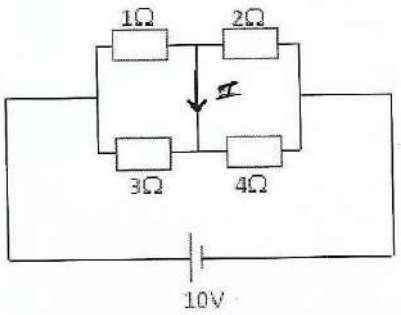
Section – I

Q.2 Solve any four. **16**

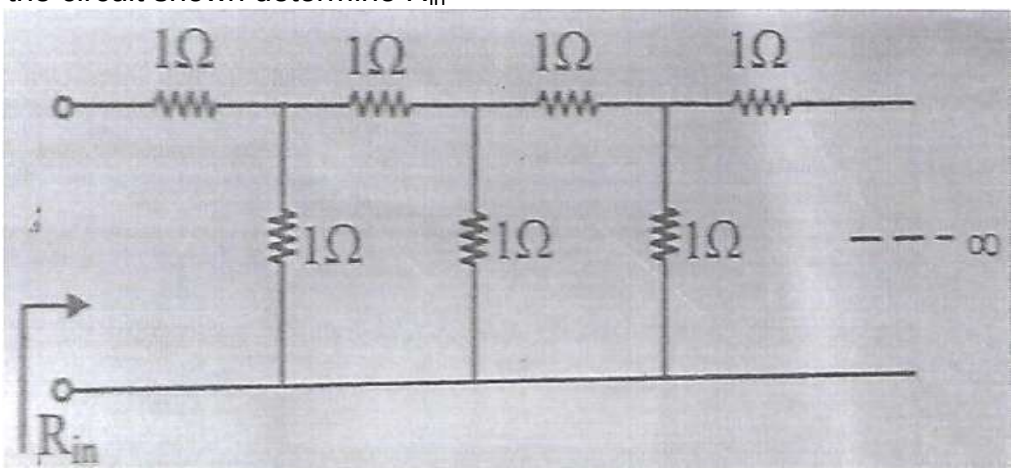
a) Obtain potential of node B with respect to node G in the network shown in the fig.



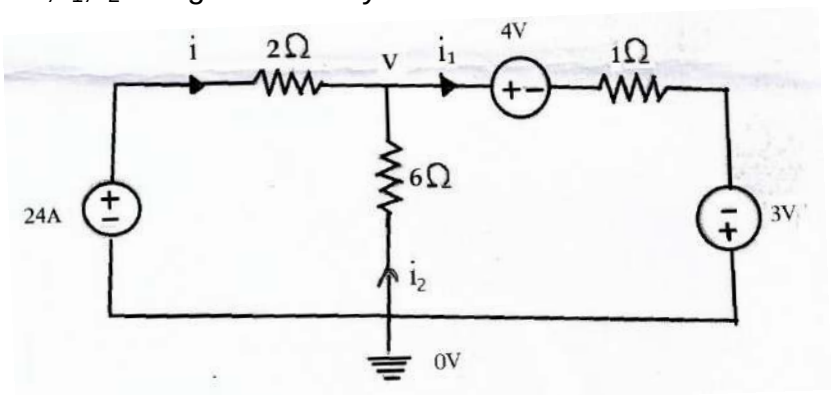
b) In the circuit shown in the given fig. determine Current I using Thevenin's Theorem.



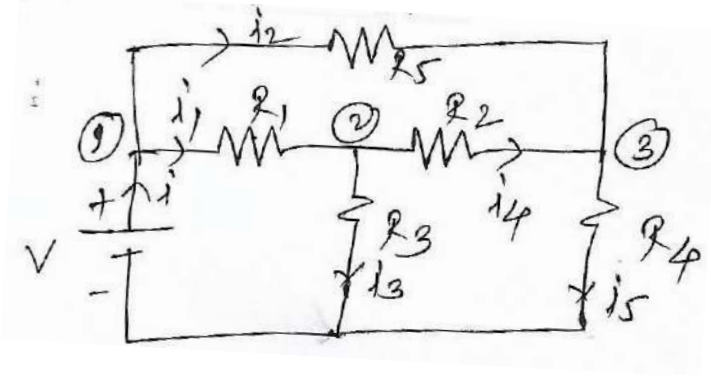
c) In the circuit shown determine R_{in}



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

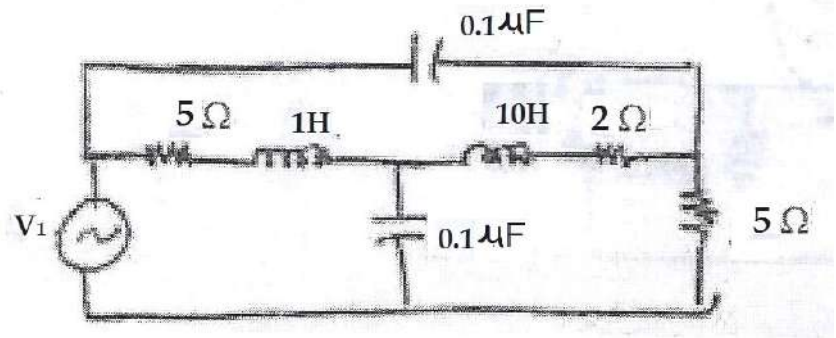


e) Draw graph of a network and Write incident matrix.

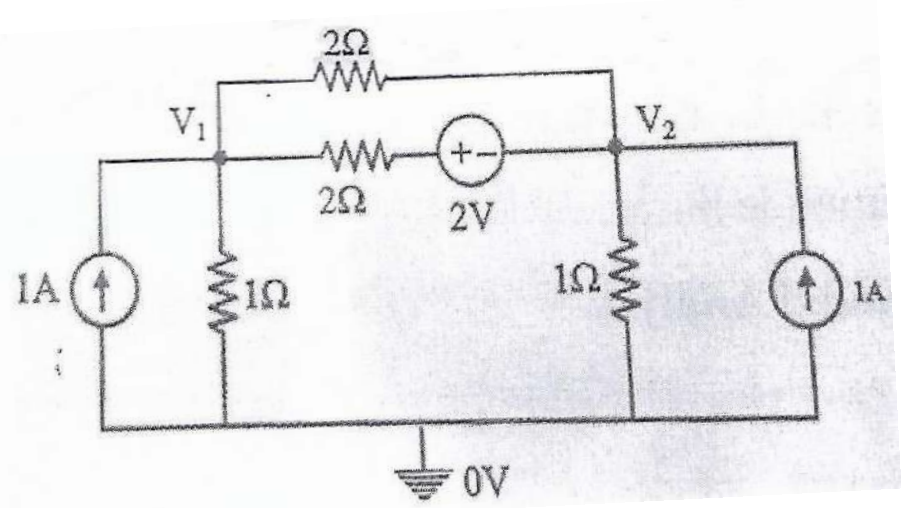


Q.3 Solve any two. **12**

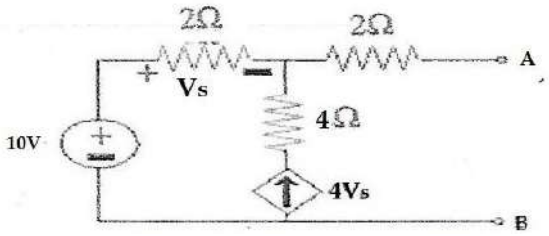
a) Find the duel network of the network shown.



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



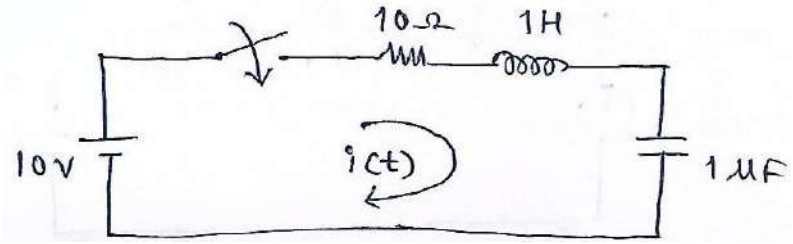
c) Find Norton's equivalent of the circuit shown in the given fig.



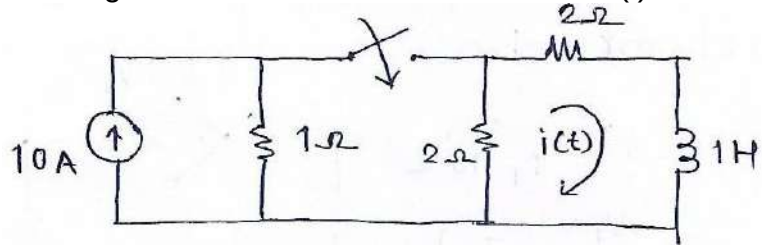
Section – II

Q.4 Solve any four. **16**

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

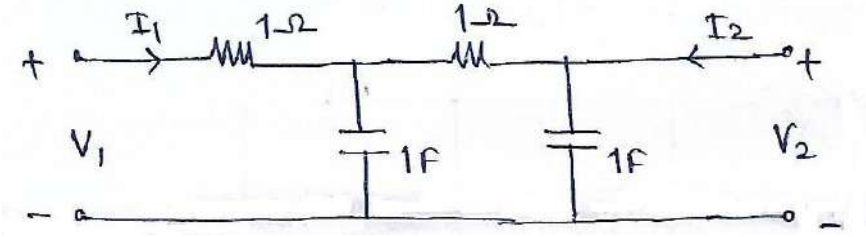


b) In the fig. the switch is closed at t = 0. Find i(t) for t>0.

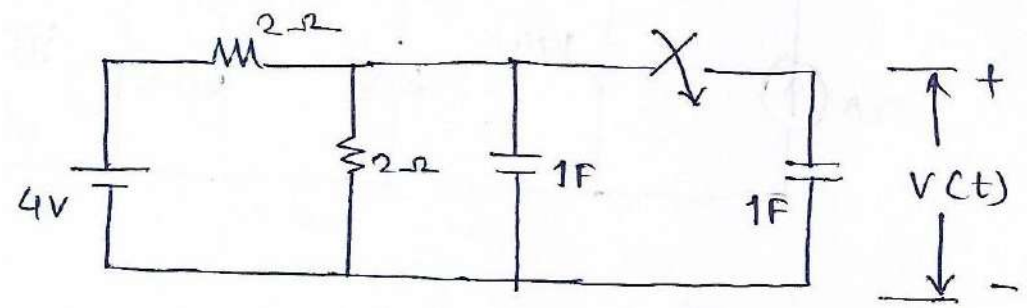


c) Derive ABCD parameter in terms of Y-parameter.

d) Determine admittance parameters of the network.

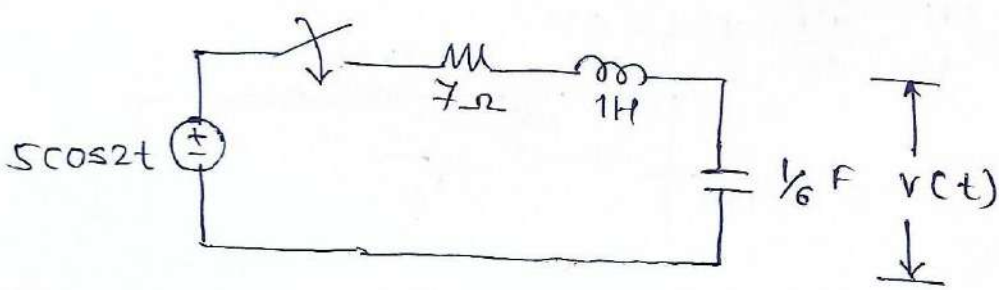


e) The network shown has acquired steady state at t < 0 with switch open. The switch is closed at t = 0. Determine v(t) using Laplace transform.

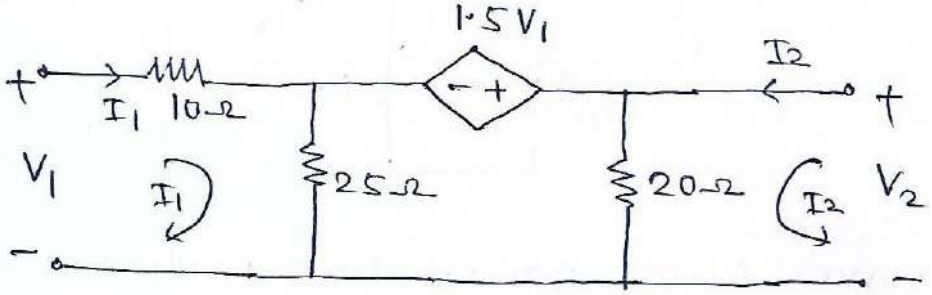


Q.5 Solve any two. **12**

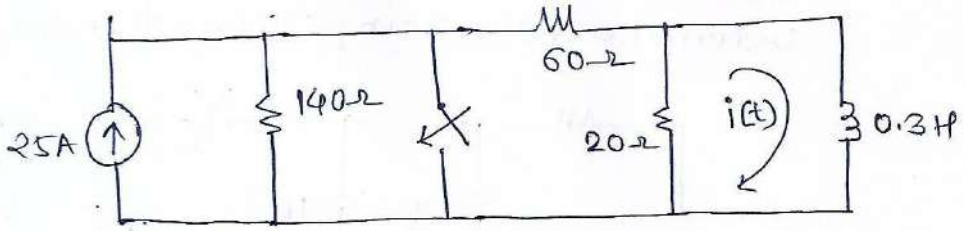
a) In the network shown, find voltage v(t) for t > 0 using Laplace transform.



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 **P**

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

Day & Date: Friday, 06-12-2019 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.

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

1) 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

2) 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)

3) Which among the following methods are generally used for the calculation of symmetrical faults?
   a) Norton theorem b) Thevenin's theorem
   c) Kirchhoff's laws d) Only (b) and (c)

4) 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.

5) In what direction does the phasor get rotated if it is multiplied by the operator 'a'?
   a) Anti-clockwise
   b) Clockwise
   c) gets rotated by 90^o in the clockwise direction
   d) gets rotated by 90^o in the anticlockwise direction

6) The Critical Clearance time of a fault in the power system is related to _____.
   a) Reactive power limit b) Short Circuit limit
   c) Steady state stability limit d) Transient stability limit

7) Fault level means _____.
   a) Fault Current b) Voltage at the point of fault
   c) Fault MVA 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 _____.
   a) 1.5 pu b) 1.0 pu
   c) 0.5 pu d) 0.25 pu

9) In a circuit the voltage and current are given by $v = (10 + j5)$ and $i = (6 + j4)$.The circuit is _____.
   a) inductive
   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
   c) 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 No.	

Set **P**

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

Day & Date: Friday, 06-12-2019 Max. Marks: 56
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. **16**

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. **12**

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	P	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 $\alpha = 1.6$.

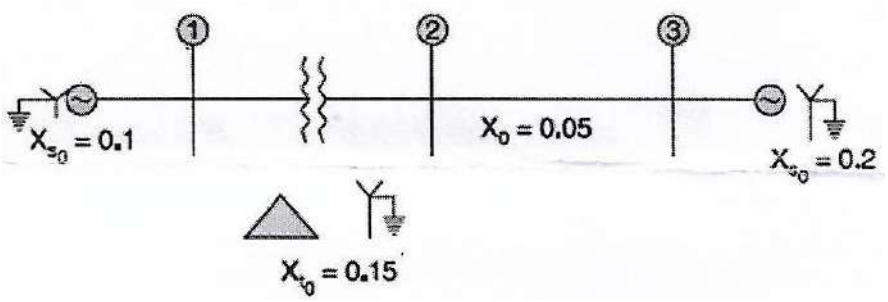
c) Obtain a step by step programmable technique for building a complete Z bus of the given system.

Section – II

Q.4 Answer any four of the following question. **16**

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) $\frac{1-a}{a+a^2} = 1-a^2$

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. **12**

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?

Seat No.	

Set **Q**

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

Day & Date: Friday, 06-12-2019 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.

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

1) 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
   c) 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) Y22, Y23 , Y32, Y33
   c) Y23,Y32 d) None of the above

4) 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

5) 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

6) 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

7) 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%

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
   c) 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) gets rotated by 90^o in the clockwise direction
   d) gets rotated by 90^o in the anticlockwise direction

13) The Critical Clearance time of a fault in the power system is related to _____.
   a) Reactive power limit b) Short Circuit limit
   c) Steady state stability limit d) Transient stability limit

14) Fault level means _____.
   a) Fault Current b) Voltage at the point of fault
   c) Fault MVA d) Fault power factor

Seat No.	

Set **Q**

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

Day & Date: Friday, 06-12-2019 Max. Marks: 56
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. **16**

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. **12**

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	P	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 $\alpha = 1.6$.

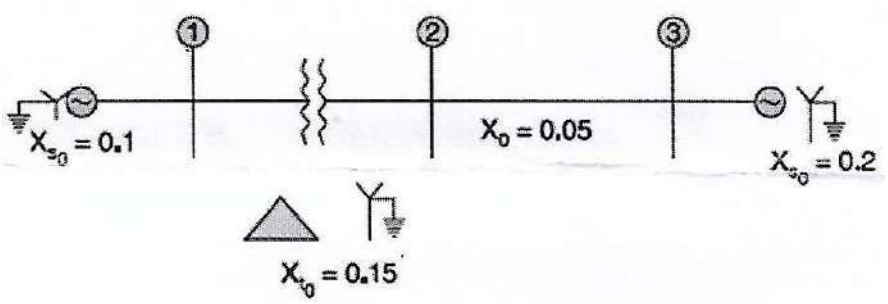
c) Obtain a step by step programmable technique for building a complete Z bus of the given system.

Section – II

Q.4 Answer any four of the following question. **16**

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) $\frac{1-a}{a+a^2} = 1-a^2$

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. **12**

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?

Seat No.	

Set **R**

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

Day & Date: Friday, 06-12-2019 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.

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

1) In what direction does the phasor get rotated if it is multiplied by the operator 'a'?
   a) Anti-clockwise
   b) Clockwise
   c) gets rotated by 90^o in the clockwise direction
   d) gets rotated by 90^o in the anticlockwise direction

2) The Critical Clearance time of a fault in the power system is related to _____.
   a) Reactive power limit b) Short Circuit limit
   c) Steady state stability limit d) Transient stability limit

3) Fault level means _____.
   a) Fault Current b) Voltage at the point of fault
   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
   c) 0.5 pu d) 0.25 pu

5) In a circuit the voltage and current are given by $v = (10 + j5)$ and $i = (6 + j4)$.The circuit is _____.
   a) inductive b) Capacitive
   c) resistive d) it could be any of the above.

6) 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
   c) Y23,Y32 d) None of the above

7) 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

8) 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

9) 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

10) 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%

11) 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

12) 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)

13) Which among the following methods are generally used for the calculation of symmetrical faults?
   a) Norton theorem b) Thevenin's theorem
   c) Kirchhoff's laws d) Only (b) and (c)

14) 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.

Seat No.	

Set **R**

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

Day & Date: Friday, 06-12-2019 Max. Marks: 56
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. **16**

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. **12**

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	P	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 $\alpha = 1.6$.

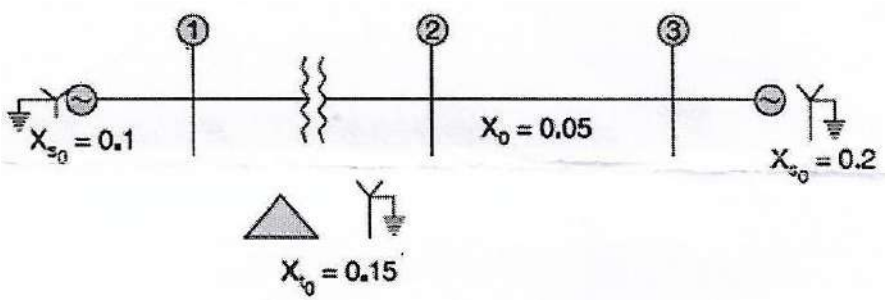
c) Obtain a step by step programmable technique for building a complete Z bus of the given system.

Section – II

Q.4 Answer any four of the following question. **16**

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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i) $\frac{1-a^2}{a-a^2} = -a$

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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. **12**

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:

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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?

Seat No.	

Set **S**

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

Day & Date: Friday, 06-12-2019 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.

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

1) 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
   c) Y23,Y32 d) None of the above

2) 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

3) 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

4) 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
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5) 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 _____.
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   c) 11.25% d) 15%

6) 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

7) For n bus power system size of Y bus matrix is _____.
   a) (n-1)×(n-1) b) (n-2)×(n-2)
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8) Which among the following methods are generally used for the calculation of symmetrical faults?
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9) Which of the following fault results into a three phase faults?
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13) 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
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14) In a circuit the voltage and current are given by $v = (10 + j5)$ and $i = (6 + j4)$.The circuit is _____.
   a) inductive
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Seat No.	

Set | S

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

Day & Date: Friday, 06-12-2019 Max. Marks: 56
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. **16**

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..

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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.

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Bus code	P	Q	V	Remarks
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4	0.3	0.1	1+j0.0	PQ

Determine the voltages at the end of first iteration using Gauss-Seidel method. Take $\alpha = 1.6$.

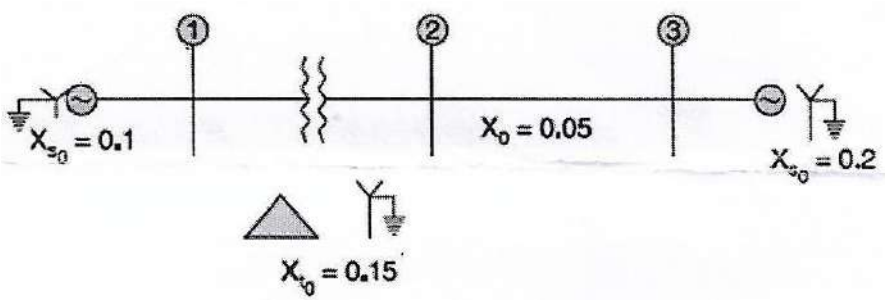
c) Obtain a step by step programmable technique for building a complete Z bus of the given system.

Section – II

Q.4 Answer any four of the following question. **16**

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.

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i) $\frac{1-a^2}{a-a^2} = -a$

ii) $\frac{1-a}{a+a^2} = 1-a^2$

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. **12**

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?

Seat No.	

Set **P**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 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) Figure 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) In closed loop control system, with positive value of feedback gain the overall gain of the system will _____.
   a) decrease b) increase
   c) be unaffected d) any of the above

2) A system is stable for _____.
   a) GM and PM both +ve b) GM and PM both -ve
   c) GM -ve PM + ve d) GM +ve and 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

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. $\frac{dy}{dx} + 6y = x(t)$ will be _____.
   a) $(1/6) * (1 - e^{-6t})$ b) $e^{-3t}\,u(t)$
   c) e^{6t} d) none of above

9) 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

10) Type and order of transfer function G (s) = K/{s(s + 2)} _____.
   a) 1, 2 b) 2, 1
   c) 0, 2 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) $75°$

13) 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

Seat No.	

Set **P**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

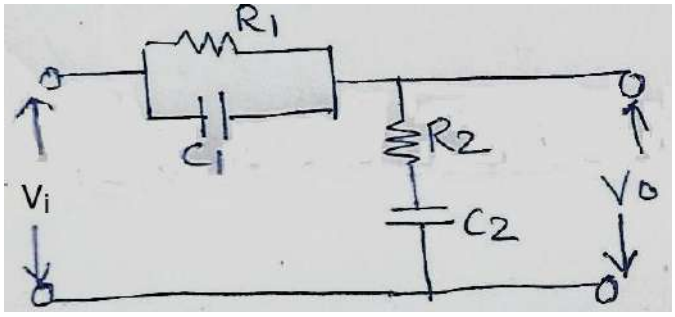
Section – I

Q.2 Solve any four. **16**

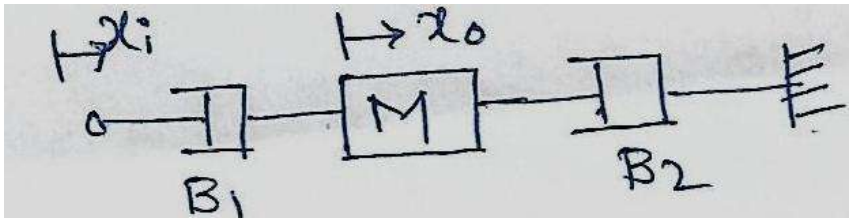
a) Explain the classification of control system.

b) Explain force to voltage and force to current analogy.

c) Determine the transfer function $\frac{V_o(s)}{V_i(s)}$ of the network shown below.



d) Determine the transfer function $\frac{X_o(s)}{X_i(s)}$ for the system shown below.

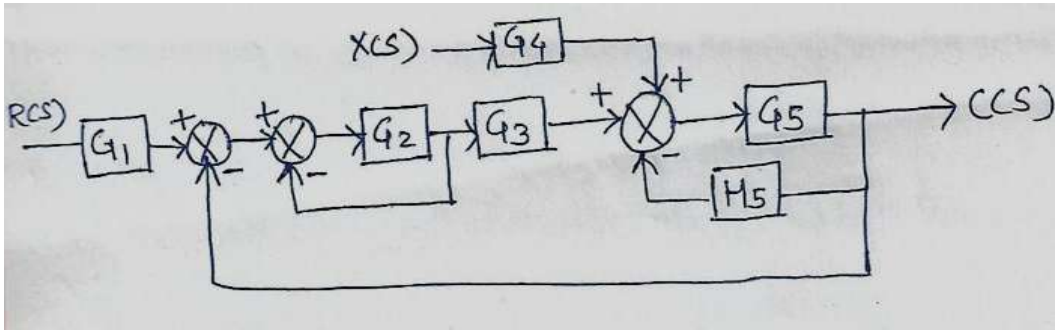


e) With the help of neat sketch explain closed loop control system.

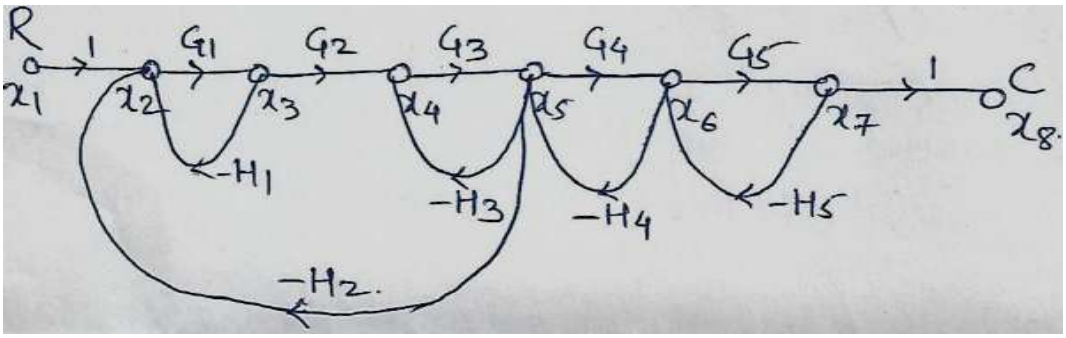
f) Explain the terminology of signal flow graph.

Q.3 Solve any two. **12**

a) Determine the total output of following system using block diagram reduction technique.



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. **16**

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**

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 Q

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 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) Figure 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) The step response of the system described by the differential equation. $\frac{dy}{dx} + 6y = x(t)$ will be _____.
   a) $(1/6)\ ^{*}(1 - e^{-6t})$ b) $e^{-3t}u(t)$
   c) e^{6t} 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)} _____.
   a) 1, 2 b) 2, 1
   c) 0, 2 d) 1, 1

4) 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

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) $75°$

6) 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

7) 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
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8) In closed loop control system, with positive value of feedback gain the overall gain of the system will _____.
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   c) be unaffected d) any of the above

9) A system is stable for _____.
   a) GM and PM both +ve
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   c) GM -ve PM + ve
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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) $1/S^2$
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12) The type 2 system has _____ at the origin.
   a) no net pole
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13) If the gain of the critical damped system is increased it will behave as _____.
   a) oscillatory
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   d) underdamped

14) Which of the following is the electrical analogous element for displacement in force-voltage analogy?
   a) Flux
   b) Voltage
   c) Charge
   d) Current

Seat No.	

Set **Q**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

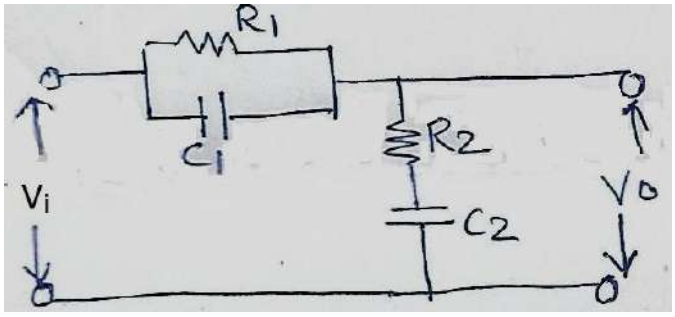
Section – I

Q.2 Solve any four. **16**

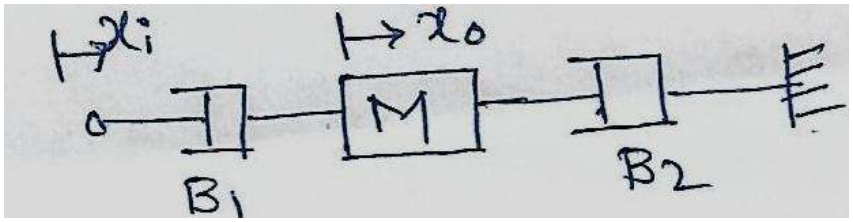
a) Explain the classification of control system.

b) Explain force to voltage and force to current analogy.

c) Determine the transfer function $\frac{V_o(s)}{V_i(s)}$ of the network shown below.



d) Determine the transfer function $\frac{X_o(s)}{X_i(s)}$ for the system shown below.

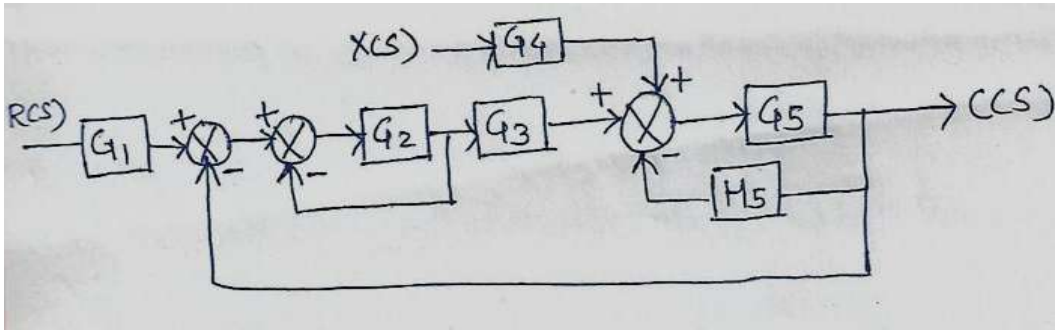


e) With the help of neat sketch explain closed loop control system.

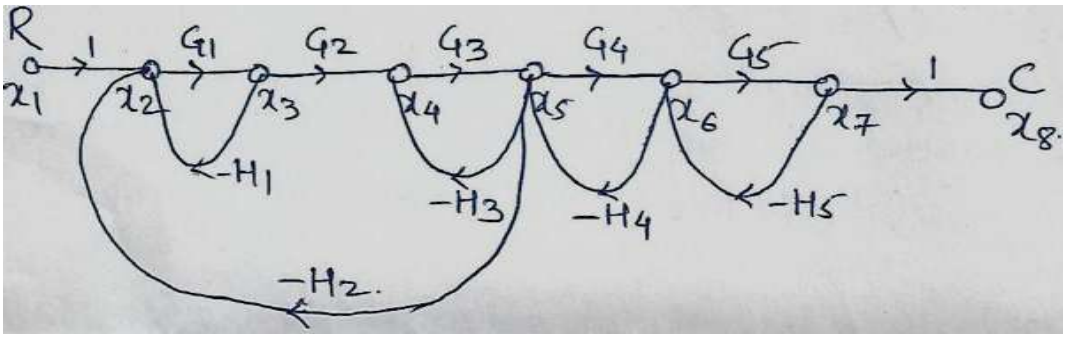
f) Explain the terminology of signal flow graph.

Q.3 Solve any two. **12**

a) Determine the total output of following system using block diagram reduction technique.



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. **16**

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**

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 R

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 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) Figure 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) The type 2 system has _____ at the origin.
   a) no net pole b) net pole
   c) simple pole d) two poles

2) If the gain of the critical damped system is increased it will behave as _____.
   a) oscillatory b) critically damped
   c) overdamped d) 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. $\frac{dy}{dx} + 6y = x(t)$ 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, 2 b) 2, 1
   c) 0, 2 d) 1, 1

7) 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

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) $45°$
   c) $60°$ d) $75°$

9) 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

10) 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

11) In closed loop control system, with positive value of feedback gain the overall gain of the system will _____.
   a) decrease
   b) increase
   c) be unaffected
   d) any of the above

12) A system is stable for _____.
   a) GM and PM both +ve
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   c) GM -ve PM + ve
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13) 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

14) In control system integrator is represented by _____.
   a) S
   b) S^2
   c) $1/S^2$
   d) 1 / S

Seat No.	

Set **R**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

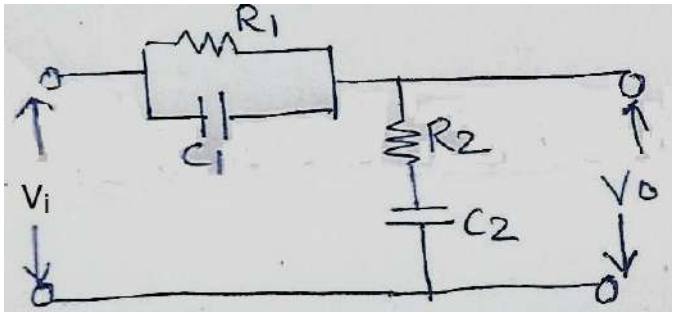
Section – I

Q.2 Solve any four. **16**

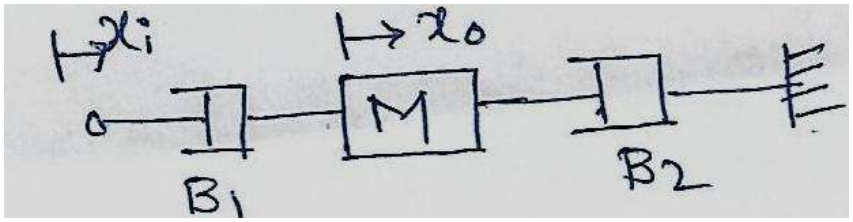
a) Explain the classification of control system.

b) Explain force to voltage and force to current analogy.

c) Determine the transfer function $\frac{V_o(s)}{V_i(s)}$ of the network shown below.



d) Determine the transfer function $\frac{X_o(s)}{X_i(s)}$ for the system shown below.

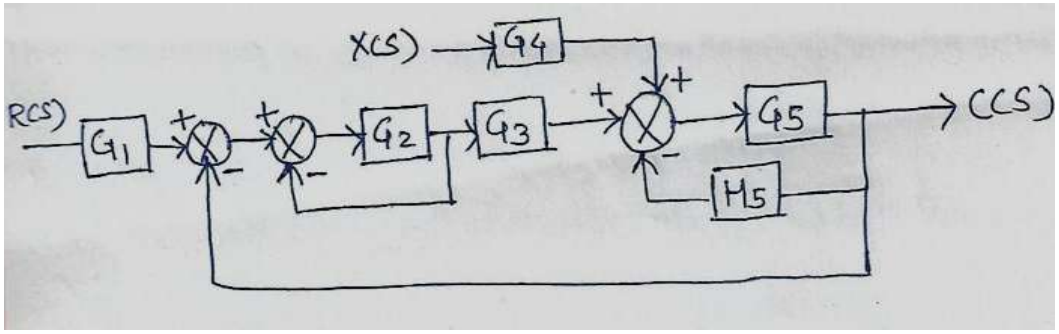


e) With the help of neat sketch explain closed loop control system.

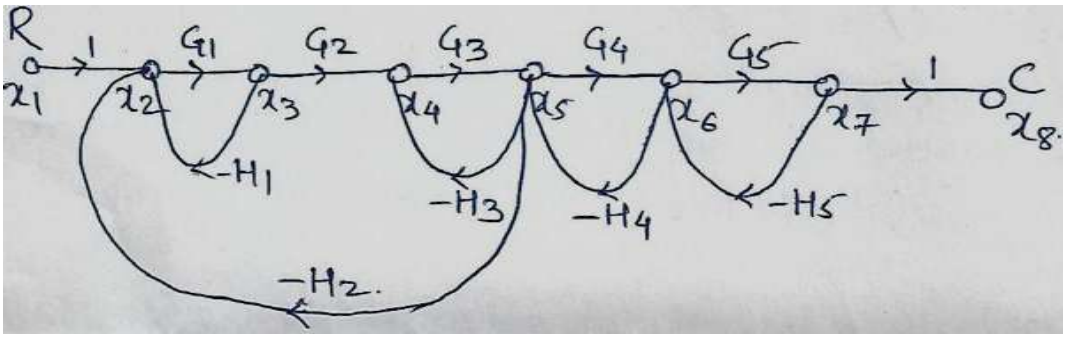
f) Explain the terminology of signal flow graph.

Q.3 Solve any two. **12**

a) Determine the total output of following system using block diagram reduction technique.



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. **16**

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.

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e) With the help of neat sketch explain transient response specification.

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2) PD controller
3) PID controller

Seat No.	

Set **S**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 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) Figure 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) Type and order of transfer function G (s) = K/{s(s + 2)} _____.
   a) 1, 2 b) 2, 1
   c) 0, 2 d) 1, 1

2) 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

3) If the phase angle at gain crossover frequency is estimated to be -105°, what will be the value of phase margin of the system?
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5) The addition of open loop poles pulls the root locus towards _____.
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6) In closed loop control system, with positive value of feedback gain the overall gain of the system will _____.
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14) Which of the following transfer functions represent under damped second order systems?
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Seat No.	

Set **S**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEMS – I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

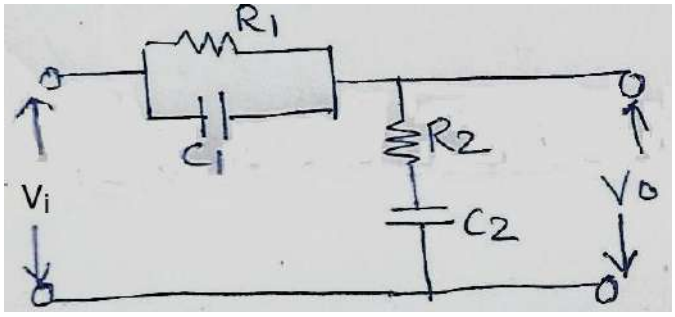
Section – I

Q.2 Solve any four. **16**

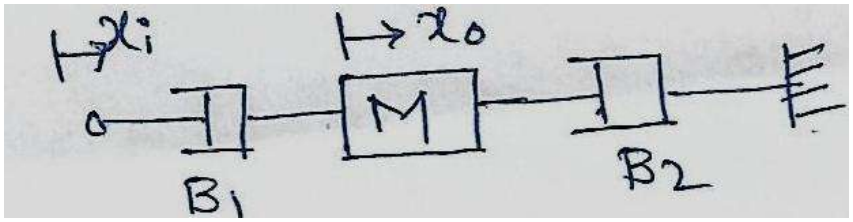
a) Explain the classification of control system.

b) Explain force to voltage and force to current analogy.

c) Determine the transfer function $\frac{V_o(s)}{V_i(s)}$ of the network shown below.



d) Determine the transfer function $\frac{X_o(s)}{X_i(s)}$ for the system shown below.

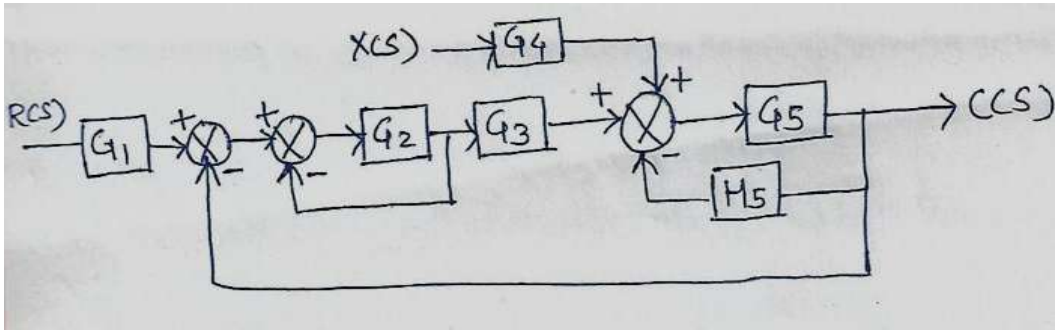


e) With the help of neat sketch explain closed loop control system.

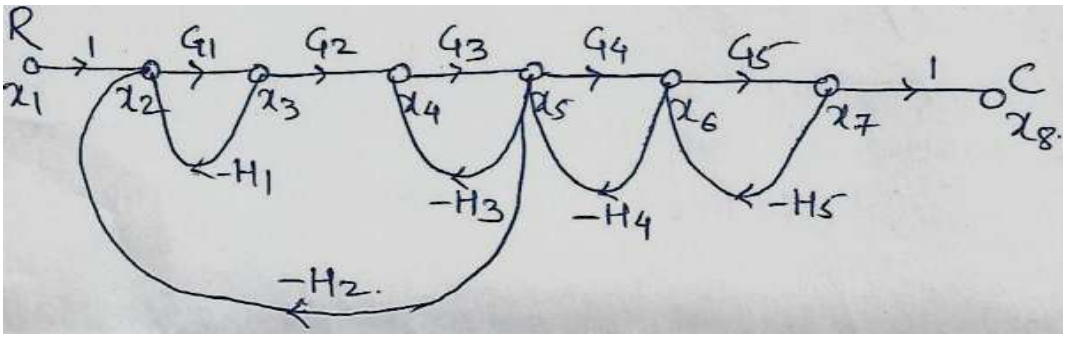
f) Explain the terminology of signal flow graph.

Q.3 Solve any two. **12**

a) Determine the total output of following system using block diagram reduction technique.



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. **16**

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.

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Q.5 Solve any two. **12**

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. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 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 Marks: 14

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

1) Which of the following register is used as a address pointer to the next instruction?
   a) SP b) HL
   c) PC d) IR

2) On reset stack pointer in 8051 microcontroller is initialized to _____.
   a) 8H b) 9H
   c) 7H d) 5H

3) The contents of accumulator after this operation will be _____.
   MOV A, #0CH
   ANL A, #2CH
   a) 00001100 b) 00001101
   c) 00001001 d) 00001000

4) When 8085 goes in reset condition the status of PC, IR and buses (address, data, control signal) respectively are _____.
   a) 0000H,3EH,Z-State b) 0000H,00H,Z-State
   c) C0000H,00H,Z-State d) None of above

5) _____ Pins of 8051 microcontroller are used for External RAM interface.
   a) P3.6 and P3.7 b) P3.4 and P3.5
   c) P3.0 and P3.1 d) P3.2 and P3.3

6) The instruction that are used for reading input port and writing an output port respectively are _____.
   a) MOV,XCHG b) MOV,IN
   c) IN,MOV d) IN,OUT

7) ISR ends with _____.
   a) IE b) RET
   c) RI,TI d) None

8) External Interrupt 1 is given on _____ Pin of 8051 microcontroller.
   a) P3.0 b) P3.1
   c) P3.3 d) P3.2

9) Timer0 overflow flag is available on _____ SFR of 8051 microcontroller.
   a) SBUF b) TCON
   c) SCON d) 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

Seat No.	

Set **P**

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **Q**

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 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 Marks: 14

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

1) External Interrupt 1 is given on _____ Pin of 8051 microcontroller.
   a) P3.0 b) P3.1
   c) P3.3 d) P3.2

2) Timer0 overflow flag is available on _____ SFR of 8051 microcontroller.
   a) SBUF b) TCON
   c) SCON d) TMOD

3) 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

4) An alternate function of port pin P3.4 in 8051 microcontroller is _____.
   a) Timer 0 b) Timer 1
   c) Interrupt 0 d) Interrupt 1

5) If Memory size is 4KB and starting address is 2000H, then ending address is _____.
   a) 1FFFH b) 2FFFH
   c) 3FFFH d) 4FFFH

6) 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

7) 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

8) Which of the following register is used as a address pointer to the next instruction?
   a) SP b) HL
   c) PC d) IR

9) On reset stack pointer in 8051 microcontroller is initialized to _____.
   a) 8H b) 9H
   c) 7H d) 5H

10) The contents of accumulator after this operation will be _____.

```
MOV A, #0CH
ANL A, #2CH
```

a) 00001100 b) 00001101
c) 00001001 d) 00001000

11) When 8085 goes in reset condition the status of PC, IR and buses (address, data, control signal) respectively are _____.

a) 0000H,3EH,Z-State b) 0000H,00H,Z-State
c) C0000H,00H,Z-State d) None of above

12) _____ Pins of 8051 microcontroller are used for External RAM interface.

a) P3.6 and P3.7 b) P3.4 and P3.5
c) P3.0 and P3.1 d) P3.2 and P3.3

13) The instruction that are used for reading input port and writing an output port respectively are _____.

a) MOV,XCHG b) MOV,IN
c) IN,MOV d) IN,OUT

14) ISR ends with _____.

a) IE b) RET
c) RI,TI d) None

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Seat No.	

Set Q

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **R**

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 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 Marks: 14

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

1) _____ Pins of 8051 microcontroller are used for External RAM interface.
   a) P3.6 and P3.7 b) P3.4 and P3.5
   c) P3.0 and P3.1 d) P3.2 and P3.3

2) The instruction that are used for reading input port and writing an output port respectively are _____.
   a) MOV,XCHG b) MOV,IN
   c) IN,MOV d) IN,OUT

3) ISR ends with _____.
   a) IE b) RET
   c) RI,TI d) None

4) External Interrupt 1 is given on _____ Pin of 8051 microcontroller.
   a) P3.0 b) P3.1
   c) P3.3 d) P3.2

5) Timer0 overflow flag is available on _____ SFR of 8051 microcontroller.
   a) SBUF b) TCON
   c) SCON d) TMOD

6) 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

7) An alternate function of port pin P3.4 in 8051 microcontroller is _____.
   a) Timer 0 b) Timer 1
   c) Interrupt 0 d) Interrupt 1

8) If Memory size is 4KB and starting address is 2000H, then ending address is _____.
   a) 1FFFH b) 2FFFH
   c) 3FFFH d) 4FFFH

9) 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

10) 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

11) Which of the following register is used as a address pointer to the next instruction?

a) SP b) HL
c) PC d) IR

12) On reset stack pointer in 8051 microcontroller is initialized to _____.

a) 8H b) 9H
c) 7H d) 5H

13) The contents of accumulator after this operation will be _____.

```
MOV A, #0CH
ANL A, #2CH
```

a) 00001100 b) 00001101
c) 00001001 d) 00001000

14) When 8085 goes in reset condition the status of PC, IR and buses (address, data, control signal) respectively are _____.

a) 0000H,3EH,Z-State b) 0000H,00H,Z-State
c) C0000H,00H,Z-State d) None of above

Seat No.	

Set **R**

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **S**

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 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 Marks: 14

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

1) 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

2) An alternate function of port pin P3.4 in 8051 microcontroller is _____.
   a) Timer 0 b) Timer 1
   c) Interrupt 0 d) Interrupt 1

3) If Memory size is 4KB and starting address is 2000H, then ending address is _____.
   a) 1FFFH b) 2FFFH
   c) 3FFFH d) 4FFFH

4) 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

5) 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

6) Which of the following register is used as a address pointer to the next instruction?
   a) SP b) HL
   c) PC d) IR

7) On reset stack pointer in 8051 microcontroller is initialized to _____.
   a) 8H b) 9H
   c) 7H d) 5H

8) The contents of accumulator after this operation will be _____.
```
MOV A, #0CH
ANL A, #2CH
```
   a) 00001100 b) 00001101
   c) 00001001 d) 00001000

9) When 8085 goes in reset condition the status of PC, IR and buses (address, data, control signal) respectively are _____.
   a) 0000H,3EH,Z-State b) 0000H,00H,Z-State
   c) C0000H,00H,Z-State d) None of above

10) _____ Pins of 8051 microcontroller are used for External RAM interface.
   a) P3.6 and P3.7 b) P3.4 and P3.5
   c) P3.0 and P3.1 d) P3.2 and P3.3

11) The instruction that are used for reading input port and writing an output port respectively are _____.
   a) MOV,XCHG b) MOV,IN
   c) IN,MOV d) IN,OUT

12) ISR ends with _____.
   a) IE b) RET
   c) RI,TI d) None

13) External Interrupt 1 is given on _____ Pin of 8051 microcontroller.
   a) P3.0 b) P3.1
   c) P3.3 d) P3.2

14) Timer0 overflow flag is available on _____ SFR of 8051 microcontroller.
   a) SBUF b) TCON
   c) SCON d) TMOD

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Seat No.	

Set S

T.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLER

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

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Seat No.	

Set P

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 Marks: 14

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

1) Payback period does not account for _____.
   a) Risk of investment b) Opportunity cost
   c) Time value of money d) All of the above

2) 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

3) Micro economy deals with _____.
   a) Whole economy b) Smaller unit of economy
   c) Only public sector d) Only private sector

4) Break-even point is _____.
   a) Where total contribution equals variable cost
   b) Where total revenue equals total cost
   c) Where total revenue equals fixed cost
   d) All of the above

5) What are the objectives of business?
   a) National objective b) Economic objective
   c) Social objective d) All of the above

6) Business includes _____.
   a) Trade b) Industry
   c) Commerce d) All of them

7) Co-operative society least think about _____.
   a) Customer satisfaction b) Loss
   c) Profit d) All of them

8) 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

9) Military organisation is known as _____.
   a) line organization b) line and staff organisation
   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
   c) Principle of pricing d) All of the above

11) PERT has following time estimate _____.
   a) one time estimate b) two time estimate
   c) three time estimate d) four time estimate

12) Goods produced on small scale have _____.
   a) Relatively inelastic supply b) Highly elastic supply
   c) Perfectly elastic supply d) None of the above

13) Break-even analysis consists of _____.
   a) fixed cost b) variable cost
   c) fixed and variable costs d) operation costs

14) Functions of management are _____.
   a) Planning b) Controlling
   c) Organising d) All of these

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Seat No.	

Set P

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND MANAGEMENT

Day & Date: Friday, 13-12-2019 Max. Marks: 56
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. **16**

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.

Q.3 Solve any two. **12**

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.

Section – II

Q.4 Solve any four. **16**

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.

Q.5 Solve any two. **12**

a) Write the salient features of Indian electricity act 2003.
b) State and Explain the various functions of management.
c) Explain the various methods of reducing the project cost.

Seat No.	

Set **Q**

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 Marks: 14

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 estimate b) two time estimate
   c) three time estimate d) 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

8) 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

10) Micro economy deals with _____.
   a) Whole economy
   b) Smaller unit of economy
   c) Only public sector
   d) Only private sector

11) Break-even point is _____.
   a) Where total contribution equals variable cost
   b) Where total revenue equals total cost
   c) Where total revenue equals fixed cost
   d) All of the above

12) What are the objectives of business?
   a) National objective
   b) Economic objective
   c) Social objective
   d) All of the above

13) Business includes _____.
   a) Trade
   b) Industry
   c) Commerce
   d) All of them

14) Co-operative society least think about _____.
   a) Customer satisfaction
   b) Loss
   c) Profit
   d) All of them

SLR-FM-419

Seat No.	

Set Q

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND MANAGEMENT

Day & Date: Friday, 13-12-2019 Max. Marks: 56
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. **16**

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.

Q.3 Solve any two. **12**

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.

Section – II

Q.4 Solve any four. **16**

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.

Q.5 Solve any two. **12**

a) Write the salient features of Indian electricity act 2003.
b) State and Explain the various functions of management.
c) Explain the various methods of reducing the project cost.

Seat No.	

Set **R**

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 Marks: 14

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

1) What are the objectives of business?
   a) National objective b) Economic objective
   c) Social objective d) All of the above

2) Business includes _____.
   a) Trade b) Industry
   c) Commerce d) All of them

3) Co-operative society least think about _____.
   a) Customer satisfaction b) Loss
   c) Profit d) All of them

4) 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

5) Military organisation is known as _____.
   a) line organization b) line and staff organisation
   c) functional organization d) all of the above

6) 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

7) PERT has following time estimate _____.
   a) one time estimate b) two time estimate
   c) three time estimate d) four time estimate

8) Goods produced on small scale have _____.
   a) Relatively inelastic supply b) Highly elastic supply
   c) Perfectly elastic supply d) None of the above

9) Break-even analysis consists of _____.
   a) fixed cost b) variable cost
   c) fixed and variable costs d) operation costs

10) Functions of management are _____.
   a) Planning
   b) Controlling
   c) Organising
   d) All of these

11) Payback period does not account for _____.
   a) Risk of investment
   b) Opportunity cost
   c) Time value of money
   d) All of the above

12) 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

13) Micro economy deals with _____.
   a) Whole economy
   b) Smaller unit of economy
   c) Only public sector
   d) Only private sector

14) Break-even point is _____.
   a) Where total contribution equals variable cost
   b) Where total revenue equals total cost
   c) Where total revenue equals fixed cost
   d) All of the above

SLR-FM-419

Seat No.	

Set R

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND MANAGEMENT

Day & Date: Friday, 13-12-2019 Max. Marks: 56
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. **16**

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.

Q.3 Solve any two. **12**

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.

Section – II

Q.4 Solve any four. **16**

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.

Q.5 Solve any two. **12**

a) Write the salient features of Indian electricity act 2003.
b) State and Explain the various functions of management.
c) Explain the various methods of reducing the project cost.

Seat No.	

Set **S**

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 Marks: 14

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

1) 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

2) PERT has following time estimate _____.
   a) one time estimate b) two time estimate
   c) three time estimate d) four time estimate

3) Goods produced on small scale have _____.
   a) Relatively inelastic supply b) Highly elastic supply
   c) Perfectly elastic supply d) None of the above

4) Break-even analysis consists of _____.
   a) fixed cost b) variable cost
   c) fixed and variable costs d) operation costs

5) Functions of management are _____.
   a) Planning b) Controlling
   c) Organising d) All of these

6) Payback period does not account for _____.
   a) Risk of investment b) Opportunity cost
   c) Time value of money d) All of the above

7) 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

8) Micro economy deals with _____.
   a) Whole economy b) Smaller unit of economy
   c) Only public sector d) Only private sector

9) Break-even point is _____.
   a) Where total contribution equals variable cost
   b) Where total revenue equals total cost
   c) Where total revenue equals fixed cost
   d) All of the above

10) What are the objectives of business?
   a) National objective
   b) Economic objective
   c) Social objective
   d) All of the above

11) Business includes _____.
   a) Trade
   b) Industry
   c) Commerce
   d) All of them

12) Co-operative society least think about _____.
   a) Customer satisfaction
   b) Loss
   c) Profit
   d) 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
   b) line and staff organisation
   c) functional organization
   d) all of the above

SLR-FM-419

Seat No.	

Set S

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND MANAGEMENT

Day & Date: Friday, 13-12-2019 Max. Marks: 56
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. **16**

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.

Q.3 Solve any two. **12**

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.

Section – II

Q.4 Solve any four. **16**

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.

Q.5 Solve any two. **12**

a) Write the salient features of Indian electricity act 2003.
b) State and Explain the various functions of management.
c) Explain the various methods of reducing the project cost.

Seat No.	

Set **P**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 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 Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) The differential volume (dv) in cylindrical coordinate system is given by _____.
   a) $\mathrm{drd}\Phi\mathrm{dz}$ b) $\mathrm{rdrd}\Phi\mathrm{dz}$
   c) $\mathrm{rdrd}\Phi$ d) $\mathrm{rd}\Phi\mathrm{dz}$

2) 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) $\tan^{-1}(y/x)$

3) 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

4) 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) $(\rho_s\epsilon_0/2)$

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 _____.
   a) Coulomb's square law b) Gauss's law
   c) Maxwell's first law d) Maxwell's second law

6) The units of capacitance are _____.
   a) volts/coulomb b) coulombs/volt
   c) ohms d) henry/Wb

7) The capacitance of a capacitor is not affected by _____.
   a) distance between plates b) area of plates
   c) thickness of plates d) all of the above

8) The product of no. of turns and the flux is called _____.
   a) Field linkage b) Magnetic field
   c) Flux linkage d) Area linkage

9) Relation between electric field intensity and permittivity is given by _____.
   a) $D = \epsilon E$ b) $E = D\epsilon$
   c) $D = E/\epsilon$ d) $E = \epsilon/d$

10) Energy density of magnetic field is _____.
   a) $\frac{1}{2}\mu H^2$ b) μH^2
   c) $2\mu H$ 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) $F = Q\ [V + E \times B]$ d) $F = Q\ [B + V \times E]$

12) Displacement current density is _____.
   a) D b) J
   c) $\partial D/\partial t$ d) $\partial J/\partial t$

13) The unit of relative permeability is _____.
   a) Henry/Meter b) Henry
   c) Henry/sq. m d) It is dimensionless

14) The vector projection of G on F is given by _____.
   a) $G.F$ b) $G.a_F$
   c) $(G.a_F)a_F$ d) $F.a_G$

Seat No.	

Set **P**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Max. Marks: 56
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. **16**

a) Transform $\bar{A} = 3a_x + 4a_y + 5a_z$ to Spherical coordinate system at point (3, 4, 5)

b) If curl of vector $\bar{A}$ is zero. Find constants a, b and c if
$\bar{A} = (x + 2y + az)a_x + (bx - 3y - z)a_y + (4x + cy + 2z)a_z$

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 $1 < y < 3mm, \varepsilon_{r3}$ for $3 < y < 5mm$, conducting surfaces are at $y = 0mm \; and \; y = 5mm$. Calculate capacitance per m^2 area if
1) ε_{r3} is that for air
2) $\varepsilon_{r3} = \varepsilon_{r1}$
3) $\varepsilon_{r3} = \varepsilon_{r2}$

Q.3 Solve any two. **12**

a) If $\bar{D} = 4xya_x + 2(x^2 + z^2)a_y + 4yza_z$ Evaluate surface integral to find total charge enclosed by rectangular parallelepiped.
$0 \leq x \leq 2, 0 \leq y \leq 3, 0 \leq z \leq 5$

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. **16**

a) A finite current filament through which current $\mathrm{I} = 1$ A current is passed from $y = 0$ to $y = 2$. Find $\bar{H}$ 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 $B = 0.3a_x + 0.1a_y \; Wb/m^2$. Find
1) Electric force
2) Magnetic force

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. **12**

a) State and prove Ampere's circuital law.

b) Evaluate both sides of Stroke's theorem for the field $\bar{H} = 6xya_x - 3y^2a_y$ and the rectangular path around the region $2 \leq x \leq 5, -1 \leq y \leq 1, z = 0$ Let the direction of ds to be a_z

c) Derive expression for boundary conditions in magnetic field.

Seat No.	

Set **Q**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) The product of no. of turns and the flux is called _____.
   a) Field linkage b) Magnetic field
   c) Flux linkage d) Area linkage

2) Relation between electric field intensity and permittivity is given by _____.
   a) $D = \epsilon E$ b) $E = D\epsilon$
   c) $D = E/\epsilon$ d) $E = \epsilon/d$

3) Energy density of magnetic field is _____.
   a) $\frac{1}{2}\mu H^2$ b) μH^2
   c) $2\mu H$ d) $\frac{1}{2}\mu^2 H$

4) Lorentz force equation is _____.
   a) $F = Q \times [E + V \times B]$ b) $F = Q\ [E + V \times B]$
   c) $F = Q\ [V + E \times B]$ d) $F = Q\ [B + V \times E]$

5) Displacement current density is _____.
   a) D b) J
   c) $\partial D/\partial t$ d) $\partial J/\partial t$

6) The unit of relative permeability is _____.
   a) Henry/Meter b) Henry
   c) Henry/sq. m d) It is dimensionless

7) The vector projection of G on F is given by _____.
   a) $G.F$ b) $G.a_F$
   c) $(G.a_F)a_F$ d) $F.a_G$

8) The differential volume (dv) in cylindrical coordinate system is given by _____.
   a) $\mathrm{drd}\Phi\mathrm{dz}$ b) $\mathrm{rdrd}\Phi\mathrm{dz}$
   c) $\mathrm{rdrd}\Phi$ d) $\mathrm{rd}\Phi\mathrm{dz}$

9) 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) $\tan^{-1}(y/x)$

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
   b) coulombs/volt
   c) ohms
   d) henry/Wb

14) The capacitance of a capacitor is not affected by _____.
   a) distance between plates
   b) area of plates
   c) thickness of plates
   d) all of the above

Seat No.	

Set **Q**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Max. Marks: 56
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. **16**

a) Transform $\bar{A} = 3a_x + 4a_y + 5a_z$ to Spherical coordinate system at point (3, 4, 5)

b) If curl of vector $\bar{A}$ is zero. Find constants a, b and c if
$\bar{A} = (x + 2y + az)a_x + (bx - 3y - z)a_y + (4x + cy + 2z)a_z$

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 $1 < y < 3mm, \varepsilon_{r3}$ for $3 < y < 5mm$, conducting surfaces are at $y = 0mm \; and \; y = 5mm$. Calculate capacitance per m^2 area if
1) ε_{r3} is that for air
2) $\varepsilon_{r3} = \varepsilon_{r1}$
3) $\varepsilon_{r3} = \varepsilon_{r2}$

Q.3 Solve any two. **12**

a) If $\bar{D} = 4xya_x + 2(x^2 + z^2)a_y + 4yza_z$ Evaluate surface integral to find total charge enclosed by rectangular parallelepiped.
$0 \leq x \leq 2, 0 \leq y \leq 3, 0 \leq z \leq 5$

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. **16**

a) A finite current filament through which current $\mathrm{I} = 1$ A current is passed from $y = 0$ to $y = 2$. Find $\bar{H}$ 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 $B = 0.3a_x + 0.1a_y \; Wb/m^2$. Find
1) Electric force
2) Magnetic force

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. **12**

a) State and prove Ampere's circuital law.

b) Evaluate both sides of Stroke's theorem for the field $\bar{H} = 6xya_x - 3y^2a_y$ and the rectangular path around the region $2 \leq x \leq 5, -1 \leq y \leq 1, z = 0$ Let the direction of ds to be a_z

c) Derive expression for boundary conditions in magnetic field.

Seat No.	

Set **R**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 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 Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) "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

2) The units of capacitance are _____.
   a) volts/coulomb b) coulombs/volt
   c) ohms d) henry/Wb

3) The capacitance of a capacitor is not affected by _____.
   a) distance between plates b) area of plates
   c) thickness of plates d) all of the above

4) The product of no. of turns and the flux is called _____.
   a) Field linkage b) Magnetic field
   c) Flux linkage d) Area linkage

5) Relation between electric field intensity and permittivity is given by _____.
   a) $D = \epsilon E$ b) $E = D\epsilon$
   c) $D = E/\epsilon$ d) $E = \epsilon / d$

6) Energy density of magnetic field is _____.
   a) $\frac{1}{2}\mu H^2$ b) μH^2
   c) $2\mu H$ d) $\frac{1}{2}\mu^2 H$

7) Lorentz force equation is _____.
   a) $F = Q \times [E + V \times B]$ b) $F = Q\ [E + V \times B]$
   c) $F = Q\ [V + E \times B]$ d) $F = Q\ [B + V \times E]$

8) Displacement current density is _____.
   a) D b) J
   c) $\partial D / \partial t$ d) $\partial J / \partial t$

9) The unit of relative permeability is _____.
   a) Henry/Meter b) Henry
   c) Henry/sq. m d) It is dimensionless

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) $\mathrm{drd}\Phi\mathrm{dz}$ b) $\mathrm{rdrd}\Phi\mathrm{dz}$
   c) $\mathrm{rdrd}\Phi$ d) $\mathrm{rd}\Phi\mathrm{dz}$

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) $(\rho_s/\epsilon_0 2)\ a_n$ b) $(\rho_s/2)\ a_n$
   c) $(\rho_s/2)$ d) $(\rho_s\epsilon_0/2)$

Seat No.	

Set **R**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Max. Marks: 56
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. **16**

a) Transform $\bar{A} = 3a_x + 4a_y + 5a_z$ to Spherical coordinate system at point (3, 4, 5)

b) If curl of vector $\bar{A}$ is zero. Find constants a, b and c if
$\bar{A} = (x + 2y + az)a_x + (bx - 3y - z)a_y + (4x + cy + 2z)a_z$

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 $1 < y < 3mm, \varepsilon_{r3}$ for $3 < y < 5mm$, conducting surfaces are at $y = 0mm \; and \; y = 5mm$. Calculate capacitance per m^2 area if
1) ε_{r3} is that for air
2) $\varepsilon_{r3} = \varepsilon_{r1}$
3) $\varepsilon_{r3} = \varepsilon_{r2}$

Q.3 Solve any two. **12**

a) If $\bar{D} = 4xya_x + 2(x^2 + z^2)a_y + 4yza_z$ Evaluate surface integral to find total charge enclosed by rectangular parallelepiped.
$0 \leq x \leq 2, 0 \leq y \leq 3, 0 \leq z \leq 5$

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. **16**

a) A finite current filament through which current $\mathrm{I} = 1$ A current is passed from $y = 0$ to $y = 2$. Find $\bar{H}$ 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 $B = 0.3a_x + 0.1a_y \; Wb/m^2$. Find
1) Electric force
2) Magnetic force

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. **12**

a) State and prove Ampere's circuital law.

b) Evaluate both sides of Stroke's theorem for the field $\bar{H} = 6xya_x - 3y^2a_y$ and the rectangular path around the region $2 \leq x \leq 5, -1 \leq y \leq 1, z = 0$ Let the direction of ds to be a_z

c) Derive expression for boundary conditions in magnetic field.

SLR-FM-420

Seat No.	

Set S

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Energy density of magnetic field is _____.
   a) $\frac{1}{2}\mu H^2$ b) μH^2
   c) $2\mu H$ d) $\frac{1}{2}\mu^2 H$

2) Lorentz force equation is _____.
   a) $F = Q \times [E + V \times B]$ b) $F = Q\ [E + V \times B]$
   c) $F = Q\ [V + E \times B]$ d) $F = Q\ [B + V \times E]$

3) Displacement current density is _____.
   a) D b) J
   c) $\partial D/\partial t$ d) $\partial J/\partial t$

4) The unit of relative permeability is _____.
   a) Henry/Meter b) Henry
   c) Henry/sq. m d) It is dimensionless

5) The vector projection of G on F is given by _____.
   a) $G.F$ b) $G.a_F$
   c) $(G.a_F)a_F$ d) $F.a_G$

6) The differential volume (dv) in cylindrical coordinate system is given by _____.
   a) $\mathrm{drd}\Phi\mathrm{dz}$ b) $\mathrm{rdrd}\Phi\mathrm{dz}$
   c) $\mathrm{rdrd}\Phi$ d) $\mathrm{rd}\Phi\mathrm{dz}$

7) The spherical coordinate $'\Phi'$ can be derived from Cartesian coordinate system as _____
   a) $x^2 + y^2$ b) $(x^2 + y^2)^{0.5}$
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8) Unit vector is having _____.
   a) Direction with one magnitude
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   c) Not both magnitude and direction
   d) None of above

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
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11) The units of capacitance are _____.
   a) volts/coulomb b) coulombs/volt
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12) The capacitance of a capacitor is not affected by _____.
   a) distance between plates b) area of plates
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13) The product of no. of turns and the flux is called _____.
   a) Field linkage 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.	

Set **S**

T.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Max. Marks: 56
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. **16**

a) Transform $\bar{A} = 3a_x + 4a_y + 5a_z$ to Spherical coordinate system at point (3, 4, 5)

b) If curl of vector $\bar{A}$ is zero. Find constants a, b and c if
$\bar{A} = (x + 2y + az)a_x + (bx - 3y - z)a_y + (4x + cy + 2z)a_z$

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 $1 < y < 3mm, \varepsilon_{r3}$ for $3 < y < 5mm$, conducting surfaces are at $y = 0mm \; and \; y = 5mm$. Calculate capacitance per m^2 area if
1) ε_{r3} is that for air
2) $\varepsilon_{r3} = \varepsilon_{r1}$
3) $\varepsilon_{r3} = \varepsilon_{r2}$

Q.3 Solve any two. **12**

a) If $\bar{D} = 4xya_x + 2(x^2 + z^2)a_y + 4yza_z$ Evaluate surface integral to find total charge enclosed by rectangular parallelepiped.
$0 \leq x \leq 2, 0 \leq y \leq 3, 0 \leq z \leq 5$

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. **16**

a) A finite current filament through which current $\mathrm{I} = 1$ A current is passed from $y = 0$ to $y = 2$. Find $\bar{H}$ 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 $B = 0.3a_x + 0.1a_y \; Wb/m^2$. Find
1) Electric force
2) Magnetic force

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. **12**

a) State and prove Ampere's circuital law.

b) Evaluate both sides of Stroke's theorem for the field $\bar{H} = 6xya_x - 3y^2a_y$ and the rectangular path around the region $2 \leq x \leq 5, -1 \leq y \leq 1, z = 0$ Let the direction of ds to be a_z

c) Derive expression for boundary conditions in magnetic field.

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) The most economical method of electric braking is _____.
   a) plugging
   b) dynamic braking with separate excitation
   c) dynamic braking with self excitation
   d) regenerative braking

2) Long distance railways operate on _____.
   a) 600 V dc b) 25 kV single phase ac
   c) 25 kV three phase ac d) 15 kV three phase ac

3) Trapezoidal speed-time curve pertains to _____.
   a) main line service b) urban service
   c) sub-urban service d) urban/sub-urban service

4) Average speed of a train is independent of _____.
   a) duration of stops
   b) acceleration and braking retardation
   c) distance between stops
   d) running time

5) Specific energy consumption is maximum in _____ services.
   a) suburban b) urban
   c) main line d) equal for all types

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
   c) series-parallel control d) motor generator control

7) Parallel operation of traction motors is easier with _____.
   a) dc shunt motors b) dc series motors
   c) induction motors d) none of these

8) Dielectric loss is proportional to _____.
   a) frequency b) $(\text{frequency})^2$
   c) $(\text{frequency})^3$ d) $(\text{frequency})^{1/2}$

9) The power factor will be leading in case of _____.
   a) induction heating b) dielectric heating
   c) electric arc heating d) resistance heating

10) Projection welding can be considered as a mass production form of _____.
   a) seam welding b) flash welding
   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
   c) 20 - 30 V d) 100 V

12) The main application of indirect arc furnace is to melt _____.
   a) iron b) steel
   c) non-ferrous d) None of the above

13) The lamp used in cinema projector is _____.
   a) carbon arc lamp b) tungsten filament lamp
   c) fluorescent lamp d) sodium vapour lamp

14) Flood lighting is not used for _____.
   a) industrial purposes b) advertising purposes
   c) aesthetic purposes d) any of the above

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

a) Explain resistance welding.
b) Explain flood lighting.
c) Write short notes on:
i) Energy conservation in agriculture
ii) Energy conservation in industries

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) Dielectric loss is proportional to _____.
   a) frequency b) $(\text{frequency})^2$
   c) $(\text{frequency})^3$ d) $(\text{frequency})^{1/2}$

2) The power factor will be leading in case of _____.
   a) induction heating b) dielectric heating
   c) electric arc heating d) resistance heating

3) Projection welding can be considered as a mass production form of _____.
   a) seam welding b) flash welding
   c) upset welding d) spot welding

4) In an electric arc welding, the voltage required to maintain the are will be _____.
   a) 250 - 500 V b) 150 - 250 V
   c) 20 - 30 V d) 100 V

5) The main application of indirect arc furnace is to melt _____.
   a) iron b) steel
   c) non-ferrous d) None of the above

6) The lamp used in cinema projector is _____.
   a) carbon arc lamp b) tungsten filament lamp
   c) fluorescent lamp d) sodium vapour lamp

7) Flood lighting is not used for _____.
   a) industrial purposes b) advertising purposes
   c) aesthetic purposes d) any of the above

8) The most economical method of electric braking is _____.
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   b) dynamic braking with separate excitation
   c) dynamic braking with self excitation
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   c) 25 kV three phase ac d) 15 kV three phase ac

10) Trapezoidal speed-time curve pertains to _____.
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   d) 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.
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   b) urban
   c) main line
   d) equal for all types

13) When two or more motors are used for traction service, the method of speed control used will be _____.
   a) rheostatic control
   b) field control
   c) series-parallel control
   d) motor generator control

14) Parallel operation of traction motors is easier with _____.
   a) dc shunt motors
   b) dc series motors
   c) induction motors
   d) none of these

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

a) Explain resistance welding.
b) Explain flood lighting.
c) Write short notes on:
i) Energy conservation in agriculture
ii) Energy conservation in industries

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) Specific energy consumption is maximum in _____ services.
   a) suburban b) urban
   c) main line d) equal for all types

2) When two or more motors are used for traction service, the method of speed control used will be _____.
   a) rheostatic control b) field control
   c) series-parallel control d) motor generator control

3) Parallel operation of traction motors is easier with _____.
   a) dc shunt motors b) dc series motors
   c) induction motors d) none of these

4) Dielectric loss is proportional to _____.
   a) frequency b) $(\text{frequency})^2$
   c) $(\text{frequency})^3$ d) $(\text{frequency})^{1/2}$

5) The power factor will be leading in case of _____.
   a) induction heating b) dielectric heating
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6) Projection welding can be considered as a mass production form of _____.
   a) seam welding b) flash welding
   c) upset welding d) spot welding

7) In an electric arc welding, the voltage required to maintain the are will be _____.
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   c) 20 - 30 V d) 100 V

8) The main application of indirect arc furnace is to melt _____.
   a) iron b) steel
   c) non-ferrous d) None of the above

9) The lamp used in cinema projector is _____.
   a) carbon arc lamp b) tungsten filament lamp
   c) fluorescent lamp d) sodium vapour lamp

10) Flood lighting is not used for _____.
   a) industrial purposes
   b) advertising purposes
   c) aesthetic purposes
   d) any of the above

11) The most economical method of electric braking is _____.
   a) plugging
   b) dynamic braking with separate excitation
   c) dynamic braking with self excitation
   d) regenerative braking

12) Long distance railways operate on _____.
   a) 600 V dc
   b) 25 kV single phase ac
   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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Seat No.	

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

a) Explain resistance welding.

b) Explain flood lighting.

c) Write short notes on:

i) Energy conservation in agriculture
ii) Energy conservation in industries

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) Projection welding can be considered as a mass production form of _____.
   a) seam welding b) flash welding
   c) upset welding d) spot welding

2) In an electric arc welding, the voltage required to maintain the are will be _____.
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3) The main application of indirect arc furnace is to melt _____.
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   c) non-ferrous d) None of the above

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8) Trapezoidal speed-time curve pertains to _____.
   a) main line service b) urban service
   c) sub-urban service d) urban/sub-urban service

9) 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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   a) suburban b) urban
   c) main line d) equal for all types

11) When two or more motors are used for traction service, the method of speed control used will be _____.
   a) rheostatic control b) field control
   c) series-parallel control d) motor generator control

12) Parallel operation of traction motors is easier with _____.
   a) dc shunt motors b) dc series motors
   c) induction motors d) none of these

13) Dielectric loss is proportional to _____.
   a) frequency b) $(\text{frequency})^2$
   c) $(\text{frequency})^3$ d) $(\text{frequency})^{1/2}$

14) The power factor will be leading in case of _____.
   a) induction heating b) dielectric heating
   c) electric arc heating d) resistance heating

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Friday, 22-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

a) Explain resistance welding.
b) Explain flood lighting.
c) Write short notes on:
i) Energy conservation in agriculture
ii) Energy conservation in industries

SLR-FM-422

Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

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 book.
2) Figures to the right indicate full marks.
3) Assume the 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 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) $\frac{1}{1-\alpha} Vs$ d) $(1-\alpha)Vs$

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

7) 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
   c) 3f d) 6f

10) A1 – ϕ brid VSI has inductor L as the load. For a constant source voltage the current through inductor is _____.
   a) Square wave
   b) Triangular wave
   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 μs, the required pulse width would be _____.
   a) 100 μs
   b) 200 μs
   c) 220 μs
   d) 660 μs

12) For eleminating third harmonic from output voltage of inverter using series connection of inverters, the required phase difference between output voltages of two inverters is _____.
   a) 60^0
   b) 45^0
   c) 90^0
   d) 180^0

13) Half bridge inverter require _____.
   a) 3 wire d.c.
   b) may use 2 wire or 3 wire d.c.
   c) has higher output voltage if fed from 3 wire d.c.
   d) has higher efficiency if fed from 3 wire d.c.

14) A single phase half bridge inverter required to feed R-L loads needs ____.
   a) 2 thyristors
   b) 4 thyristors
   c) 2 thyristor 2 diodes
   d) 4 thyristors and 4 diodes

Seat No.	

Set **P**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 45^0 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 40^0 and the load current extinguishes at an angle of 210^0. Find average load voltage and average load current for R = 5 Ω, L= 2 mH.

Q.3 Attempt any two. **12**

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) A1ϕ halfwave controlled rectifier with resistive load, if firing angle $\alpha = \pi/4$, rad E_S≡230 V, R = 5Ω Find
1) Average output voltage
2) RMS output voltage
3) Power delivered to load

Section –II

Q.4 Attempt any four. **16**

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.

Q.5 Attempt any two. **12**

a) Discuss the principle of working of 3 phase bridge inverter with appropriate waveform and circuit diagram on assumption that each thyristor conduct for 180^0 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”.

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

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 book.
2) Figures to the right indicate full marks.
3) Assume the 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) 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) $\beta + \alpha$

2) In 3ϕ full converter, output voltage pulsates at a frequency equal to_____.
   a) supply frequency f b) 2f
   c) 3f d) 6f

3) A1 − ϕ brid VSI has inductor L as the load. For a constant source voltage the current through inductor is _____.
   a) Square wave b) Triangular wave
   c) Sine wave d) Pulsed wave

4) 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 μs, the required pulse width would be _____.
   a) 100 μs b) 200 μs
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5) For eleminating third harmonic from output voltage of inverter using series connection of inverters, the required phase difference between output voltages of two inverters is _____.
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   c) equal to latching current
   d) none of the above

10) The uncontrolled electronic switch employed in power-electronic converters is _____.
   a) SCR
   b) BJT
   c) Diode
   d) MOSFET

11) In step-down chopper output voltage is given by _____.
   a) $Vo = \alpha Vs$
   b) $\frac{Vs}{\sqrt{\alpha}}$
   c) $\frac{1}{1-\alpha} Vs$
   d) $(1-\alpha)Vs$

12) 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

13) Thyristor may be termed as_____.
   a) D.C. switch
   b) A.C. switch
   c) A.C. and D.C. switch
   d) Square wave switch

14) For continuous conduction, in single phase full converter each pair of SCR conduct for _____.
   a) $\pi - \alpha$
   b) π
   c) α
   d) $\pi + \alpha$

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 45^0 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 40^0 and the load current extinguishes at an angle of 210^0. Find average load voltage and average load current for R = 5 Ω, L= 2 mH.

Q.3 Attempt any two. **12**

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) $A1\phi$ halfwave controlled rectifier with resistive load, if firing angle $\alpha = \pi/4$, rad E_s≡230 V, R = 5Ω Find
1) Average output voltage
2) RMS output voltage
3) Power delivered to load

Section –II

Q.4 Attempt any four. **16**

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.

Q.5 Attempt any two. **12**

a) Discuss the principle of working of 3 phase bridge inverter with appropriate waveform and circuit diagram on assumption that each thyristor conduct for 180^0 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”.

Seat No.	

Set R

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

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 book.
2) Figures to the right indicate full marks.
3) Assume the 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) 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

2) Thyristor may be termed as_____.
   a) D.C. switch b) A.C. switch
   c) A.C. and D.C. switch d) Square wave switch

3) For continuous conduction, in single phase full converter each pair of SCR conduct for _____.
   a) $\pi - \alpha$ b) π
   c) α d) $\pi + \alpha$

4) 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) $\beta + \alpha$

5) In 3ϕ full converter, output voltage pulsates at a frequency equal to_____.
   a) supply frequency f b) 2f
   c) 3f d) 6f

6) $A1 - \phi$ brid VSI has inductor L as the load. For a constant source voltage the current through inductor is _____.
   a) Square wave b) Triangular wave
   c) Sine wave d) Pulsed wave

7) 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 μs, the required pulse width would be _____.
   a) 100 μs b) 200 μs
   c) 220 μs d) 660 μs

8) For eleminating third harmonic from output voltage of inverter using series connection of inverters, the required phase difference between output voltages of two inverters is _____.
   a) 60^0 b) 45^0
   c) 90^0 d) 180^0

9) Half bridge inverter require _____.
   a) 3 wire d.c.
   b) may use 2 wire or 3 wire d.c.
   c) has higher output voltage if fed from 3 wire d.c.
   d) has higher efficiency if fed from 3 wire d.c.

10) A single phase half bridge inverter required to feed R-L loads needs ____.
   a) 2 thyristors
   b) 4 thyristors
   c) 2 thyristor 2 diodes
   d) 4 thyristors and 4 diodes

11) 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*

12) 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

13) The uncontrolled electronic switch employed in power-electronic converters is _____.
   a) SCR
   b) BJT
   c) Diode
   d) MOSFET

14) In step-down chopper output voltage is given by _____.
   a) $Vo = \alpha Vs$
   b) $\frac{Vs}{\sqrt{\alpha}}$
   c) $\frac{1}{1-\alpha} Vs$
   d) $(1-\alpha)Vs$

Seat No.	

Set **R**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 45^0 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 40^0 and the load current extinguishes at an angle of 210^0. Find average load voltage and average load current for R = 5 Ω, L= 2 mH.

Q.3 Attempt any two. **12**

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) A1ϕ halfwave controlled rectifier with resistive load, if firing angle $\alpha = \pi/4$, rad E_S≡230 V, R = 5Ω Find
1) Average output voltage
2) RMS output voltage
3) Power delivered to load

Section –II

Q.4 Attempt any four. **16**

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.

Q.5 Attempt any two. **12**

a) Discuss the principle of working of 3 phase bridge inverter with appropriate waveform and circuit diagram on assumption that each thyristor conduct for 180^0 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”.

Seat No.	

Set **S**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

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 book.
2) Figures to the right indicate full marks.
3) Assume the 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) A1 – ϕ brid VSI has inductor L as the load. For a constant source voltage the current through inductor is _____.
   a) Square wave b) Triangular wave
   c) Sine wave d) Pulsed 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 μs, the required pulse width would be _____.
   a) 100 μs b) 200 μs
   c) 220 μs d) 660 μs

3) For eleminating third harmonic from output voltage of inverter using series connection of inverters, the required phase difference between output voltages of two inverters is _____.
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   c) 90^0 d) 180^0

4) Half bridge inverter require _____.
   a) 3 wire d.c.
   b) may use 2 wire or 3 wire d.c.
   c) has higher output voltage if fed from 3 wire d.c.
   d) has higher efficiency if fed from 3 wire d.c.

5) A single phase half bridge inverter required to feed R-L loads needs ____.
   a) 2 thyristors b) 4 thyristors
   c) 2 thyristor 2 diodes d) 4 thyristors and 4 diodes

6) 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*

7) 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

8) The uncontrolled electronic switch employed in power-electronic converters is _____.
   a) SCR b) BJT
   c) Diode d) MOSFET

9) In step-down chopper output voltage is given by _____.
   a) $Vo = \alpha Vs$ b) $\frac{Vs}{\sqrt{\alpha}}$
   c) $\frac{1}{1-\alpha} Vs$ d) $(1-\alpha)Vs$

10) 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

11) Thyristor may be termed as_____.
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   c) A.C. and D.C. switch d) Square wave switch

12) For continuous conduction, in single phase full converter each pair of SCR conduct for _____.
   a) $\pi - \alpha$ b) π
   c) α d) $\pi + \alpha$

13) 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) $\beta + \alpha$

14) In 3ϕ full converter, output voltage pulsates at a frequency equal to_____.
   a) supply frequency f b) 2f
   c) 3f d) 6f

Seat No.	

Set **S**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 45^0 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 40^0 and the load current extinguishes at an angle of 210^0. Find average load voltage and average load current for R = 5 Ω, L= 2 mH.

Q.3 Attempt any two. **12**

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) A1ϕ halfwave controlled rectifier with resistive load, if firing angle $\alpha = \pi/4$, rad E_s≡230 V, R = 5Ω Find
1) Average output voltage
2) RMS output voltage
3) Power delivered to load

Section –II

Q.4 Attempt any four. **16**

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.

Q.5 Attempt any two. **12**

a) Discuss the principle of working of 3 phase bridge inverter with appropriate waveform and circuit diagram on assumption that each thyristor conduct for 180^0 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”.

SLR-FM-423

Seat No.	

Set P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) 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

2) The transfer function is $\frac{s+2}{s+3}$ It represents a _____.
   a) lead network b) lag network
   c) lag-lead network d) proportional controller

3) 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) $1, -2, 4$

4) 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) $15°$

5) 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) $\sin^{-1}\left(\frac{a-1}{a+1}\right)$

6) For an n^{th} order system the state equations will be of the order of _____.
   a) n b) 1
   c) $n/2$ d) $(n+1)/2$

7) The necessary and sufficient condition for full order state observer is that the system must be _____.
   a) completely observable b) completely controllable
   c) not observable d) not controllable

8) Which of the following is the nonlinearity caused by servomotor?
   a) static friction
   b) backlash
   c) saturation
   d) none of the above

9) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu \qquad y = Cx + Du$
   a) $B(sI - A)^{-1}C + D$
   b) $C(sI - A)^{-1}B + D$
   c) $D(sI - A)^{-1}B + C$
   d) $A(sI - B)^{-1}C + D$

10) In nonlinear control system limit cycle is self-sustained oscillations of _____.
   a) fixed frequency
   b) variable frequency
   c) variable amplitude
   d) fixed frequency & amplitude

11) The information contained in a signal is preserved in the sampled version if _____.
   a) $\omega_s = \omega_m$
   b) $\omega_s = 0.5\omega_m$
   c) $\omega_s = 0.1\,\omega_m$
   d) $\omega_s = 2\omega_m$

12) For a unity feedback system, the origin of the s-plane is mapped in the z-plane by transformation $z =$ _____ to which one of the following?
   a) Origin
   b) $1 + \mathrm{j}0$
   c) $-1 + \mathrm{j}0$
   d) $0 + \mathrm{j}1$

13) 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) $z2 + 5z + 3 = 0$
   b) $z2 - 3z - 5 = 0$
   c) $z2 + 3z + 5 = 0$
   d) $z2 + z + 2 = 0$

14) The transfer function of zero order hold is _____.
   a) $1 - e^{Ts}$
   b) $1 - e^{-Ts}$
   c) $\frac{1-e^{Ts}}{s}$
   d) $\frac{1-e^{-Ts}}{s}$

Seat No.		Set	P

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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 of the following questions. **16**

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

$\dot{x}_1 = x_1 + x_2 + u$

$\dot{x}_1 = -x_2$

c) Determine the Transfer function from the data given as below.

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix};\ B = \begin{bmatrix} 1 \\ 1 \end{bmatrix};\ C = [1 \quad 1]\ and\ D = 0$$

d) Write the properties of state transition matrix.

e) Explain realization of Lead compensator

f) Obtain state model for the system described in phase variable form.

$$d^3y/dt^3 + 11\ d^2y/dt^2 + 4\frac{dy}{dx} + 8y = 9\,u(t)$$

Q.3 Attempt any two of the following questions. **12**

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) $k_v = 0.2sec^{-1}$
2) $\text{PM} = 40°$

Section – II

Q.4 Attempt any four of the following questions. **16**

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.

f) Determine the kind of singularity for the following differential equation.

$\ddot{y} + 3\dot{y} + 2y = 0$

Q.5 Attempt any two of the following questions. **12**

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.

$$Z^3 - 1.1Z^2 - 0.1Z + 0.2 = 0$$

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 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.
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Duration: 30 Minutes Marks: 14

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

1) Which of the following is the nonlinearity caused by servomotor?
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   c) saturation d) none of the above

2) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu \quad y = Cx + Du$
   a) $B(sI - A)^{-1}C + D$ b) $C(sI - A)^{-1}B + D$
   c) $D(sI - A)^{-1}B + C$ d) $A(sI - B)^{-1}C + D$

3) In nonlinear control system limit cycle is self-sustained oscillations of _____.
   a) fixed frequency b) variable frequency
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4) The information contained in a signal is preserved in the sampled version if _____.
   a) $\omega_s = \omega_m$ b) $\omega_s = 0.5\omega_m$
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5) For a unity feedback system, the origin of the s-plane is mapped in the z-plane by transformation $z =$ _____ to which one of the following?
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   c) $-1 + \mathrm{j}0$ d) $0 + \mathrm{j}1$

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 _____.
   a) $z2 + 5z + 3 = 0$ b) $z2 - 3z - 5 = 0$
   c) $z2 + 3z + 5 = 0$ d) $z2 + z + 2 = 0$

7) The transfer function of zero order hold is _____.
   a) $1 - e^{Ts}$ b) $1 - e^{-Ts}$
   c) $\frac{1-e^{Ts}}{s}$ d) $\frac{1-e^{-Ts}}{s}$

8) What is the effect of phase lead compensator on gain crossover frequency (ω_{gc}) and on the bandwidth (ω_b) _____.
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c) $\sin^{-1}\left(\frac{a+1}{a-1}\right)$
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13) For an n^{th} order system the state equations will be of the order of _____.

a) n
b) 1
c) $n/2$
d) $(n+1)/2$

14) The necessary and sufficient condition for full order state observer is that the system must be _____.

a) completely observable
b) completely controllable
c) not observable
d) not controllable

Seat No.	

Set **Q**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
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Section – I

Q.2 Attempt any four of the following questions. **16**

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b) Test the controllability of the system whose state equations are given as

$\dot{x}_1 = x_1 + x_2 + u$

$\dot{x}_1 = -x_2$

c) Determine the Transfer function from the data given as below.

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix};\ B = \begin{bmatrix} 1 \\ 1 \end{bmatrix};\ C = [1 \quad 1]\ and\ D = 0$$

d) Write the properties of state transition matrix.

e) Explain realization of Lead compensator

f) Obtain state model for the system described in phase variable form.

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a) Obtain state Transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 2 & 3 \\ 0 & -3 \end{bmatrix}$$

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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) $k_v = 0.2sec^{-1}$
2) $\text{PM} = 40°$

Section – II

Q.4 Attempt any four of the following questions. **16**

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.

f) Determine the kind of singularity for the following differential equation.

$\ddot{y} + 3\dot{y} + 2y = 0$

Q.5 Attempt any two of the following questions. **12**

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.

$$Z^3 - 1.1Z^2 - 0.1Z + 0.2 = 0$$

Seat No.	

Set **R**

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) 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) $\sin^{-1}\left(\frac{a-1}{a+1}\right)$

2) For an n[th] order system the state equations will be of the order of _____.
   a) n b) 1
   c) $n/2$ d) $(n+1)/2$

3) The necessary and sufficient condition for full order state observer is that the system must be _____.
   a) completely observable b) completely controllable
   c) not observable d) not controllable

4) Which of the following is the nonlinearity caused by servomotor?
   a) static friction b) backlash
   c) saturation d) none of the above

5) The transfer function of a SISO system with the following state space representation is $\dot{x} = Ax + Bu \quad y = Cx + Du$
   a) $B(sI - A)^{-1}C + D$ b) $C(sI - A)^{-1}B + D$
   c) $D(sI - A)^{-1}B + C$ d) $A(sI - B)^{-1}C + D$

6) In nonlinear control system limit cycle is self-sustained oscillations of _____.
   a) fixed frequency b) variable frequency
   c) variable amplitude d) fixed frequency & amplitude

7) The information contained in a signal is preserved in the sampled version if _____.
   a) $\omega_s = \omega_m$ b) $\omega_s = 0.5\omega_m$
   c) $\omega_s = 0.1\,\omega_m$ d) $\omega_s = 2\omega_m$

8) For a unity feedback system, the origin of the s-plane is mapped in the z-plane by transformation $z =$ _____ to which one of the following?
   a) Origin b) $1 + \mathrm{j}0$
   c) $-1 + \mathrm{j}0$ d) $0 + \mathrm{j}1$

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) $z2 + 5z + 3 = 0$ b) $z2 - 3z - 5 = 0$

c) $z2 + 3z + 5 = 0$ d) $z2 + z + 2 = 0$

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 a _____.

a) lead network b) lag network

c) lag-lead network d) 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 _____.

a) $60°$ b) $45°$

c) $30°$ d) $15°$

Seat No.		Set	R

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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 of the following questions. **16**

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

$\dot{x}_1 = x_1 + x_2 + u$

$\dot{x}_1 = -x_2$

c) Determine the Transfer function from the data given as below.

$$A = \begin{bmatrix} -3 & 1 \\ 0 & -1 \end{bmatrix};\ B = \begin{bmatrix} 1 \\ 1 \end{bmatrix};\ C = [1 \quad 1]\ and\ D = 0$$

d) Write the properties of state transition matrix.

e) Explain realization of Lead compensator

f) Obtain state model for the system described in phase variable form.

$$d^3y/dt^3 + 11\ d^2y/dt^2 + 4\frac{dy}{dx} + 8y = 9\,u(t)$$

Q.3 Attempt any two of the following questions. **12**

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) $k_v = 0.2sec^{-1}$
2) $\text{PM} = 40°$

Section – II

Q.4 Attempt any four of the following questions. **16**

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.

f) Determine the kind of singularity for the following differential equation.

$\ddot{y} + 3\dot{y} + 2y = 0$

Q.5 Attempt any two of the following questions. **12**

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.

$$Z^3 - 1.1Z^2 - 0.1Z + 0.2 = 0$$

Seat No.		Set	S

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) In nonlinear control system limit cycle is self-sustained oscillations of _____.
   a) fixed frequency b) variable frequency
   c) variable amplitude d) fixed frequency & amplitude

2) The information contained in a signal is preserved in the sampled version if _____.
   a) $\omega_s = \omega_m$ b) $\omega_s = 0.5\omega_m$
   c) $\omega_s = 0.1\,\omega_m$ d) $\omega_s = 2\omega_m$

3) For a unity feedback system, the origin of the s-plane is mapped in the z-plane by transformation $z =$ _____ to which one of the following?
   a) Origin b) $1 + \mathrm{j}0$
   c) $-1 + \mathrm{j}0$ d) $0 + \mathrm{j}1$

4) 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 _____.
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5) The transfer function of zero order hold is _____.
   a) $1 - e^{Ts}$ b) $1 - e^{-Ts}$
   c) $\frac{1-e^{Ts}}{s}$ d) $\frac{1-e^{-Ts}}{s}$

6) What is the effect of phase lead compensator on gain crossover frequency (ω_{gc}) and on the bandwidth (ω_b) _____.
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   b) ω_{gc} is increased but ω_b is decreased
   c) ω_{gc} is decreased but ω_b is increased
   d) Both are decreased

7) The transfer function is $\frac{s+2}{s+3}$ It represents a _____.
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c) $\sin^{-1}\left(\frac{a+1}{a-1}\right)$ d) $\sin^{-1}\left(\frac{a-1}{a+1}\right)$

11) For an n[th] order system the state equations will be of the order of _____.

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a) $B(sI - A)^{-1}C + D$ b) $C(sI - A)^{-1}B + D$
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Seat No.		Set	S

T.E. (Part - II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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 of the following questions. **16**

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

$\dot{x}_1 = x_1 + x_2 + u$

$\dot{x}_1 = -x_2$

c) Determine the Transfer function from the data given as below.

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d) Write the properties of state transition matrix.

e) Explain realization of Lead compensator

f) Obtain state model for the system described in phase variable form.

$$d^3y/dt^3 + 11\ d^2y/dt^2 + 4\frac{dy}{dx} + 8y = 9\,u(t)$$

Q.3 Attempt any two of the following questions. **12**

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) $k_v = 0.2sec^{-1}$
2) $\text{PM} = 40°$

Section – II

Q.4 Attempt any four of the following questions. **16**

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.

f) Determine the kind of singularity for the following differential equation.

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Q.5 Attempt any two of the following questions. **12**

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.

$$Z^3 - 1.1Z^2 - 0.1Z + 0.2 = 0$$

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 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.
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 $\mathrm{u(n)}$ as unit step function, $\mathrm{u\,(n+1)-u\,(n)}$ is _____.
   a) $\delta(\mathrm{n})$ b) $\delta(\mathrm{n})-\delta(\mathrm{n}+1)$
   c) $\delta(\mathrm{n}-1)$ d) $\delta\,(\mathrm{n}+1)$

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 $x(n)=\{5,1,\underset{\uparrow}{1},1,5\}$ in terms of unit impulse signal is _____.
   a) $\delta\,(\mathrm{n})+\delta\,(\mathrm{n}-1)+5\delta\,(\mathrm{n}-2)+\delta\,(\mathrm{n}+1)+5\delta\,(\mathrm{n}+2)$
   b) $5\delta\,(\mathrm{n})+\delta\,(\mathrm{n}-1)+\delta\,(\mathrm{n}-2)+\delta\,(\mathrm{n}-3)+5\delta\,(\mathrm{n}-4)$
   c) $5\delta\,(\mathrm{n})+\delta\,(\mathrm{n}+1)+\delta\,(\mathrm{n}+2)+\delta\,(\mathrm{n}+3)+5\delta\,(\mathrm{n}+4)$
   d) None of these

7) 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

8) The response of DT-LTI system in Z domain is given by _____.
   a) Addition
   b) Multiplication
   c) Both a & b
   d) None of these

9) 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

10) if $X(\omega)$ is the Fourier transform of the signal $x(n)$, then what is the Fourier transform of the signal $x(n - k)$?
   a) $e^{j\omega k} \cdot X(-\omega)$
   b) $e^{j\omega k} \cdot X(\omega)$
   c) $e^{-j\omega k} \cdot X(-\omega)$
   d) $e^{-j\omega k} \cdot X(\omega)$

11) 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

12) The Fourier transform of $u(t)$ is _____.
   a) $\frac{1}{jw}$
   b) jw
   c) $\frac{1}{1-jw}$
   d) None of these

13) The number of complex multiplications needed to be performed for determination of N-point DFT is _____.
   a) $N - 1$
   b) $2N$
   c) N^2
   d) $(N - 1)$

14) 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) $\{0,8,8,0\}$

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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 $h[n] = \{3, 1, \underset{\uparrow}{1}, 3\}$

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. **12**

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

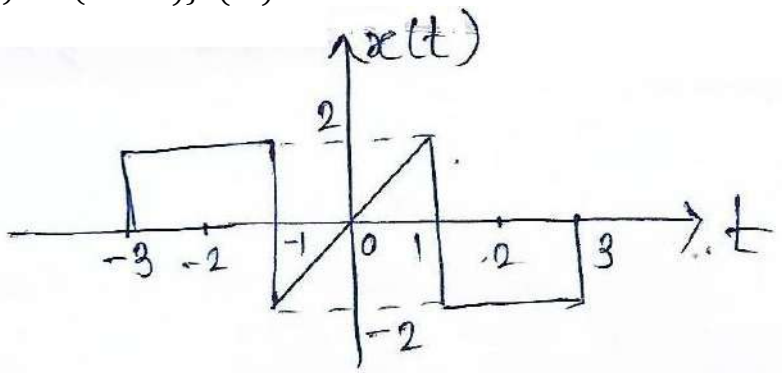
$y[n] = n\,x[5n]$

c) Sketch the following signals for given $x(t)$

1) $x(\frac{t}{2}+3)$

2) $x(-2-\frac{t}{3})$

3) $\{x(t-2) + x(2t-2)\}u(2t)$



Section - II

Q.4 Attempt any four. **16**

a) State & prove the linearity property of the CT Fourier transform.

b) State the time shifting property of Z transform & Determine Z transform of $x[n] = 4u[n+8]$. Also comment of ROC of the Z transform.

c) Find 4 point DFT of sequence $x[n] = \{2,4,3,9\}$.

d) Find the Fourier transform of $x[n] = 3^n\, u[n] - 4^n u[n+3]$

e) State & prove the periodicity property of Discrete Time Fourier Transform.

Q.5 Attempt any two. **12**

a) Find 8 point DFT of sequence $x[n] = \{1,3,5,7,2,4,6,8\}$ by using DITFFT algorithm.

b) Find inverse Z transform of $X(Z) = \frac{z+2}{z^2+3z-1}$ using power series expansion method if

1) $x[n]$ is casual

2) $x[n]$ is non-casual

c) Find 8 point DFT of given signal $x[n]$ by using DIF-FFT algorithm.

$$x[n] = \begin{cases} n+2 & 0 \le n \le 3 \\ n-2 & 4 \le n \le 7 \end{cases}$$

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 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.
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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 response of DT-LTI system in Z domain is given by _____.
   a) Addition b) Multiplication
   c) Both a & b d) None of these

2) The ROC of bilateral Z transform is _____.
   a) Entire Z plane except $\mathrm{Z} = 0$
   b) Entire Z plane except $\mathrm{Z} = \infty$
   c) Entire Z plane except $\mathrm{Z} = 0$ & $Z = \infty$
   d) Entire Z plane

3) if $\mathrm{X}(\omega)$ is the Fourier transform of the signal $x(n)$, then what is the Fourier transform of the signal $\mathrm{x}(\mathrm{n} - \mathrm{k})$?
   a) $e^{j\omega k} \cdot X(-\omega)$ b) $e^{j\omega k} \cdot X(\omega)$
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6) The number of complex multiplications needed to be performed for determination of N-point DFT is _____.
   a) $\mathrm{N} - 1$ b) $2\mathrm{N}$
   c) N^2 d) $(\mathrm{N} - 1)$

7) The 4 point DFT of sequence $x[n] = \{2,2,2,2\}$
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8) The signal operation $x(-t+t_0)$ is known as _____. (where t_0 is shifting factor)
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   d) None of these

13) The signal $x(n)=\{5,1,\underset{\uparrow}{1},1,5\}$ in terms of unit impulse signal is _____.
   a) $\delta\,(\mathrm{n})+\,\delta\,(\mathrm{n}-1)+5\delta\,(\mathrm{n}-2)+\delta\,(\mathrm{n}+1)+5\delta\,(\mathrm{n}+2)$
   b) $5\delta\,(\mathrm{n})+\,\delta\,(\mathrm{n}-1)+\delta\,(\mathrm{n}-2)\,+\,\delta\,(\mathrm{n}-3)+5\delta\,(\mathrm{n}-4)$
   c) $5\delta\,(\mathrm{n})+\delta\,(\mathrm{n}+1)+\delta\,(\mathrm{n}+2)+\delta\,(\mathrm{n}+3)+5\delta\,(\mathrm{n}+4)$
   d) None of these

14) Which property is true for convolution sum?
   i) $\mathrm{h_1(n)^*h_2(n)=h_2(n)^*h_1(n)}$
   ii) $\mathrm{[h_1(n)+h_2(n)]^*h_3(n)=h_1(n)^*h_2(n)+h_2(n)^*h_3(n)}$
   iii) $\mathrm{[h_1(n)+h_2(n)]^*\,h_3(n)=h_1(n)\,h_3(n)+h_2(n)\,h_3(n)}$
   iv) $\mathrm{[h_1(n)+h_2(n)]^*\,h_3(n)=h_1(n)^*h_3(n)+h_2(n)^*\,h_3(n)}$
   a) Only i b) Only iii
   c) i & iv d) All of the above

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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 $h[n] = \{3, 1, \underset{\uparrow}{1}, 3\}$

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. **12**

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

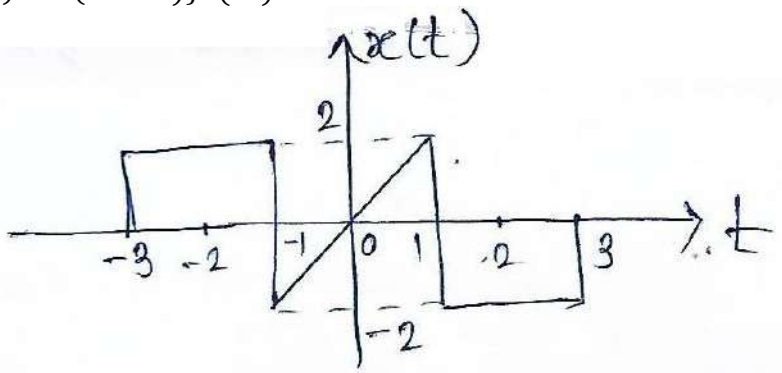
$y[n] = n\,x[5n]$

c) Sketch the following signals for given $x(t)$

1) $x(\frac{t}{2}+3)$

2) $x(-2-\frac{t}{3})$

3) $\{x(t-2) + x(2t-2)\}u(2t)$



Section – II

Q.4 Attempt any four. **16**

a) State & prove the linearity property of the CT Fourier transform.

b) State the time shifting property of Z transform & Determine Z transform of $x[n] = 4u[n+8]$. Also comment of ROC of the Z transform.

c) Find 4 point DFT of sequence $x[n] = \{2,4,3,9\}$.

d) Find the Fourier transform of $x[n] = 3^n\, u[n] - 4^n u[n+3]$

e) State & prove the periodicity property of Discrete Time Fourier Transform.

Q.5 Attempt any two. **12**

a) Find 8 point DFT of sequence $x[n] = \{1,3,5,7,2,4,6,8\}$ by using DITFFT algorithm.

b) Find inverse Z transform of $X(Z) = \frac{z+2}{z^2+3z-1}$ using power series expansion method if

1) $x[n]$ is casual

2) $x[n]$ is non-casual

c) Find 8 point DFT of given signal $x[n]$ by using DIF-FFT algorithm.

$$x[n] = \begin{cases} n+2 & 0 \le n \le 3 \\ n-2 & 4 \le n \le 7 \end{cases}$$

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 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.
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) 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 $x(n) = \{5,1,\underset{\uparrow}{1},1,5\}$ 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 _____.
   a) Addition b) Multiplication
   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) $e^{j\omega k} \cdot X(-\omega)$ b) $e^{j\omega k} \cdot X(\omega)$
   c) $e^{-j\omega k} \cdot X(-\omega)$ d) $e^{-j\omega k} \cdot X(\omega)$

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

8) The Fourier transform of $u(t)$ is _____.
   a) $\frac{1}{jw}$ b) jw
   c) $\frac{1}{1-jw}$ d) None of these

9) The number of complex multiplications needed to be performed for determination of N-point DFT is _____.
   a) $\mathrm{N}-1$ b) $2\mathrm{N}$
   c) N^2 d) $(\mathrm{N}-1)$

10) The 4 point DFT of sequence $x[n]=\{2,2,2,2\}$
   a) $\{8,0,0,8\}$ b) $\{8,0,0,0\}$
   c) $\{0,0,0,8\}$ d) $\{0,8,8,0\}$

11) 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

12) 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

13) With $\mathrm{u(n)}$ as unit step function, $\mathrm{u\,(n+1)-u\,(n)}$ is _____.
   a) $\delta(\mathrm{n})$ b) $\delta(\mathrm{n})-\delta(\mathrm{n}\ +1)$
   c) $\delta(\mathrm{n}-1)$ d) $\delta\,(\mathrm{n}+1)$

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) $\{6,3,9,9,3,6\}$
   c) $\{9,3,6,6,3,9\}$ d) None of these

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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 $h[n] = \{3, 1, \underset{\uparrow}{1}, 3\}$

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. **12**

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

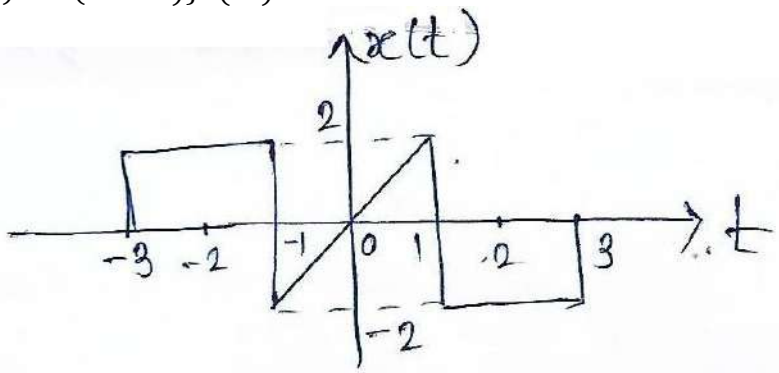
$y[n] = n\,x[5n]$

c) Sketch the following signals for given $x(t)$

1) $x(\frac{t}{2}+3)$

2) $x(-2-\frac{t}{3})$

3) $\{x(t-2) + x(2t-2)\}u(2t)$



Section - II

Q.4 Attempt any four. **16**

a) State & prove the linearity property of the CT Fourier transform.

b) State the time shifting property of Z transform & Determine Z transform of $x[n] = 4u[n+8]$. Also comment of ROC of the Z transform.

c) Find 4 point DFT of sequence $x[n] = \{2,4,3,9\}$.

d) Find the Fourier transform of $x[n] = 3^n\, u[n] - 4^n u[n+3]$

e) State & prove the periodicity property of Discrete Time Fourier Transform.

Q.5 Attempt any two. **12**

a) Find 8 point DFT of sequence $x[n] = \{1,3,5,7,2,4,6,8\}$ by using DITFFT algorithm.

b) Find inverse Z transform of $X(Z) = \frac{z+2}{z^2+3z-1}$ using power series expansion method if

1) $x[n]$ is casual

2) $x[n]$ is non-casual

c) Find 8 point DFT of given signal $x[n]$ by using DIF-FFT algorithm.

$$x[n] = \begin{cases} n+2 & 0 \le n \le 3 \\ n-2 & 4 \le n \le 7 \end{cases}$$

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 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.
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) if $\mathrm{X}(\omega)$ is the Fourier transform of the signal $x(n)$, then what is the Fourier transform of the signal $\mathrm{x(n-k)}$?
   a) $e^{j\omega k} \cdot X(-\omega)$ b) $e^{j\omega k} \cdot X(\omega)$
   c) $e^{-j\omega k} \cdot X(-\omega)$ d) $e^{-j\omega k} \cdot X(\omega)$

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) $\frac{1}{jw}$ b) jw
   c) $\frac{1}{1-jw}$ d) None of these

4) The number of complex multiplications needed to be performed for determination of N-point DFT is _____.
   a) $\mathrm{N-1}$ b) $\mathrm{2N}$
   c) $\mathrm{N^2}$ d) $\mathrm{(N-1)}$

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

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 $x(n) = \{5,1,\underset{\uparrow}{1},1,5\}$ 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 _____.
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   c) Both a & b d) None of these

14) The ROC of bilateral Z transform is _____.
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   b) Entire Z plane except $Z = \infty$
   c) Entire Z plane except $Z = 0$ & $Z = \infty$
   d) Entire Z plane

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS AND SYSTEMS

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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 $h[n] = \{3, 1, \underset{\uparrow}{1}, 3\}$

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. **12**

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

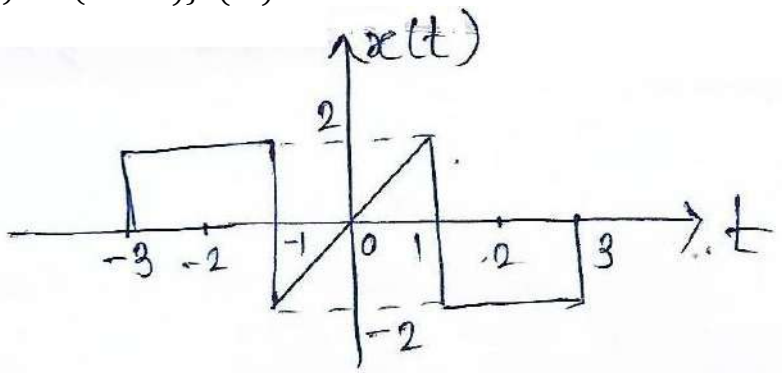
$y[n] = n\,x[5n]$

c) Sketch the following signals for given $x(t)$

1) $x(\frac{t}{2}+3)$

2) $x(-2-\frac{t}{3})$

3) $\{x(t-2) + x(2t-2)\}u(2t)$



Section - II

Q.4 Attempt any four. **16**

a) State & prove the linearity property of the CT Fourier transform.

b) State the time shifting property of Z transform & Determine Z transform of $x[n] = 4u[n+8]$. Also comment of ROC of the Z transform.

c) Find 4 point DFT of sequence $x[n] = \{2,4,3,9\}$.

d) Find the Fourier transform of $x[n] = 3^n\, u[n] - 4^n u[n+3]$

e) State & prove the periodicity property of Discrete Time Fourier Transform.

Q.5 Attempt any two. **12**

a) Find 8 point DFT of sequence $x[n] = \{1,3,5,7,2,4,6,8\}$ by using DITFFT algorithm.

b) Find inverse Z transform of $X(Z) = \frac{z+2}{z^2+3z-1}$ using power series expansion method if

1) $x[n]$ is casual

2) $x[n]$ is non-casual

c) Find 8 point DFT of given signal $x[n]$ by using DIF-FFT algorithm.

$$x[n] = \begin{cases} n+2 & 0 \le n \le 3 \\ n-2 & 4 \le n \le 7 \end{cases}$$

Seat No.	

Set **P**

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

Duration: 30 Minutes Marks: 14

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

1) 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)

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

5) 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

6) 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 100,000amp.cond./m

7) 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

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) distribution b) power
   c) shell type d) 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) smaller b) longer
   c) any of these d) none of these

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
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. **16**

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/m^2, window space factor=0.32, current density 3A/mm^2 and stacking factor=0.9. The net iron area is $0.56d^2$ 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. **12**

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/m^2 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 50^0c
2) Total loss at full load is 5.0 Kw.
3) Tank dimensions, height × length× 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 $(AT)_{armature}$

Section – II

Q.4 Attempt any four **16**

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 KVA, 50Hz, 3-ph, 375rpm alternator. The average air gap flux density is 0.55 Wb/m^2 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. **12**

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/m^2 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.

Seat No.	

Set **Q**

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

Duration: 30 Minutes Marks: 14

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

1) 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

2) If all the dimension of a transformer is doubled its iron loss will be _____.
   a) half b) double
   c) four times d) 8 times

3) In transformers cylindrical windings are not used for voltage exceeding _____.
   a) 6kV b) 13kV
   c) 33kV d) 66kV

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.
   a) distribution b) power
   c) shell type d) none of these

6) 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

7) 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

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)

9) 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 100,000amp.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.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
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. **16**

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/m^2, window space factor=0.32, current density 3A/mm^2 and stacking factor=0.9. The net iron area is $0.56d^2$ 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. **12**

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/m^2 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 50^0c
2) Total loss at full load is 5.0 Kw.
3) Tank dimensions, height × length× 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 $(AT)_{armature}$

Section – II

Q.4 Attempt any four **16**

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 KVA, 50Hz, 3-ph, 375rpm alternator. The average air gap flux density is 0.55 Wb/m^2 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. **12**

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/m^2 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.

Seat No.	

Set **R**

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

Duration: 30 Minutes Marks: 14

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

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 100,000amp.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

7) 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 b) power
   c) shell type d) none of these

9) 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

10) 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

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
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. **16**

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/m^2, window space factor=0.32, current density 3A/mm^2 and stacking factor=0.9. The net iron area is $0.56d^2$ 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. **12**

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/m^2 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 50^0c
2) Total loss at full load is 5.0 Kw.
3) Tank dimensions, height × length× 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 $(AT)_{armature}$

Section – II

Q.4 Attempt any four **16**

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 KVA, 50Hz, 3-ph, 375rpm alternator. The average air gap flux density is 0.55 Wb/m^2 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. **12**

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/m^2 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.

Seat No.		Set	S

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

Duration: 30 Minutes Marks: 14

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

1) In transformers cylindrical windings are not used for voltage exceeding _____.
   a) 6kV b) 13kV
   c) 33kV d) 66kV

2) In transformers the cylindrical windings employing circular conductors are used for current rating upto _____.
   a) 20A b) 50A
   c) 80A d) 150A

3) Helical windings are employed in _____ transformers.
   a) distribution b) power
   c) shell type d) none of these

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 d) All of the above

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

6) 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)

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

8) 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

9) Which type of slots are normally used in induction motor?
   a) Open
   b) Semi closed
   c) Closed
   d) Round

10) 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

11) 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 100,000amp.cond./m

12) 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

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
   c) decreasing the yoke height
   d) increasing the operating flux density in the yoke

14) If all the dimension of a transformer is doubled its iron loss will be _____.
   a) half
   b) double
   c) four times
   d) 8 times

SLR-FM-425

Seat No.	

Set S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
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. **16**

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/m^2, window space factor=0.32, current density 3A/mm^2 and stacking factor=0.9. The net iron area is $0.56d^2$ 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. **12**

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/m^2 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 50^0c
2) Total loss at full load is 5.0 Kw.
3) Tank dimensions, height × length× 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 $(AT)_{armature}$

Section – II

Q.4 Attempt any four **16**

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 KVA, 50Hz, 3-ph, 375rpm alternator. The average air gap flux density is 0.55 Wb/m^2 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. **12**

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/m^2 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.

SLR-FM-426

Seat No.	

Set P

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

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) In a three-stack 12/8-pole VR motor, the rotor pole pitch is _____.
   a) $15^{\underline{o}}$ b) $30^{\underline{o}}$
   c) $45^{\underline{o}}$ d) $60^{\underline{o}}$

2) For a reluctance motor, the maximum average torque occurs when $\delta =$ _____.
   a) $45°$ b) $90°$
   c) $0°$ d) $180°$

3) If a hybrid stepper motor has a rotor pitch of 36° and a step angle of 9^{o}, the number of its phases must be _____.
   a) 4 b) 2
   c) 3 d) 6

4) 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

5) 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

6) 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

7) In BLDC motor driver module, we do not require _____.
   a) SCRs b) Power transistors
   c) FETs d) Transistors

8) Construction of BLDC is exactly similar to the _____.
   a) Conventional DC motor
   b) Induction motor
   c) Permanent magnet synchronous motor
   d) Totally different construction

9) Typical brushless motor doesn't have _____.
   a) Commutator
   b) Permanent magnet
   c) Electronic controller
   d) Fixed armature

10) BLDC can be used instead _____.
   a) Synchronous motor
   b) Normal brushed DC motor
   c) Induction motor
   d) Air motor

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SPECIAL PURPOSE MACHINES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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:- **40**

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 No.	

Set **Q**

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

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 _____.
   a) SCRs b) Power transistors
   c) FETs d) Transistors

3) Construction of BLDC is exactly similar to the _____.
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   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) $15^{\underline{o}}$ b) $30^{\underline{o}}$
   c) $45^{\underline{o}}$ d) $60^{\underline{o}}$

7) For a reluctance motor, the maximum average torque occurs when $\delta =$ _____.
   a) $45°$ b) $90°$
   c) $0°$ d) $180°$

8) If a hybrid stepper motor has a rotor pitch of 36° and a step angle of 9^{o}, the number of its phases must be _____.
   a) 4 b) 2
   c) 3 d) 6

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

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SPECIAL PURPOSE MACHINES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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:- **40**

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 No.	

Set **R**

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

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) Typical brushless motor doesn't have _____.
   a) Commutator b) Permanent magnet
   c) Electronic controller d) Fixed armature

2) BLDC can be used instead _____.
   a) Synchronous motor b) Normal brushed DC motor
   c) Induction motor d) Air motor

3) In a three-stack 12/8-pole VR motor, the rotor pole pitch is _____.
   a) $15^{\underline{o}}$ b) $30^{\underline{o}}$
   c) $45^{\underline{o}}$ d) $60^{\underline{o}}$

4) For a reluctance motor, the maximum average torque occurs when $\delta =$ _____.
   a) $45°$ b) $90°$
   c) $0°$ d) $180°$

5) If a hybrid stepper motor has a rotor pitch of 36° and a step angle of 9^{o}, the number of its phases must be _____.
   a) 4 b) 2
   c) 3 d) 6

6) 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

7) 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

8) 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

9) In BLDC motor driver module, we do not require _____.
   a) SCRs
   b) Power transistors
   c) FETs
   d) Transistors

10) Construction of BLDC is exactly similar to the _____.
   a) Conventional DC motor
   b) Induction motor
   c) Permanent magnet synchronous motor
   d) Totally different construction

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SPECIAL PURPOSE MACHINES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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:- **40**

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. .

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Seat No.	

Set S

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

Q.1 Choose the correct alternatives from the options and rewrite the sentence. **10**

1) If a hybrid stepper motor has a rotor pitch of 36° and a step angle of 9^o, 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 dc b) Ac to ac
   c) Dc to ac d) Digital-to-analogue

4) 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

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 instead _____.
   a) Synchronous motor b) Normal brushed DC motor
   c) Induction motor d) Air motor

9) In a three-stack 12/8-pole VR motor, the rotor pole pitch is _____.

a) $15^{\underline{o}}$ b) $30^{\underline{o}}$

c) $45^{\underline{o}}$ d) $60^{\underline{o}}$

10) For a reluctance motor, the maximum average torque occurs when $\delta =$ _____.

a) $45°$ b) $90°$

c) $0°$ d) $180°$

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SPECIAL PURPOSE MACHINES

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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:- **40**

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. .

SLR-FM-427

Seat No.	

Set P

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL SAFETY

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 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

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?
   a) Frostbite b) Asbestosis
   c) Asphyxiation d) Electric shock

3) Which of these is most likely to cause an accident in a workplace?
   a) Administration b) Manual handling
   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
   b) Cable should be completely insulated
   c) Cable should have any joints
   d) Both (a) & (b)

5) Handy fire extinguishers kept in chemical plants are containing _____.
   a) Dry chemical powder b) Carbon dioxide
   c) Either (a) or (b) d) Foam

6) Dry pipe fire extinguisher contains _____.
   a) N_2 b) H_2O
   c) CO_2 d) None of the above

7) Fire can be defined as _____.
   a) Release of light
   b) Self propagating reaction of combustible material with O_2 from air
   c) Release of energy
   d) None of above

8) Fire is a combination of _____.
   a) Fuel, light and oxygen b) Fuel, heat and oxygen
   c) Fuel, heat and carbon dioxide d) Fuel, light and nitrogen

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.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL SAFETY

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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 **40**

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

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL SAFETY

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 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

1) Dry pipe fire extinguisher contains _____.
   a) N_2 b) H_2O
   c) CO_2 d) None of the above

2) Fire can be defined as _____.
   a) Release of light
   b) Self propagating reaction of combustible material with O_2 from air
   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 d) Fuel, light and nitrogen

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

5) 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

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)

7) 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

8) Which of these is most likely to cause an accident in a workplace?
   a) Administration b) Manual handling
   c) Adequate lighting d) Excessive noise

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)

10) Handy fire extinguishers kept in chemical plants are containing _____.
   a) Dry chemical powder
   b) Carbon dioxide
   c) Either (a) or (b)
   d) Foam

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL SAFETY

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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 **40**

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

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL SAFETY

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 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

1) 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

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

3) 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)

4) 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

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)

7) Handy fire extinguishers kept in chemical plants are containing _____.
   a) Dry chemical powder b) Carbon dioxide
   c) Either (a) or (b) d) Foam

8) Dry pipe fire extinguisher contains _____.
   a) N_2 b) H_2O
   c) CO_2 d) None of the above

9) Fire can be defined as _____.
   a) Release of light
   b) Self propagating reaction of combustible material with O_2 from air
   c) Release of energy
   d) None of above

10) Fire is a combination of _____.
   a) Fuel, light and oxygen
   b) Fuel, heat and oxygen
   c) Fuel, heat and carbon dioxide
   d) Fuel, light and nitrogen

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL SAFETY

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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 **40**

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

Seat No.	

Set **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL SAFETY

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 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

1) Which of these is most likely to cause an accident in a workplace?
   a) Administration b) Manual handling
   c) Adequate lighting d) Excessive noise

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 _____.
   a) Dry chemical powder b) Carbon dioxide
   c) Either (a) or (b) d) Foam

4) Dry pipe fire extinguisher contains _____.
   a) N_2 b) H_2O
   c) CO_2 d) None of the above

5) Fire can be defined as _____.
   a) Release of light
   b) Self propagating reaction of combustible material with O_2 from air
   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 d) Fuel, light and nitrogen

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

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

Seat No.	

Set | S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL SAFETY

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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 **40**

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

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

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 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 a main disadvantage of a solar PV system?
   a) Capital cost b) Operation cost
   c) Maintenance cost d) Life cycle cost

2) In India PV panel should be _____.
   a) North Facing b) North and East facing
   c) East facing d) South facing

3) Which is not a part of Site feasibility study?
   a) Soil quality b) Population of nearest city
   c) Wind speed d) Location

4) In a residential roof-top PV system, which is not taken in to the consideration?
   a) Nearest transmission grid b) Load & load flow analysis
   c) Roof area d) Back up Hours

5) In Solar PV system, what does PR stands for _____.
   a) Project Report b) Project Review
   c) Performance ratio d) Performance review

6) In a high rise building, LA is installed against _____?
   a) Lightening b) Birds
   c) Animals d) Both (a) and (b)

7) Battery bank shouldn't be installed in a location?
   a) Near PV array b) Well ventilated room
   c) Near Control Room d) At high temperature Area

8) If the orientation of PV module changes from horizontal to vertical, Tilt angle will _____?
   a) Change b) Remain same
   c) Depends d) Can't say

9) Which is the key of efficiency in PV plant?
   a) Well design
   b) Proper Cleaning & maintenance
   c) Procurement
   d) All of the above

10) MPPT Stands for _____?
    a) Maximum Power Point Temperature
    b) Maximum Power Produce Temperature
    c) Maximum Power Point Tracker
    d) Minimum Power Produce Temperature.

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Solve any four questions from Q.2 to Q.6

Q.2 Answer the following questions. **10**
a) Explain the basic concept of Solar Energy.
b) Write advantages of Renewable Energy.

Q.3 Answer the following questions. **10**
a) Explain PV module name plate specifications.
b) Explain factors affecting output of PV module.

Q.4 Answer the following questions. **10**
a) Explain stand alone, Grid & Hybrid configurations of PV power system.
b) Explain different components of PV system.

Q.5 Answer the following questions. **10**
a) Explain steps involved in PV system sizing.
b) Explain different types of batteries used in solar PV system.

Q.6 Answer the following questions. **10**
a) Explain installation process of solar power plant.
b) Explain inverter, its types and operation in solar PV system.

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

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 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) In a high rise building, LA is installed against _____?
   a) Lightening b) Birds
   c) Animals d) Both (a) and (b)

2) Battery bank shouldn't be installed in a location?
   a) Near PV array b) Well ventilated room
   c) Near Control Room d) At high temperature Area

3) If the orientation of PV module changes from horizontal to vertical, Tilt angle will _____?
   a) Change b) Remain same
   c) Depends d) Can't say

4) Which is the key of efficiency in PV plant?
   a) Well design
   b) Proper Cleaning & maintenance
   c) Procurement
   d) All of the above

5) MPPT Stands for _____?
   a) Maximum Power Point Temperature
   b) Maximum Power Produce Temperature
   c) Maximum Power Point Tracker
   d) Minimum Power Produce Temperature.

6) Which of the following is a main disadvantage of a solar PV system?
   a) Capital cost b) Operation cost
   c) Maintenance cost d) Life cycle cost

7) In India PV panel should be _____.
   a) North Facing b) North and East facing
   c) East facing d) South facing

8) Which is not a part of Site feasibility study?
   a) Soil quality b) Population of nearest city
   c) Wind speed d) Location

9) In a residential roof-top PV system, which is not taken in to the consideration?
   a) Nearest transmission grid b) Load & load flow analysis
   c) Roof area d) Back up Hours

10) In Solar PV system, what does PR stands for _____.

a) Project Report
b) Project Review
c) Performance ratio
d) Performance review

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Solve any four questions from Q.2 to Q.6

Q.2 Answer the following questions. **10**
a) Explain the basic concept of Solar Energy.
b) Write advantages of Renewable Energy.

Q.3 Answer the following questions. **10**
a) Explain PV module name plate specifications.
b) Explain factors affecting output of PV module.

Q.4 Answer the following questions. **10**
a) Explain stand alone, Grid & Hybrid configurations of PV power system.
b) Explain different components of PV system.

Q.5 Answer the following questions. **10**
a) Explain steps involved in PV system sizing.
b) Explain different types of batteries used in solar PV system.

Q.6 Answer the following questions. **10**
a) Explain installation process of solar power plant.
b) Explain inverter, its types and operation in solar PV system.

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

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 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 is the key of efficiency in PV plant?
   a) Well design
   b) Proper Cleaning & maintenance
   c) Procurement
   d) All of the above

2) MPPT Stands for _____?
   a) Maximum Power Point Temperature
   b) Maximum Power Produce Temperature
   c) Maximum Power Point Tracker
   d) Minimum Power Produce Temperature.

3) Which of the following is a main disadvantage of a solar PV system?
   a) Capital cost b) Operation cost
   c) Maintenance cost d) Life cycle cost

4) In India PV panel should be _____.
   a) North Facing b) North and East facing
   c) East facing d) South facing

5) Which is not a part of Site feasibility study?
   a) Soil quality b) Population of nearest city
   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 b) Load & load flow analysis
   c) Roof area d) Back up Hours

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?
   a) Near PV array b) Well ventilated room
   c) Near Control Room d) At high temperature Area

10) If the orientation of PV module changes from horizontal to vertical, Tilt angle will _____?

a) Change
b) Remain same
c) Depends
d) Can't say

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Solve any four questions from Q.2 to Q.6

Q.2 Answer the following questions. **10**
a) Explain the basic concept of Solar Energy.
b) Write advantages of Renewable Energy.

Q.3 Answer the following questions. **10**
a) Explain PV module name plate specifications.
b) Explain factors affecting output of PV module.

Q.4 Answer the following questions. **10**
a) Explain stand alone, Grid & Hybrid configurations of PV power system.
b) Explain different components of PV system.

Q.5 Answer the following questions. **10**
a) Explain steps involved in PV system sizing.
b) Explain different types of batteries used in solar PV system.

Q.6 Answer the following questions. **10**
a) Explain installation process of solar power plant.
b) Explain inverter, its types and operation in solar PV system.

Seat No.	

Set | S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

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 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 is not a part of Site feasibility study?
   a) Soil quality b) Population of nearest city
   c) Wind speed d) Location

2) In a residential roof-top PV system, which is not taken in to the consideration?
   a) Nearest transmission grid b) Load & load flow analysis
   c) Roof area d) Back up Hours

3) In Solar PV system, what does PR stands for _____.
   a) Project Report b) Project Review
   c) Performance ratio d) 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
   c) Near Control Room d) At high temperature Area

6) If the orientation of PV module changes from horizontal to vertical, Tilt angle will _____?
   a) Change b) Remain same
   c) Depends d) Can't say

7) Which is the key of efficiency in PV plant?
   a) Well design
   b) Proper Cleaning & maintenance
   c) Procurement
   d) All of the above

8) MPPT Stands for _____?
   a) Maximum Power Point Temperature
   b) Maximum Power Produce Temperature
   c) Maximum Power Point Tracker
   d) Minimum Power Produce Temperature.

9) Which of the following is a main disadvantage of a solar PV system?
   a) Capital cost b) Operation cost
   c) Maintenance cost d) Life cycle cost

10) In India PV panel should be _____.

a) North Facing
b) North and East facing
c) East facing
d) South facing

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Seat No.	

Set | **S**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SOLAR PHOTOVOLTAIC SYSTEM DESIGN & INSTALLATION

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
Time: 10:00 AM To 12:00 PM

Instructions: 1) Figures to right indicate full marks.
2) Solve any four questions from Q.2 to Q.6

Q.2 Answer the following questions. **10**
a) Explain the basic concept of Solar Energy.
b) Write advantages of Renewable Energy.

Q.3 Answer the following questions. **10**
a) Explain PV module name plate specifications.
b) Explain factors affecting output of PV module.

Q.4 Answer the following questions. **10**
a) Explain stand alone, Grid & Hybrid configurations of PV power system.
b) Explain different components of PV system.

Q.5 Answer the following questions. **10**
a) Explain steps involved in PV system sizing.
b) Explain different types of batteries used in solar PV system.

Q.6 Answer the following questions. **10**
a) Explain installation process of solar power plant.
b) Explain inverter, its types and operation in solar PV system.

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INSTRUMENTATION PROCESS CONTROL & ROBOTICS

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 correct for proximity sensors?
   a) Inductive type b) Capacitive type
   c) Ultrasonic wave type d) All of the mentioned

2) State model representation is possible using _____.
   a) Physical variable b) Phase variables
   c) Canonical state variables d) All of the mentioned

3) 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

4) A Robot is a _____.
   a) Programmable b) Multi functional manipulator
   c) Both (a) and b) d) None of the above

5) 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 d) Feedback

7) Which among the following are the interconnected units of state diagram representation?
   a) Scalars b) Adders
   c) Integrators d) All of the above

8) A sensor is a device that converts _____.
   a) Physical quantity into measurable signals
   b) Physical quantity into mechanical signal
   c) Electrical signal into physical quantity
   d) Physical quantity into electric signal only

9) The following drive is used for lighter class of Robot _____.
   a) Pneumatic drive
   b) Hydraulic drive
   c) Electric drive
   d) All of the above

10) Fast, self-regulating processes typically respond well to aggressive control action _____.
   a) Nonlinear
   b) Derivative
   c) Proportional
   d) Reset

Seat No.	

Set **P**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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. **20**

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. **20**

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.

Seat No.	

Set **Q**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INSTRUMENTATION PROCESS CONTROL & ROBOTICS

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) Automatic controllers operate on the difference between set point and measurement, which is called _____.
   a) Offset b) Bias
   c) Error d) Feedback

2) Which among the following are the interconnected units of state diagram representation?
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   c) Integrators d) All of the above

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   a) Physical quantity into measurable signals
   b) Physical quantity into mechanical signal
   c) Electrical signal into physical quantity
   d) Physical quantity into electric signal only

4) The following drive is used for lighter class of Robot _____.
   a) Pneumatic drive b) Hydraulic drive
   c) Electric drive d) All of the above

5) Fast, self-regulating processes typically respond well to aggressive control action _____.
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   c) Proportional d) Reset

6) Which of the following is correct for proximity sensors?
   a) Inductive type b) Capacitive type
   c) Ultrasonic wave type d) All of the mentioned

7) State model representation is possible using _____.
   a) Physical variable b) Phase variables
   c) Canonical state variables d) All of the mentioned

8) 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

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

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Seat No.	

Set Q

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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. **20**

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. **20**

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.

Seat No.	

Set **R**

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INSTRUMENTATION PROCESS CONTROL & ROBOTICS

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) The following drive is used for lighter class of Robot _____.
   a) Pneumatic drive b) Hydraulic drive
   c) Electric drive d) All of the above

2) Fast, self-regulating processes typically respond well to aggressive control action _____.
   a) Nonlinear b) Derivative
   c) Proportional d) Reset

3) Which of the following is correct for proximity sensors?
   a) Inductive type b) Capacitive type
   c) Ultrasonic wave type d) All of the mentioned

4) State model representation is possible using _____.
   a) Physical variable b) Phase variables
   c) Canonical state variables d) All of the mentioned

5) 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

6) A Robot is a _____.
   a) Programmable b) Multi functional manipulator
   c) Both (a) and b) d) None of the above

7) 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

8) Automatic controllers operate on the difference between set point and measurement, which is called _____.
   a) Offset b) Bias
   c) Error d) Feedback

9) Which among the following are the interconnected units of state diagram representation?
   a) Scalars
   b) Adders
   c) Integrators
   d) All of the above

10) A sensor is a device that converts _____.
   a) Physical quantity into measurable signals
   b) Physical quantity into mechanical signal
   c) Electrical signal into physical quantity
   d) Physical quantity into electric signal only

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Seat No.	

Set R

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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. **20**

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. **20**

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.

Seat No.	

Set | S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INSTRUMENTATION PROCESS CONTROL & ROBOTICS

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 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

2) A Robot is a _____.
   a) Programmable b) Multi functional manipulator
   c) Both (a) and b) d) None of the above

3) 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

4) Automatic controllers operate on the difference between set point and measurement, which is called _____.
   a) Offset b) Bias
   c) Error d) Feedback

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   a) Scalars b) Adders
   c) Integrators d) All of the above

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   a) Physical quantity into measurable signals
   b) Physical quantity into mechanical signal
   c) Electrical signal into physical quantity
   d) Physical quantity into electric signal only

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   a) Nonlinear b) Derivative
   c) Proportional d) Reset

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

SLR-FM-429

Seat No.	

Set S

T.E. (Part – II) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INSTRUMENTATION PROCESS CONTROL & ROBOTICS

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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. **20**

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.
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Q.3 Answer any two of the following questions. **20**

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.

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) 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) 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 Marks: 14

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

1) The cold rolled grain oriented steel has _____ in the direction of grain orientation.
   a) Minimum b) Maximum
   c) Nil 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
   c) Radiation d) All of the above

3) Electrical machines having power outputs ranging from a few kW upto approximately 250 kW may be classified as _____.
   a) Small size machines b) Medium size machines
   c) Large size machines d) Any of the above

4) The effect of harmonics in rotating machines can be minimized by _____.
   a) use of longer air gap b) skewing the poles
   c) use of distributed winding d) all of the above

5) In dc machines by increasing the number of poles, all of the following reduce except _____.
   a) weight of copper b) weight of iron parts
   c) frequency of flux reversals d) overall size of the machine

6) The stacking factor will be least for _____.
   a) Square core b) Cruciform core
   c) 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 _____.
   a) equal to that of armature mmf
   b) less in comparison with the armature mmf
   c) large in comparison with the armature mmf
   d) none of the above

8) For avoiding cogging in induction motor the difference between the number of stator and rotor slots should not be _____.
   a) P b) 3P
   c) 5 P d) any of the above

9) 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 b) better overload capacity
   c) better power factor 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 b) reverse field winding
   c) low excitation d) any of the above

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.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
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. **16**

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/m^2. Assume form factor Kf = 0.7.
e) Explain the choice of specific loadings in case of DC machine.

Q.3 Attempt the following questions. **12**

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/m^2, a current density of 1.4 A/mm^2 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. **16**

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.

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/m^2 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. **12**

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/m^2, ampere conductors per metre = 40000 and current density = 4 Amp/mm^2.

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/m^2, 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.

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) 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) 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 Marks: 14

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

1) For avoiding cogging in induction motor the difference between the number of stator and rotor slots should not be _____.
   a) P b) 3P
   c) 5 P d) any of the above

2) 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

3) 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
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5) If an induction motor is designed with lesser air gap, then the motor will have _____.
   a) better cooling b) better overload capacity
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6) In case a synchronous motor starts but fails to develop torque, the probable cause could be _____.
   a) open or short circuit b) reverse field winding
   c) low excitation d) any of the above

7) 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

8) The cold rolled grain oriented steel has _____ in the direction of grain orientation.
   a) Minimum
   b) Maximum
   c) Nil
   d) None of the above

9) 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
   c) Radiation
   d) All of the above

10) Electrical machines having power outputs ranging from a few kW upto approximately 250 kW may be classified as _____.
   a) Small size machines
   b) Medium size machines
   c) Large size machines
   d) Any of the above

11) The effect of harmonics in rotating machines can be minimized by _____.
   a) use of longer air gap
   b) skewing the poles
   c) use of distributed winding
   d) all of the above

12) In dc machines by increasing the number of poles, all of the following reduce except _____.
   a) weight of copper
   b) weight of iron parts
   c) frequency of flux reversals
   d) overall size of the machine

13) The stacking factor will be least for _____.
   a) Square core
   b) Cruciform core
   c) Three stepped core
   d) Four stepped core

14) In D.C. machines, ir order to prevent excessive distortion of field form by the armature reaction the field mmf must be made _____.
   a) equal to that of armature mmf
   b) less in comparison with the armature mmf
   c) large in comparison with the armature mmf
   d) none of the above

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
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. **16**

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/m^2. Assume form factor Kf = 0.7.
e) Explain the choice of specific loadings in case of DC machine.

Q.3 Attempt the following questions. **12**

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/m^2, a current density of 1.4 A/mm^2 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. **16**

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.

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/m^2 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. **12**

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/m^2, ampere conductors per metre = 40000 and current density = 4 Amp/mm^2.

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/m^2, 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.

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) 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) 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 Marks: 14

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

1) In dc machines by increasing the number of poles, all of the following reduce except _____.
   a) weight of copper b) weight of iron parts
   c) frequency of flux reversals d) overall size of the machine

2) The stacking factor will be least for _____.
   a) Square core b) Cruciform core
   c) Three stepped core d) Four stepped core

3) In D.C. machines, ir order to prevent excessive distortion of field form by the armature reaction the field mmf must be made _____.
   a) equal to that of armature mmf
   b) less in comparison with the armature mmf
   c) large in comparison with the armature mmf
   d) none of the above

4) For avoiding cogging in induction motor the difference between the number of stator and rotor slots should not be _____.
   a) P b) 3P
   c) 5 P d) any of the above

5) 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

6) 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

7) 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

8) If an induction motor is designed with lesser air gap, then the motor will have _____.
   a) better cooling
   b) better overload capacity
   c) better power factor
   d) lower power factor

9) In case a synchronous motor starts but fails to develop torque, the probable cause could be _____.
   a) open or short circuit
   b) reverse field winding
   c) low excitation
   d) any of the above

10) 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

11) The cold rolled grain oriented steel has _____ in the direction of grain orientation.
   a) Minimum
   b) Maximum
   c) Nil
   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
   b) Convection
   c) 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 _____.
   a) Small size machines
   b) Medium size machines
   c) Large size machines
   d) Any of the above

14) The effect of harmonics in rotating machines can be minimized by _____.
   a) use of longer air gap
   b) skewing the poles
   c) use of distributed winding
   d) all of the above

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
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. **16**

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/m^2. Assume form factor Kf = 0.7.
e) Explain the choice of specific loadings in case of DC machine.

Q.3 Attempt the following questions. **12**

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/m^2, a current density of 1.4 A/mm^2 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. **16**

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.

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/m^2 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. **12**

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/m^2, ampere conductors per metre = 40000 and current density = 4 Amp/mm^2.

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/m^2, 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.

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) 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) 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 Marks: 14

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

1) 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

2) 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

3) If an induction motor is designed with lesser air gap, then the motor will have _____.
   a) better cooling b) better overload capacity
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4) In case a synchronous motor starts but fails to develop torque, the probable cause could be _____.
   a) open or short circuit b) reverse field winding
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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) Conduction b) Convection
   c) Radiation d) All of the above

8) Electrical machines having power outputs ranging from a few kW upto approximately 250 kW may be classified as _____.
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   c) 5 P
   d) any of the above

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   b) 50 to 450 ampere conductors/meter
   c) 500 to 4500 ampere conductors/meter
   d) 5000 to 45000 ampere conductors/meter

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE DESIGN

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
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. **16**

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/m^2. Assume form factor Kf = 0.7.
e) Explain the choice of specific loadings in case of DC machine.

Q.3 Attempt the following questions. **12**

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/m^2, a current density of 1.4 A/mm^2 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. **16**

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.

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/m^2 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. **12**

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/m^2, ampere conductors per metre = 40000 and current density = 4 Amp/mm^2.

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/m^2, 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.

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Seat No.	

Set P

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) Usually a lag network for compensation consist of _____.
   a) R element b) R&L elements
   c) R&C elements d) R, 1 & C elements

2) Which of the following relation is correct?
   a) $\alpha\beta = 0.1$ b) $\alpha\beta = 1$
   c) $\alpha/\beta = 1$ d) None of these

3) Lag-Lead compensator improves _____ response.
   a) Steady state b) Transient
   c) Both a & b d) Dynamic

4) Which of the following equation is correct in case of lead compensator?
   a) $\phi_m = \gamma_d + \gamma + \varepsilon$ b) $\phi_m = \gamma_d - \gamma + \varepsilon$
   c) $\phi_m = \gamma_d + \gamma - \varepsilon$ d) $\phi_m = \gamma_d - \gamma - \varepsilon$

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 $\dot{x} = Ax + Bu\ y = Cx + Du$
   a) $B(SI - B)^{-1}+D$ b) $C(SI - A)^{-1}+D$
   c) $D(SI - A)^{-1}++C$ d) $A(SI - B)^{-1}++D$

7) The state transition matrix for the system with initial state X(0) is _____.
   a) $(sI - A)^{-1}$ b) (sI - A)
   c) Laplace inverse of $(sI - A)^{-1}$ d) Laplace inverse of (sI - A)

8) 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

9) The process of designing a closed loop control system is by _____.
   a) Pole placement b) Lag Compensation
   c) Regulator d) None of these

10) Which of the following is not a type of common nonlinearity?
   a) Backlash
   b) Saturation
   c) Limit cycle
   d) Dead Zone

11) In nonlinear system when Eigen values are distinct and negative the equilibrium point is _____.
   a) Saddle point
   b) Nodal Point
   c) Focus Point
   d) None of these

12) Non-linearities can be _____.
   a) Incidental
   b) Intentional
   c) Linearized
   d) Both a & b

13) Which of the following is transfer function of zero order hold _____.
   a) $\frac{1-e}{s}$
   b) $\frac{e-1}{s}$
   c) $\frac{e^{-Ts}-1}{s}$
   d) $\frac{1-e^{-Ts}}{s}$

14) Inherent characteristic of a digital controller is that it accepts _____ data.
   a) Analog
   b) intermittent
   c) either a or b
   d) sampled

SLR-FM-431

Seat No.		Set	P

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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. **16**

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.

$\dot{x} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \mathrm{x}$

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. **12**

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^o

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. **16**

a) Explain any one method of determination of observer gain matrix Ke.

b) Determine the kind of singularity for the following differential equation $y + 3y \ddagger 2y = 0$. Let the state variables be $\mathrm{x}1 = y, x2 = \dot{y}$

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

Q.5 Attempt any two of the following question. **12**

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

$P(z)=Z^4 - 1.2Z^3 + 0.07Z^2 + 0.3z - .08 = 0$

Seat No.	

Set **Q**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 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
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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Seat No.	

Set Q

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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) 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. **16**

a) Explain any one method of determination of observer gain matrix Ke.

b) Determine the kind of singularity for the following differential equation $y + 3y \ddagger 2y = 0$. Let the state variables be $\mathrm{x}1 = y, x2 = \dot{y}$

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

Q.5 Attempt any two of the following question. **12**

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

$P(z)=Z^4 - 1.2Z^3 + 0.07Z^2 + 0.3z - .08 = 0$

Seat No.	

Set **R**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) 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

2) 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) $D(SI - A)^{-1}++C$ d) $A(SI - B)^{-1}++D$

3) The state transition matrix for the system with initial state X(0) is _____.
   a) $(sI - A)^{-1}$ b) $(sI - A)$
   c) Laplace inverse of $(sI - A)^{-1}$ d) Laplace inverse of $(sI - A)$

4) 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

5) The process of designing a closed loop control system is by _____.
   a) Pole placement b) Lag Compensation
   c) Regulator d) None of these

6) Which of the following is not a type of common nonlinearity?
   a) Backlash b) Saturation
   c) Limit cycle d) Dead Zone

7) In nonlinear system when Eigen values are distinct and negative the equilibrium point is _____.
   a) Saddle point b) Nodal Point
   c) Focus Point d) None of these

8) Non-linearities can be _____.
   a) Incidental b) Intentional
   c) Linearized d) Both a & b

9) Which of the following is transfer function of zero order hold _____.

a) $\frac{1-e}{s}$ b) $\frac{e-1}{s}$

c) $\frac{e^{-Ts}-1}{s}$ d) $\frac{1-e^{-Ts}}{s}$

10) Inherent characteristic of a digital controller is that it accepts _____ data.

a) Analog b) intermittent

c) either a or b d) sampled

11) Usually a lag network for compensation consist of _____.

a) R element b) R&L elements

c) R&C elements d) R, 1 & C elements

12) Which of the following relation is correct?

a) $\alpha\beta = 0.1$ b) $\alpha\beta = 1$

c) $\alpha/\beta = 1$ d) None of these

13) Lag-Lead compensator improves _____ response.

a) Steady state b) Transient

c) Both a & b d) Dynamic

14) Which of the following equation is correct in case of lead compensator?

a) $\phi_m = \gamma_d + \gamma + \varepsilon$ b) $\phi_m = \gamma_d - \gamma + \varepsilon$

c) $\phi_m = \gamma_d + \gamma - \varepsilon$ d) $\phi_m = \gamma_d - \gamma - \varepsilon$

Seat No.	

Set **R**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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. **16**

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.

$\dot{x} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \mathrm{x}$

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. **12**

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^o

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. **16**

a) Explain any one method of determination of observer gain matrix Ke.

b) Determine the kind of singularity for the following differential equation $y + 3y \ddot{+} 2y = 0$. Let the state variables be $\mathrm{x}1 = y, x2 = \dot{y}$

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

Q.5 Attempt any two of the following question. **12**

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

$P(z)=Z^4 - 1.2Z^3 + 0.07Z^2 + 0.3z - .08 = 0$

Seat No.	

Set **S**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) Which of the following is not a type of common nonlinearity?
   a) Backlash b) Saturation
   c) Limit cycle d) Dead Zone

2) In nonlinear system when Eigen values are distinct and negative the equilibrium point is _____.
   a) Saddle point b) Nodal Point
   c) Focus Point d) None of these

3) Non-linearities can be _____.
   a) Incidental b) Intentional
   c) Linearized d) Both a & b

4) Which of the following is transfer function of zero order hold _____.
   a) $\frac{1-e}{s}$ b) $\frac{e-1}{s}$
   c) $\frac{e^{-Ts}-1}{s}$ d) $\frac{1-e^{-Ts}}{s}$

5) Inherent characteristic of a digital controller is that it accepts _____ data.
   a) Analog b) intermittent
   c) either a or b d) sampled

6) Usually a lag network for compensation consist of _____.
   a) R element b) R&L elements
   c) R&C elements d) R, 1 & C elements

7) Which of the following relation is correct?
   a) $\alpha\beta = 0.1$ b) $\alpha\beta = 1$
   c) $\alpha/\beta = 1$ d) None of these

8) Lag-Lead compensator improves _____ response.
   a) Steady state b) Transient
   c) Both a & b d) Dynamic

9) Which of the following equation is correct in case of lead compensator?
   a) $\phi_m = \gamma_d + \gamma + \varepsilon$ b) $\phi_m = \gamma_d - \gamma + \varepsilon$
   c) $\phi_m = \gamma_d + \gamma - \varepsilon$ d) $\phi_m = \gamma_d - \gamma - \varepsilon$

10) 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

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) $D(SI - A)^{-1}++C$
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12) The state transition matrix for the system with initial state X(0) is _____.
   a) $(sI - A)^{-1}$
   b) (sI - A)
   c) Laplace inverse of $(sI - A)^{-1}$
   d) Laplace inverse of (sI - A)

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

SLR-FM-431

Seat No.		Set	S

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – II

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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. **16**

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.

$\dot{x} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \mathrm{x}$

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. **12**

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^o

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. **16**

a) Explain any one method of determination of observer gain matrix Ke.

b) Determine the kind of singularity for the following differential equation $y + 3y \ddot{+} 2y = 0$. Let the state variables be $\mathrm{x}1 = y, x2 = \dot{y}$

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

Q.5 Attempt any two of the following question. **12**

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

$P(z)=Z^4 - 1.2Z^3 + 0.07Z^2 + 0.3z - .08 = 0$

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 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

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct option. **14**

1) What does Microprocessor speed depends upon _____.
   a) Clock b) Data bus width
   c) Address bus width d) None of above

2) The instructions that are used for reading an input port and writing an output port respectively are.
   a) MOV, XCHG b) MOV, IN
   c) IN, MOV d) IN, OUT

3) When 8051 microcontroller is reset all ports are configured as, _____.
   a) Inputs b) Outputs
   c) Inputs and outputs d) Inputs or Outputs

4) XORL P1, #01h _____.
   a) Compliments P1 b) Compliments P1.0
   c) Compliments P1.7 d) None

5) Identify the invalid Instruction.
   a) MOV A,@R0 b) MOVX @DPTR,A
   c) MOVC A,@A+DPTR d) MOV A,@R2

6) LJMP is _____ byte instruction.
   a) 2 b) 3
   c) 4 d) 1

7) CPL P1.0 _____.
   a) Complements P1.0 b) Complements P1
   c) Complements P1.7 d) None

8) What changes are to be made to send data to an LCD?
   a) clear the R/W bit b) high to low pulse on EN bit
   c) set the RS bit d) all of the mentioned

9) For writing commands on an LCD, RS bit is _____.
   a) set b) reset
   c) both of the mentioned d) none of the mentioned

10) The memory which can be erased and programed is called as _____.
   a) PROM b) EEPROM
   c) Both A and B d) None

11) 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

12) If we push data on Stack in 8085 microprocessor then stack pointer _____.
   a) Increases with every push
   b) Decreases with every push
   c) Remains at same position
   d) None of above

13) 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

14) Vector address for timer 0 interrupt is _____.
   a) 0003h
   b) 000Bh
   c) 001Bh
   d) None

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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.

Q.5 Solve any two. **12**

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.	

Set | Q |

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 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

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct option. **14**

1) What changes are to be made to send data to an LCD?
   a) clear the R/W bit b) high to low pulse on EN bit
   c) set the RS bit d) all of the mentioned

2) For writing commands on an LCD, RS bit is _____.
   a) set b) Reset
   c) both of the mentioned d) none of the mentioned

3) The memory which can be erased and programed is called as _____.
   a) PROM b) EEPROM
   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

5) If we push data on Stack in 8085 microprocessor then stack pointer _____.
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   c) 3 d) 1.1

7) Vector address for timer 0 interrupt is _____.
   a) 0003h b) 000Bh
   c) 001Bh d) None

8) What does Microprocessor speed depends upon _____.
   a) Clock b) Data bus width
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9) The instructions that are used for reading an input port and writing an output port respectively are.
   a) MOV, XCHG b) MOV, IN
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10) When 8051 microcontroller is reset all ports are configured as, _____.
   a) Inputs b) Outputs
   c) Inputs and outputs d) Inputs or Outputs

11) XORL P1, #01h _____.
   a) Compliments P1
   b) Compliments P1.0
   c) Compliments P1.7
   d) None

12) Identify the invalid Instruction.
   a) MOV A,@R0
   b) MOVX @DPTR,A
   c) MOVC A,@A+DPTR
   d) MOV A,@R2

13) LJMP is _____ byte instruction.
   a) 2
   b) 3
   c) 4
   d) 1

14) CPL P1.0 _____.
   a) Complements P1.0
   b) Complements P1
   c) Complements P1.7
   d) None

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Max. Marks: 56
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. **16**

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. **12**

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.
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Section – II

Q.4 Solve any four. **16**

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1) MOV TMOD,#03H
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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.
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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.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 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

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct option. **14**

1) Identify the invalid Instruction.
   a) MOV A,@R0 b) MOVX @DPTR,A
   c) MOVC A,@A+DPTR d) MOV A,@R2

2) LJMP is _____ byte instruction.
   a) 2 b) 3
   c) 4 d) 1

3) CPL P1.0 _____.
   a) Complements P1.0 b) Complements P1
   c) Complements P1.7 d) None

4) What changes are to be made to send data to an LCD?
   a) clear the R/W bit b) high to low pulse on EN bit
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5) For writing commands on an LCD, RS bit is _____.
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   c) both of the mentioned d) none of the mentioned

6) The memory which can be erased and programed is called as _____.
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   c) Both A and B d) None

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   c) 3 d) 1.1

10) Vector address for timer 0 interrupt is _____.
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   c) 001Bh d) None

11) What does Microprocessor speed depends upon _____.
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   b) Data bus width
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12) The instructions that are used for reading an input port and writing an output port respectively are.
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   b) MOV, IN
   c) IN, MOV
   d) IN, OUT

13) When 8051 microcontroller is reset all ports are configured as, _____.
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   b) Outputs
   c) Inputs and outputs
   d) Inputs or Outputs

14) XORL P1, #01h _____.
   a) Compliments P1
   b) Compliments P1.0
   c) Compliments P1.7
   d) None

SLR-FM-432

Seat No.	

Set R

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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.

Q.5 Solve any two. **12**

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.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 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

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct option. **14**

1) The memory which can be erased and programed is called as _____.
   a) PROM b) EEPROM
   c) Both A and B d) None

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

3) If we push data on Stack in 8085 microprocessor then stack pointer _____.
   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 _____.
   a) 200 b) 1.8
   c) 3 d) 1.1

5) Vector address for timer 0 interrupt is _____.
   a) 0003h b) 000Bh
   c) 001Bh d) None

6) What does Microprocessor speed depends upon _____.
   a) Clock b) Data bus width
   c) 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
   c) IN, MOV d) IN, OUT

8) When 8051 microcontroller is reset all ports are configured as, _____.
   a) Inputs b) Outputs
   c) Inputs and outputs d) Inputs or Outputs

9) XORL P1, #01h _____.
   a) Compliments P1 b) Compliments P1.0
   c) Compliments P1.7 d) None

10) Identify the invalid Instruction.
   a) MOV A,@R0 b) MOVX @DPTR,A
   c) MOVC A,@A+DPTR d) MOV A,@R2

11) LJMP is _____ byte instruction.
   a) 2 b) 3
   c) 4 d) 1

12) CPL P1.0 _____.
   a) Complements P1.0 b) Complements P1
   c) Complements P1.7 d) None

13) What changes are to be made to send data to an LCD?
   a) clear the R/W bit b) high to low pulse on EN bit
   c) set the RS bit d) all of the mentioned

14) For writing commands on an LCD, RS bit is _____.
   a) set b) Reset
   c) both of the mentioned d) none of the mentioned

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
MICROPROCESSOR AND MICROCONTROLLERS

Day & Date: Friday, 22-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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.

Q.5 Solve any two. **12**

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.	

Set **P**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

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 it should be solved in first 30 minutes in answer book.
2) Figure to right indicate full marks.
3) Assume the 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) Silicon controlled rectifier is _____.
   a) Unidirectional b) Bidirectional
   c) Unidirectional & bidirectional d) None

2) The thyristor turn-off requires that the anode current _____.
   a) falls below the holding current
   b) falls below the latching current
   c) rises above the holding current
   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) $\gamma = \alpha \,/\, \beta$

5) 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) $\pi \,/\, 2 \; to \; 2\pi - \alpha$

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
   c) 560 V d) 480 V

7) The values of duty cycle (α) lies between _____.
   a) $0 < \alpha < 1$ b) $0 > \alpha > -1$
   c) $0 <= \alpha <= 1$ d) $1 < \alpha < 100$

8) 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) $Vs \,/\, \alpha$
   c) $\sqrt{\alpha} \times Vs$ d) $Vs \,/\, 2$

9) 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^o, the average output voltage is _____.
   a) $200 / \pi$ b) $300 / \pi$
   c) $100 / \pi$ d) $400 / \pi$

10) Which circuit gives inherent freewheeling action?
   a) Half wave converter b) Full wave converter
   c) Semi converter d) None of these

11) A type D chopper is a _____.
   a) two quadrant type-B chopper b) two quadrant type-A chopper
   c) two quadrant type-C chopper d) none of the mentioned

12) The AC voltage controllers are used in _____ applications.
   a) power generation b) electric heating
   c) conveyor belt motion d) power transmission

13) 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
   c) $Vs \times \sqrt{k}$ d) Vs

14) The GTO can be turned off _____.
   a) By a positive gate pulse
   b) By a negative gate pulse
   c) By a negative anode-cathode voltage
   d) By removing the gate pulse

Seat No.	

Set **P**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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. **12**

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^o. 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. **16**

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

Q.5 Attempt any two of the following questions. **12**

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 3-phase 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?

Seat No.	

Set **Q**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

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 it should be solved in first 30 minutes in answer book.
2) Figure to right indicate full marks.
3) Assume the 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) 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) $Vs / 2$

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^o, the average output voltage is _____.
   a) $200 / \pi$ b) $300 / \pi$
   c) $100 / \pi$ d) $400 / \pi$

3) Which circuit gives inherent freewheeling action?
   a) Half wave converter b) Full wave converter
   c) Semi converter d) None of these

4) A type D chopper is a _____.
   a) two quadrant type-B chopper b) two quadrant type-A chopper
   c) two quadrant type-C chopper d) none of the mentioned

5) The AC voltage controllers are used in _____ applications.
   a) power generation b) electric heating
   c) conveyor belt motion 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.
   a) $Vs \times k$ b) Vs/k
   c) $Vs \times \sqrt{k}$ d) Vs

7) The GTO can be turned off _____.
   a) By a positive gate pulse
   b) By a negative gate pulse
   c) By a negative anode-cathode voltage
   d) By removing the gate pulse

8) Silicon controlled rectifier is _____.
   a) Unidirectional b) Bidirectional
   c) Unidirectional & bidirectional d) None

9) The thyristor turn-off requires that the anode current _____.
   a) falls below the holding current
   b) falls below the latching current
   c) rises above the holding current
   d) rises above the latching current

10) A single-phase half wave circuit has Vs = 230 V with a R load of 100 Ω. Find the average load current at $\alpha = 30^{\circ}$.
   a) 1.45 A b) 0.57 A
   c) 0.96 A d) 2.3 A

11) 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) $\gamma = \alpha \ / \ \beta$

12) 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) $\pi \ / \ 2 \ to \ 2\pi - \alpha$

13) 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

14) The values of duty cycle (α) lies between _____.
   a) $0 < \alpha < 1$ b) $0 > \alpha > -1$
   c) $0 <= \alpha <= 1$ d) $1 < \alpha < 100$

Seat No.	

Set **Q**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 $\mathrm{R} = 10\Omega$. 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. **12**

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^{o}. 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. **16**

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 $\mathrm{R} = 10\Omega$ & 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
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Q.5 Attempt any two of the following questions. **12**

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 3-phase 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?

Seat No.	

Set **R**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

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 it should be solved in first 30 minutes in answer book.
2) Figure to right indicate full marks.
3) Assume the 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 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) $\pi\ /\ 2\ to\ 2\pi - \alpha$

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
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3) The values of duty cycle (α) lies between _____.
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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 _____.
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   c) $\sqrt{\alpha} \times Vs$ d) $Vs\ /\ 2$

5) 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^o, the average output voltage is _____.
   a) $200\ /\ \pi$ b) $300\ /\ \pi$
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6) Which circuit gives inherent freewheeling action?
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13) A single-phase half wave circuit has Vs = 230 V with a R load of 100 Ω. Find the average load current at $\alpha = 30^{\circ}$.
   a) 1.45 A b) 0.57 A
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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) $\gamma = \beta - \alpha$
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Seat No.	

Set **R**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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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 :
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Q.3 Attempt any two of the following questions. **12**

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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. **16**

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?

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a) What is the DC to Dc converter? Describe the classification of DC to dc Converter? Explain buck-boost chopper with their applications?

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i) Pulse width of output voltage

ii) Find the Output voltage, if pulse width is reduced to ½ th for constant frequency?

Seat No.	

Set **S**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

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 it should be solved in first 30 minutes in answer book.
2) Figure to right indicate full marks.
3) Assume the 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) Which circuit gives inherent freewheeling action?
   a) Half wave converter b) Full wave converter
   c) Semi converter d) None of these

2) A type D chopper is a _____.
   a) two quadrant type-B chopper b) two quadrant type-A chopper
   c) two quadrant type-C chopper d) none of the mentioned

3) The AC voltage controllers are used in _____ applications.
   a) power generation b) electric heating
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4) 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
   c) $Vs \times \sqrt{k}$ d) Vs

5) The GTO can be turned off **_____**.
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   b) By a negative gate pulse
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   d) By removing the gate pulse

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8) A single-phase half wave circuit has Vs = 230 V with a R load of 100 Ω. Find the average load current at $\alpha = 30^{\circ}$.
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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 duty cycle of 50 % and Vs = 240 V.

a) 240 V b) 120 V

c) 560 V d) 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) $Vs \ / \ \alpha$

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^o, the average output voltage is _____.

a) $200 \ / \ \pi$ b) $300 \ / \ \pi$

c) $100 \ / \ \pi$ d) $400 \ / \ \pi$

Seat No.	

Set **S**

T.E. (Part - II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER ELECTRONICS

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 $\mathrm{R} = 10\Omega$. 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. **12**

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^{o}. 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. **16**

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 $\mathrm{R} = 10\Omega$ & 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

Q.5 Attempt any two of the following questions. **12**

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 3-phase 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-434

Seat No.	

Set P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 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.
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) Evaluate the integrals $\int_{-\infty}^{\infty} e^{-\propto t}\, \partial\,(t-10)dt$
   a) $e^{-100\alpha}$ b) $e^{-10\alpha}$
   c) $e^{-\alpha}$ d) $e^{-1000\alpha}$

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) A _____ signal is one whose occurrence is always random
   a) Deterministic b) Non-deterministic
   c) Regular d) None of above

4) The impulse response of y(t) = x(t-t_0) is _____.
   a) $h(t) = \delta(t + t_0)$ b) $h(t) = \delta(t \div t_0)$
   c) $h(t) = \delta(t - t_0)$ d) None of these

5) In DT-LTI system, Impulse response can be computed by simply taking the first difference of _____ Response.
   a) ramp b) parabola
   c) impulse d) step

6) Fourier transform exists for f(t) if, _____.
   a) $\int_{-\infty}^{\infty}|f(t)|dt < 0$ b) $\int_{-\infty}^{\infty}|f(t)|dt < \infty$
   c) $\int_{-\infty}^{\infty}|f(t)|dt > 0$ d) $\int_{-\infty}^{\infty}|f(t)|dt > \infty$

7) The Fourier transform of non- periodic signal m(t)= $e^{-a|t|}$ is _____.
   a) $2a/(a^2+\omega^2)$ b) $2\omega/(a^2+\omega^2)$
   c) $a/(a^2+\omega^2)$ d) $\omega/(a^2+\omega^2)$

8) In DTFT, $X(e^{i\omega})$ is periodic in 'ω' with period '2π' satisfying which of the following condition _____.
   a) $X = [e^{j(\omega+2k)}]$ b) $X = [e^{j(\omega+2k\pi)}]$
   c) $X = \left[e^{j(\omega+\pi k)}\right]$ d) $X = [e^{j(\omega+k)}]$

9) If x(n) = $(0.6)^n$ u(n) + $(0.4)^n$ u(n) then, ROC of X(Z) is _____.
   a) $|Z| > 0.4$ b) $0.4 < |Z| < 0.6$
   c) $|Z| > 0.6$ d) Any of above

10) In DTFT Properties, Parsevals theorem is also called as _____.
   a) Energy Density Spectrum b) Power Density Spectrum
   c) Current Density Spectrum d) None

11) In DFT, the magnitude of twiddle factor $|e^{-j2\pi/N}|$ is _____.
   a) 0 b) ∞
   c) 1 d) Cant say

12) ROC can not contain any _____.
   a) Zero b) Pole
   c) Either a or b d) Both a & b

13) If $X(Z) = Z\{x(n)\}$ then $\{a^n x(n)\}$ is _____
   a) $X(az)$ b) $X(a^{-1}z)$
   c) $X(a^n z)$ d) $X(a^{-n}z)$

14) $Z\{u(n)\}$ is; _____.
   a) $1/(Z-1)$ b) $1/(Z+1)$
   c) $Z/(Z+1)$ d) $Z/(Z-1)$

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS & SYSTEMS

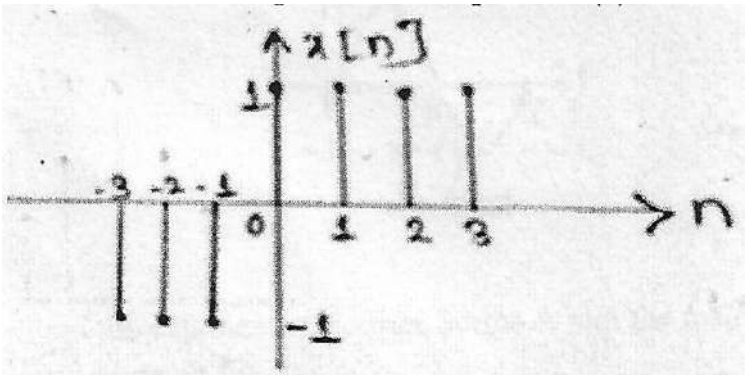
Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four. **16**

a) Find even and odd part of DT sequence x(n)



b) Check whether given signal is energy signal or power signal.

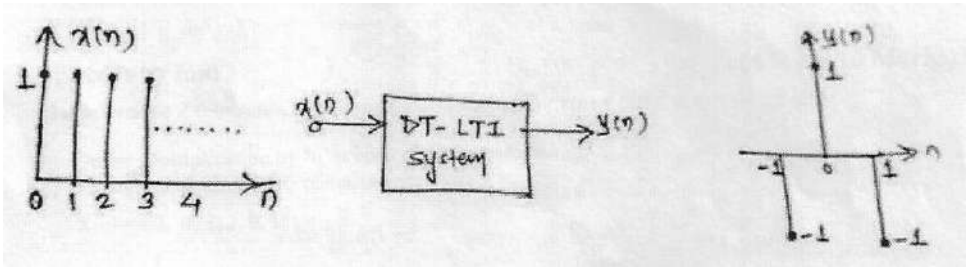
$$x(t) = (1 + e^{-5t}).u(t)$$

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.

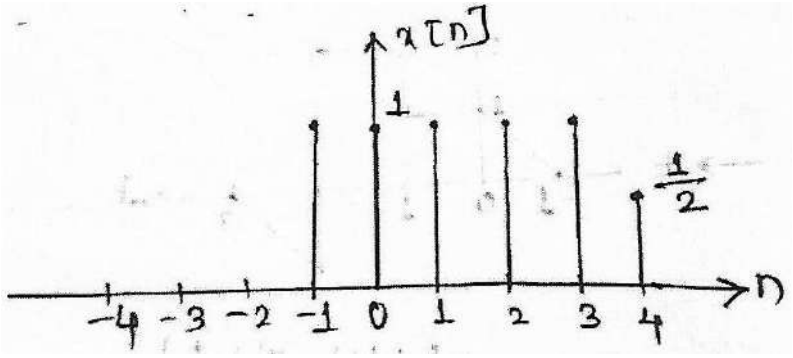


e) Derive time differentiation property of Fourier Transform.

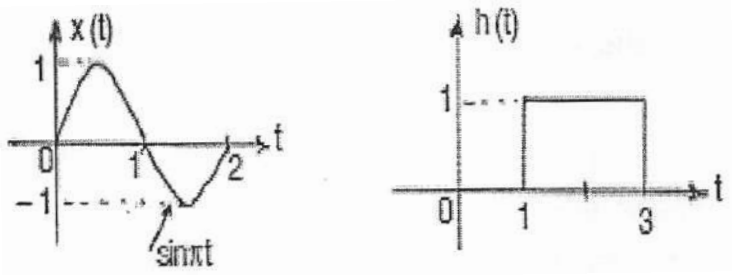
Q.3 Solve any two. **12**

a) Sketch the following signals

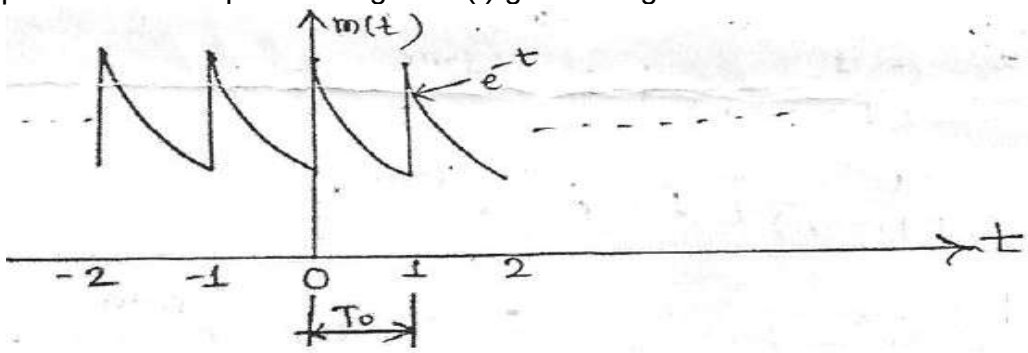
1) $x(4-n)$
2) $x(2n+1)$
3) $x(n)u(2-n)$
4) $x(n-1)\delta(n-3)$



b) Find the convolution of following signals



c) Find the exponential Fourier Series & plot the magnitude & phase spectrum for the periodic signal m(t) given in fig.



Section – II

Q.4 Solve any four. **16**

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.

e) Find 4 point IDFT of the following
X(K) = { 1, 1-j2, -1, 1+j2 }

Q.5 Solve any two. **12**

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.

$$x(n) = \{0.5, 0, 0.5, 0, 0.5, 0, 0.5, 0\}$$

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 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.
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 DTFT, $X(e^{i\omega})$ is periodic in 'ω' with period '2π' satisfying which of the following condition _____.
   a) $X = [e^{j(\omega+2k)}]$ b) $X = [e^{j(\omega+2k\pi)}]$
   c) $X = \left[e^{j(\omega+\pi k)}\right]$ d) $X = [e^{j(\omega+k)}]$

2) If $x(n) = (0.6)^n u(n) + (0.4)^n u(n)$ then, ROC of X(Z) is _____.
   a) $|Z| > 0.4$ b) $0.4 < |Z| < 0.6$
   c) $|Z| > 0.6$ d) Any of above

3) In DTFT Properties, Parsevals theorem is also called as _____.
   a) Energy Density Spectrum b) Power Density Spectrum
   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 _____.
   a) Zero b) Pole
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6) If $X(Z) = Z\{x(n)\}$ then $\{a^n x(n)\}$ is _____
   a) $X(az)$ b) $X(a^{-1}z)$
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7) $Z\{u(n)\}$ is; _____.
   a) $1/(Z-1)$ b) $1/(Z+1)$
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8) Evaluate the integrals $\int_{-\infty}^{\infty} e^{-\propto t}\, \partial\,(t-10)dt$
   a) $e^{-100\alpha}$ b) $e^{-10\alpha}$
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11) The impulse response of $y(t) = x(t-t_0)$ is _____.
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12) In DT-LTI system, Impulse response can be computed by simply taking the first difference of _____ Response.
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   b) parabola
   c) impulse
   d) step

13) Fourier transform exists for f(t) if, _____.
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   c) $\int_{-\infty}^{\infty} |f(t)| dt > 0$
   d) $\int_{-\infty}^{\infty} |f(t)| dt > \infty$

14) The Fourier transform of non- periodic signal $m(t) = e^{-a|t|}$ is _____.
   a) $2a/(a^2 + \omega^2)$
   b) $2\omega/(a^2 + \omega^2)$
   c) $a/(a^2 + \omega^2)$
   d) $\omega/(a^2 + \omega^2)$

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS & SYSTEMS

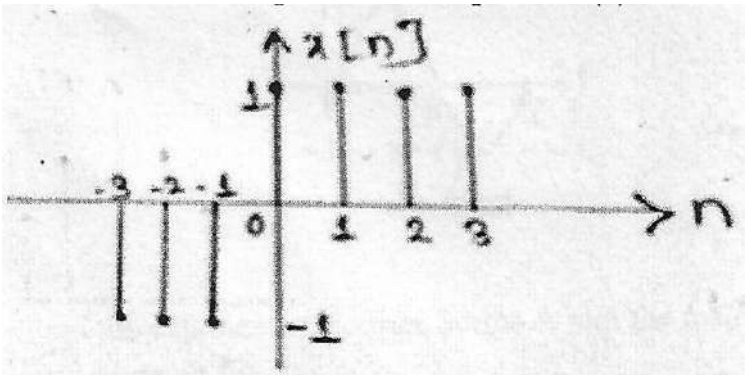
Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four. **16**

a) Find even and odd part of DT sequence x(n)



b) Check whether given signal is energy signal or power signal.

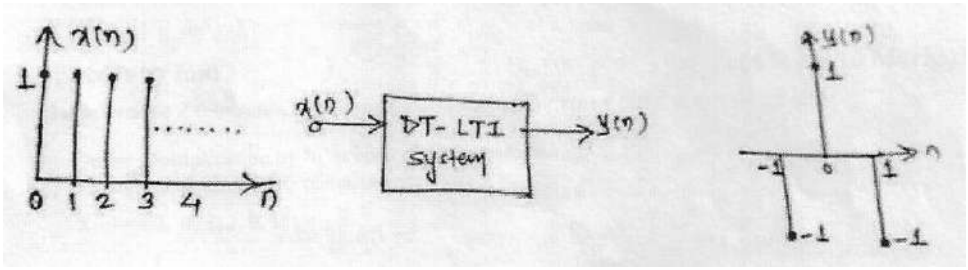
$$x(t) = (1 + e^{-5t}).u(t)$$

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.

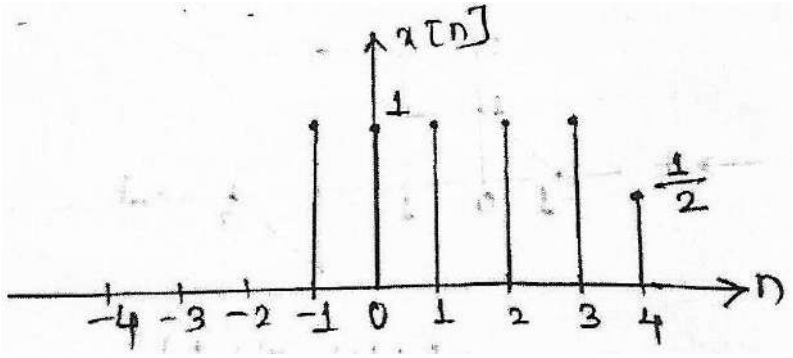


e) Derive time differentiation property of Fourier Transform.

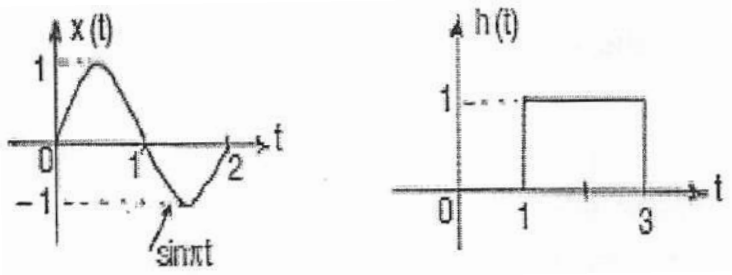
Q.3 Solve any two. **12**

a) Sketch the following signals

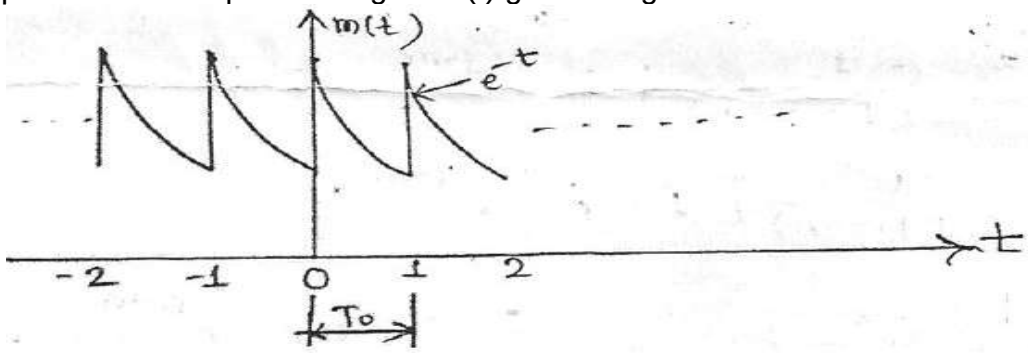
1) $x(4-n)$
2) $x(2n+1)$
3) $x(n)u(2-n)$
4) $x(n-1)\delta(n-3)$



b) Find the convolution of following signals



c) Find the exponential Fourier Series & plot the magnitude & phase spectrum for the periodic signal m(t) given in fig.



Section – II

Q.4 Solve any four. **16**

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.

e) Find 4 point IDFT of the following
X(K) = { 1, 1-j2, -1, 1+j2 }

Q.5 Solve any two. **12**

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.

$$x(n) = \{0.5, 0, 0.5, 0, 0.5, 0, 0.5, 0\}$$

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 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.
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 DT-LTI system, Impulse response can be computed by simply taking the first difference of _____ Response.
   a) ramp b) parabola
   c) impulse d) step

2) Fourier transform exists for f(t) if, _____.
   a) $\int_{-\infty}^{\infty}|f(t)|dt < 0$ b) $\int_{-\infty}^{\infty}|f(t)|dt < \infty$
   c) $\int_{-\infty}^{\infty}|f(t)|dt > 0$ d) $\int_{-\infty}^{\infty}|f(t)|dt > \infty$

3) The Fourier transform of non- periodic signal m(t)= $e^{-a|t|}$ is _____.
   a) $2a/(a^2+\omega^2)$ b) $2\omega/(a^2+\omega^2)$
   c) $a/(a^2+\omega^2)$ d) $\omega/(a^2+\omega^2)$

4) In DTFT, $X(e^{i\omega})$ is periodic in 'ω' with period '2π' satisfying which of the following condition _____.
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   c) $X = \left[e^{j(\omega+\pi k)}\right]$ d) $X = [e^{j(\omega+k)}]$

5) If x(n) = $(0.6)^n$ u(n) + $(0.4)^n$ u(n) then, ROC of X(Z) is _____.
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9) If $X(Z) = Z\{x(n)\}$ then $\{a^n x(n)\}$ is _____
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c) $h(t) = \delta(t - t_0)$ d) None of these

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS & SYSTEMS

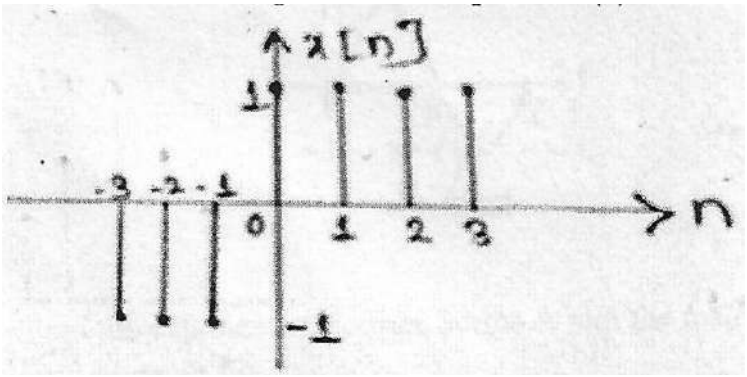
Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four. **16**

a) Find even and odd part of DT sequence x(n)



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c) Determine whether the following systems are causal or not.

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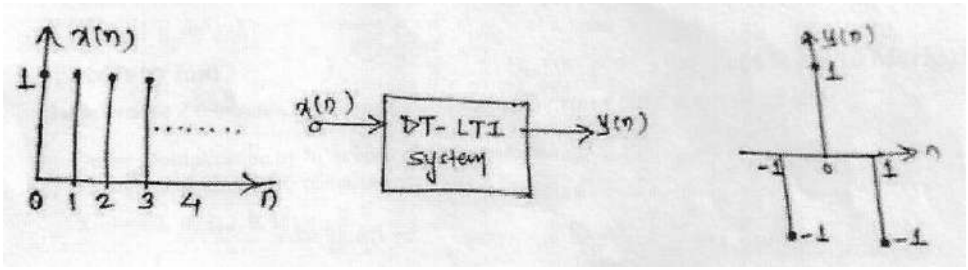
d) Find the impulse response and sketch it, for following DT-LTI system.

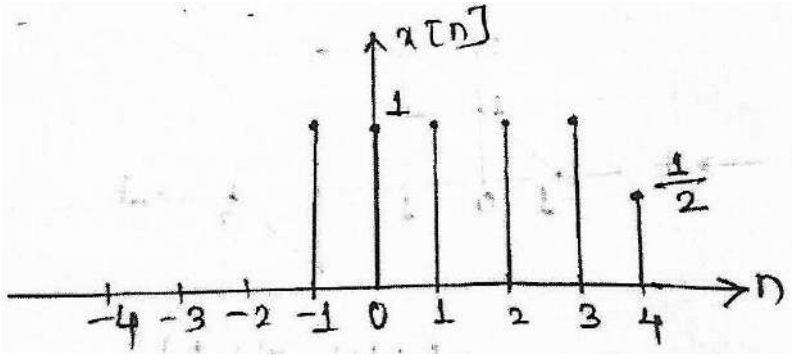


e) Derive time differentiation property of Fourier Transform.

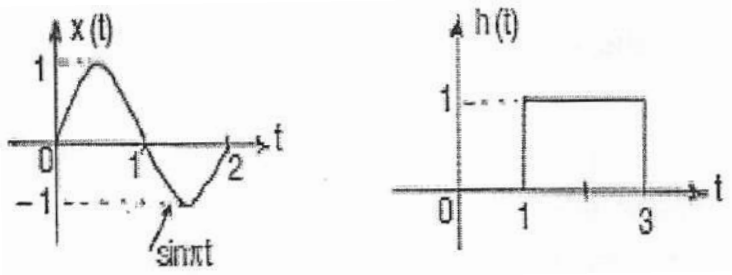
Q.3 Solve any two. **12**

a) Sketch the following signals

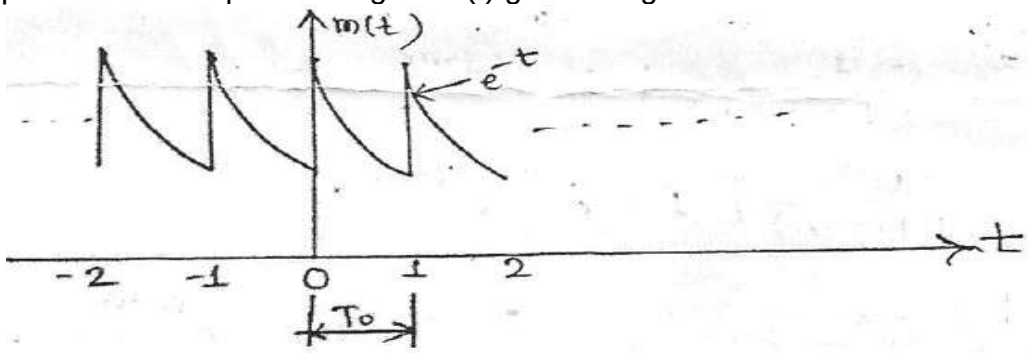
1) $x(4-n)$
2) $x(2n+1)$
3) $x(n)u(2-n)$
4) $x(n-1)\delta(n-3)$



b) Find the convolution of following signals



c) Find the exponential Fourier Series & plot the magnitude & phase spectrum for the periodic signal m(t) given in fig.



Section – II

Q.4 Solve any four. **16**

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.

e) Find 4 point IDFT of the following
X(K) = { 1, 1-j2, -1, 1+j2 }

Q.5 Solve any two. **12**

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.

$$x(n) = \{0.5, 0, 0.5, 0, 0.5, 0, 0.5, 0\}$$

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS & SYSTEMS

Day & Date: Tuesday, 26-11-2019 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.
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 DTFT Properties, Parsevals theorem is also called as _____.
   a) Energy Density Spectrum b) Power Density Spectrum
   c) Current Density Spectrum d) None

2) In DFT, the magnitude of twiddle factor $|e^{-j2\pi/N}|$ is _____.
   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

4) If $X(Z) = Z\{x(n)\}$ then $\{a^n x(n)\}$ is _____
   a) $X(az)$ b) $X(a^{-1}z)$
   c) $X(a^n z)$ d) $X(a^{-n}z)$

5) $Z\{u(n)\}$ is; _____.
   a) $1/(Z-1)$ b) $1/(Z+1)$
   c) $Z/(Z+1)$ d) $Z/(Z-1)$

6) Evaluate the integrals $\int_{-\infty}^{\infty} e^{-\propto t}\, \partial\,(t-10)dt$
   a) $e^{-100\alpha}$ b) $e^{-10\alpha}$
   c) $e^{-\alpha}$ d) $e^{-1000\alpha}$

7) 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

8) A _____ signal is one whose occurrence is always random
   a) Deterministic b) Non-deterministic
   c) Regular d) None of above

9) The impulse response of $y(t) = x(t-t_0)$ is _____.
   a) $h(t) = \delta(t + t_0)$ b) $h(t) = \delta(t \div t_0)$
   c) $h(t) = \delta(t - t_0)$ d) None of these

10) In DT-LTI system, Impulse response can be computed by simply taking the first difference of _____ Response.
   a) Ramp
   b) Parabola
   c) Impulse
   d) Step

11) Fourier transform exists for f(t) if, _____.
   a) $\int_{-\infty}^{\infty}|f(t)|dt < 0$
   b) $\int_{-\infty}^{\infty}|f(t)|dt < \infty$
   c) $\int_{-\infty}^{\infty}|f(t)|dt > 0$
   d) $\int_{-\infty}^{\infty}|f(t)|dt > \infty$

12) The Fourier transform of non- periodic signal m(t)= $e^{-a|t|}$ is _____.
   a) $2a/(a^2+\omega^2)$
   b) $2\omega/(a^2+\omega^2)$
   c) $a/(a^2+\omega^2)$
   d) $\omega/(a^2+\omega^2)$

13) In DTFT, $X(e^{i\omega})$ is periodic in 'ω' with period '2π' satisfying which of the following condition _____.
   a) $X = [e^{j(\omega+2k)}]$
   b) $X = [e^{j(\omega+2k\pi)}]$
   c) $X = \left[e^{j(\omega+\pi k)}\right]$
   d) $X = [e^{j(\omega+k)}]$

14) If x(n) = $(0.6)^n$ u(n) + $(0.4)^n$ u(n) then, ROC of X(Z) is _____.
   a) $|Z| > 0.4$
   b) $0.4 < |Z| < 0.6$
   c) $|Z| > 0.6$
   d) Any of above

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SIGNALS & SYSTEMS

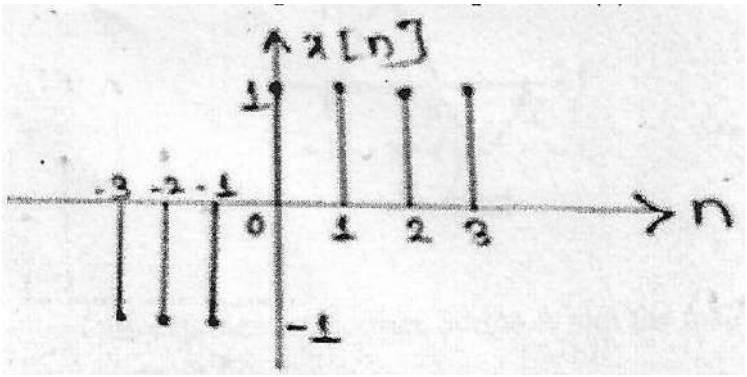
Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four. **16**

a) Find even and odd part of DT sequence x(n)



b) Check whether given signal is energy signal or power signal.

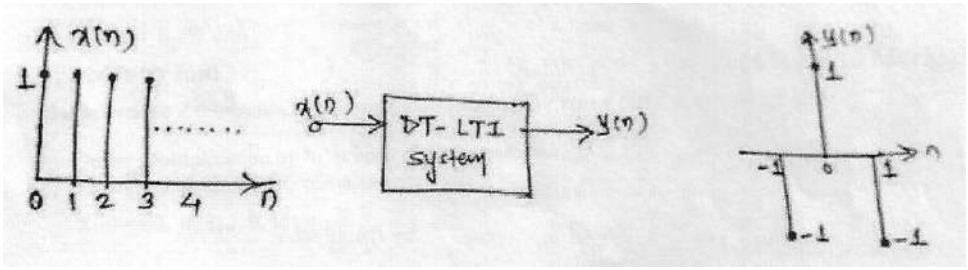
$$x(t) = (1 + e^{-5t}).u(t)$$

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.

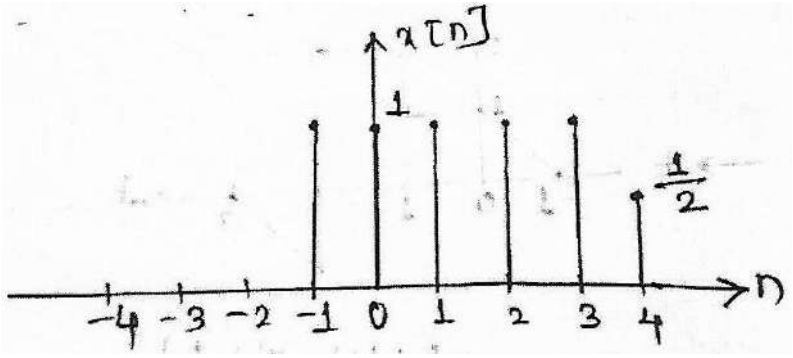


e) Derive time differentiation property of Fourier Transform.

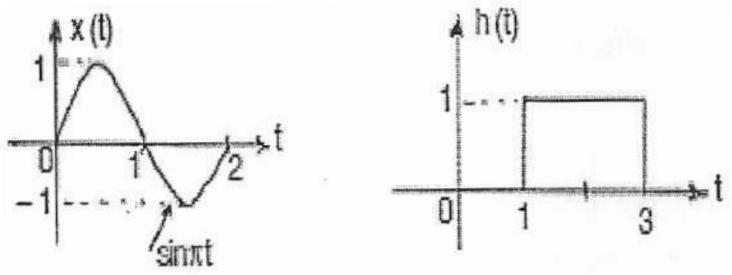
Q.3 Solve any two. **12**

a) Sketch the following signals

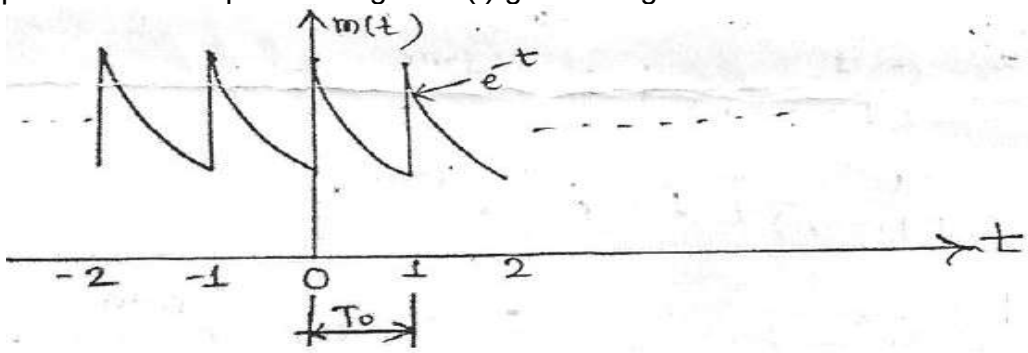
1) $x(4-n)$
2) $x(2n+1)$
3) $x(n)u(2-n)$
4) $x(n-1)\delta(n-3)$



b) Find the convolution of following signals



c) Find the exponential Fourier Series & plot the magnitude & phase spectrum for the periodic signal m(t) given in fig.



Section – II

Q.4 Solve any four. **16**

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.

e) Find 4 point IDFT of the following
X(K) = { 1, 1-j2, -1, 1+j2 }

Q.5 Solve any two. **12**

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.

$$x(n) = \{0.5, 0, 0.5, 0, 0.5, 0, 0.5, 0\}$$

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SAFETY ENGINEERING AND DISASTER MANAGEMENT

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) 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
   c) action d) Act

5) A committee was formed for disaster management plans in _____ under the chairmanship of Mr. J. C. Pant.
   a) August 1999 b) Feb 2002
   c) Sept 1949 d) Jan 2002

6) Weather and climate related disasters are _____.
   a) Flood b) Drought
   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

10) Which are the ‘Safety’ equipments while working in industry?

a) Helmets
b) Safety belts
c) Machine guards
d) All of the above

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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. **20**

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. **20**

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.

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
Time: 10:00 AM To 12:00 PM

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MCQ/Objective Type Questions

Duration: 20 Minutes Marks: 10

Q.1 Choose the correct alternatives from the options and rewrite the sentence. 10

1) Weather and climate related disasters are _____.
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   a) Landscape and mud flows b) Avalanche
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   c) Machine guards d) All of the above

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   c) Probability d) Possibility

8) Recovery in disaster management refers to _____.
   a) Temporary Housing Facility b) Medical aid
   c) Grants d) All of the above

9) An emergency is a situation generated by the real or imminent occurance of event that requires immediate _____.
   a) response b) attention
   c) action d) Act

10) A committee was formed for disaster management plans in _____ under the chairmanship of Mr. J. C. Pant.

a) August 1999 b) Feb 2002
c) Sept 1949 d) Jan 2002

Seat No.	

Set **Q**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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. **20**

a) What are the unsafe acts while working in industry?

b) Explain the “need for safety”.

c) What are the requirements of safety specialist?

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f) Brief corrective actions for prevention of industrial accidents.

Q.3 Solve any two of the following. **20**

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.

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SAFETY ENGINEERING AND DISASTER MANAGEMENT

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) The geological disasters are _____.
   a) Earthquakes b) Volcanic activity
   c) Dam bursts d) All of the above

2) Which are the 'Safety' equipments while working in industry?
   a) Helmets b) Safety belts
   c) Machine guards d) All of the above

3) A disaster management cycle comprises of _____.
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   c) Cyclone d) All of the above

9) Which is not the disaster related to geological conditions?
   a) Landscape and mud flows b) Avalanche
   c) Heat wave d) Coastal erosion

10) Which does not include environmental disaster?
   a) Decertification
   b) Cloud burst
   c) Dam Bursts
   d) Mine fires

Seat No.	

Set **R**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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. **20**

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c) What are the requirements of safety specialist?

d) What are highlights of National policy on disaster management approved in 2009?

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f) Brief corrective actions for prevention of industrial accidents.

Q.3 Solve any two of the following. **20**

a) Explain types of accidents and preventive measures in industries.

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Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SAFETY ENGINEERING AND DISASTER MANAGEMENT

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) Recovery in disaster management refers to _____.
   a) Temporary Housing Facility b) Medical aid
   c) Grants d) All of the above

2) An emergency is a situation generated by the real or imminent occurance of event that requires immediate _____.
   a) response b) attention
   c) action d) Act

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9) A disaster management cycle comprises of _____.
   a) Mitigation b) Preparedness
   c) Recovery d) All of the above

10) Risk is _____ that loss will occur as the result of an adverse event.
a) Effect
b) Event
c) Probability
d) Possibility

Seat No.	

Set **S**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day & Date: Thursday, 28-11-2019 Max. Marks: 40
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. **20**

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. **20**

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.

SLR-FM-436

Seat No.	

Set P

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
INTELLECTUAL PROPERTY RIGHTS

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 TRUE OR FALSE (Attempt All) **10**

a) Certification mark can be licensed.
b) Trademark can be domain name.
c) Domain name is used in real world.
d) Geographical Indication is public good.
e) Geographical Indication is community right.
f) Company can register collective mark.
g) Trademark can be used in virtual world.
h) WTO administer domain name.
i) ICANN head quarter is in Geneva.
j) Certification is used along with trademark.

SLR-FM-436

Seat No.	

Set P

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 **20**

a) Explain measures to control piracy.
b) Explain software copyright.
c) Explain law on semiconductor layout design.
d) Explain patent on biotechnology.
e) What is expected from patentee as an obligation to the state?
f) What are the types of designs not registrable under act?

Q.3 Attempt any Two **20**

a) Discuss the importance of Law on Industrial designs.
b) What is Intellectual property? How it is useful for Engineers?
c) Explain commercial exploitation and infringement.

Seat No.	

Set **P**

T.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
VALUE ENGINEERING

Day & Date: Thursday, 28-11-2019 Max. Marks: 50
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. **50**

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.

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 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.
3) Assume the suitable data wherever 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) 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

2) 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

3) 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

4) For high frequency choppers the device that is preferred is _____.
   a) Thyristor b) TRIAC
   c) Transistor d) GTO

5) An elevator drive is required to operate in _____.
   a) One quadrant only b) Two quadrants
   c) Three quadrants d) Four quadrants

6) Full-converter can be used in DC motor for regenerative braking in _____.
   a) Constant Operation b) Variable Operation
   c) Inversion Operation d) Opposite Operation

7) Which of the following method is employed when regenerative braking is necessary?
   a) DC Chopper b) Variable Resistor
   c) Inverter Rectifier d) Motor-generator

8) 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

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 _____.
   a) Constant power drive
   b) Constant torque drive
   c) Variable power drive
   d) None of the above

13) 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

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) $105°$

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 $\alpha = 60°$ & Speed = 600 rpm
   2) Motor Speed for $\alpha = 60°$ & 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

Section – II

Q.4 Solve any four **16**

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 **12**

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

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 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.
3) Assume the suitable data wherever 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) 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

2) 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

3) 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

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 _____.
   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

5) Speed control by variation of field flux results in _____.
   a) Constant power drive b) Constant torque drive
   c) Variable power drive d) None of the above

6) 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

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
   c) Intermittent duty with starting
   d) Intermittent duty with starting and braking

11) For high frequency choppers the device that is preferred is _____.
   a) 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
   c) Inversion Operation d) Opposite Operation

14) Which of the following method is employed when regenerative braking is necessary?
   a) DC Chopper b) Variable Resistor
   c) Inverter Rectifier d) Motor-generator

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 $\alpha = 60°$ & Speed = 600 rpm
   2) Motor Speed for $\alpha = 60°$ & 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

Section – II

Q.4 Solve any four **16**

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 **12**

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

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 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.
3) Assume the suitable data wherever 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) An elevator drive is required to operate in _____.
   a) One quadrant only b) Two quadrants
   c) Three quadrants d) Four quadrants

2) Full-converter can be used in DC motor for regenerative braking in _____.
   a) Constant Operation b) Variable Operation
   c) Inversion Operation d) Opposite Operation

3) Which of the following method is employed when regenerative braking is necessary?
   a) DC Chopper b) Variable Resistor
   c) Inverter Rectifier d) Motor-generator

4) 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

5) 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

6) 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

7) 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

8) Speed control by variation of field flux results in _____.
   a) Constant power drive
   b) Constant torque drive
   c) Variable power 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

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
   b) TRIAC
   c) Transistor
   d) GTO

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time : 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.
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Section – I

Q.2 Solve any four **16**

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 **12**

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 $\alpha = 60°$ & Speed = 600 rpm
   2) Motor Speed for $\alpha = 60°$ & 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

Section – II

Q.4 Solve any four **16**

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 **12**

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

Seat No.	

Set | S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 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.
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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 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

2) 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 drive
   c) Variable power drive d) None of the above

4) Reluctance motor is a _____.
   a) Variable torque motor
   b) Low torque variable speed motor
   c) Self starting type synchronous motor
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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 motor b) Wound rotor induction motor
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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
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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 _____.
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   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

SLR-FM-438

Seat No.		Set	S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
INDUSTRIAL DRIVES CONTROL

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
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Section – I

Q.2 Solve any four **16**

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   1) Calculate duty ratio of chopper for motor speed of 1000rpm & braking torque equal to 1.5 times rated motor torque.
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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.
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e) Explain the chopper fed DC separately excited motor in motoring mode.

Q.3 Solve Any Two **12**

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 $\alpha = 60°$ & Speed = 600 rpm
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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

Section – II

Q.4 Solve any four **16**

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 **12**

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

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 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 minute 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) 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 within _____.
   a) 1.5 sec b) 5 to 10 sec
   c) 5 to 20 sec d) 20 to 30 sec

3) The actuating quantity for the relays may be _____.
   a) Magnitude b) Frequency
   c) Phase angle d) 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 is _____.
   a) Non-directional relay b) Directional relay
   c) Differential relay d) 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) Fact b) Sensitive
   c) Slow d) None of the above

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

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 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 minute 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) 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

2) 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

3) The arc resistance depends on which among the following factors?
   a) Cross section of the arc b) Length of the arc
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4) 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

5) For ground fault, which of the relay is preferred?
   a) Plain impedance relay b) Directional relay
   c) Reactance relay d) Overcurrent relay

6) Up to what voltage a cartridge type of fuse can be used?
   a) 400 V b) 11 KV
   c) 20 KV d) 33 KV

7) Protective relays can be designed to respond to _____.
   a) Light intensity, impedance
   b) Temperature, resistance, reactance
   c) Voltage and current
   d) All of these

8) 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

9) The relay with inverse time characteristic will operate within _____.
   a) 1.5 sec
   b) 5 to 10 sec
   c) 5 to 20 sec
   d) 20 to 30 sec

10) The actuating quantity for the relays may be _____.
   a) Magnitude
   b) Frequency
   c) Phase angle
   d) Any of the above

11) 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

12) Up to what voltage can the liquid type HRC fuses be used?
   a) 33 kV
   b) 132 kV
   c) 66 V
   d) 220 kV

13) Admittance relay is _____.
   a) Non-directional relay
   b) Directional relay
   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
   b) Air blast circuit breaker
   c) SF6 circuit breaker
   d) Vacuum circuit breaker

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 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 minute 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) Up to what voltage can the liquid type HRC fuses be used?
   a) 33 kV b) 132 kV
   c) 66 V d) 220 kV

2) Admittance relay is _____.
   a) Non-directional relay b) Directional relay
   c) Differential relay d) All of the above

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
   c) SF6 circuit breaker d) Vacuum circuit breaker

4) 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

5) 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

6) 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

7) 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

8) For ground fault, which of the relay is preferred?
   a) Plain impedance relay b) Directional relay
   c) Reactance relay d) Overcurrent relay

9) Up to what voltage a cartridge type of fuse can be used?
   a) 400 V
   b) 11 KV
   c) 20 KV
   d) 33 KV

10) Protective relays can be designed to respond to _____.
   a) Light intensity, impedance
   b) Temperature, resistance, reactance
   c) Voltage and current
   d) All of these

11) 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

12) The relay with inverse time characteristic will operate within _____.
   a) 1.5 sec
   b) 5 to 10 sec
   c) 5 to 20 sec
   d) 20 to 30 sec

13) The actuating quantity for the relays may be _____.
   a) Magnitude
   b) Frequency
   c) Phase angle
   d) Any of the above

14) 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

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set | S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 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 minute 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) The arc resistance depends on which among the following factors?
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   c) Degree of ionization d) All of the above

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   b) Voltage during abnormal condition
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   c) 20 KV d) 33 KV

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   b) Temperature, resistance, reactance
   c) Voltage and current
   d) All of these

6) If the fault occurs near the impedance relay, the V/I ratio will be _____.
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   b) Lower than that of if fault occurs away from the relay
   c) Higher than that of if fault occurs away from the relay
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7) The relay with inverse time characteristic will operate within _____.
   a) 1.5 sec b) 5 to 10 sec
   c) 5 to 20 sec d) 20 to 30 sec

8) The actuating quantity for the relays may be _____.
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   b) Frequency
   c) Phase angle
   d) Any of the above

9) Burden of a protective relay is the power _____.
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   c) Developed by the relay circuit
   d) None of the above

10) Up to what voltage can the liquid type HRC fuses be used?
   a) 33 kV
   b) 132 kV
   c) 66 V
   d) 220 kV

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   b) Directional relay
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   d) All of the above

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   b) Air blast circuit breaker
   c) SF6 circuit breaker
   d) Vacuum circuit breaker

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

14) 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

SLR-FM-439

Seat No.	

Set S

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **P**

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

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) 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)

2) The current flowing through the resistance is given by _____.
   a) $I \cos Ø$ b) $I \sin Ø$
   c) $I \tan Ø$ 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 CO_2
   c) CO2 and NOx d) H_2O

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
   c) natural gas for fertilizer plant d) LPG for soft coke

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 _____.
   a) Induction motors b) Induction generators
   c) Synchronous motors d) Synchronous generators

7) Reactive power is measured in terms of _____.
   a) kW b) kVA
   c) kVAR d) None of these

8) 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

9) Particles that participate in the strong nuclear interaction are called _____.
   a) Neutrinos
   b) Hadrons
   c) Leptons
   d) Electrons
   e) Photons

10) Which one is a secondary form of energy?
   a) furnace oil
   b) natural gas
   c) electricity
   d) Coal

11) 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

12) 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

13) A moderator is used to slow _____.
   a) Proton
   b) Alpha particles
   c) Neutron
   d) Beta particle
   e) Photon

14) 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

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **Q**

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

Instructions: 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

Duration: 30 Minutes Marks: 14

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   a) financial strength of the company
   b) management philosophy
   c) input and output energy flow
   d) human resource strength of the company

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   a) Neutrinos b) Hadrons
   c) Leptons d) Electrons
   e) Photons

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   a) furnace oil b) natural gas
   c) electricity d) Coal

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   a) input-output b) conversion efficiency
   c) losses d) all the above
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5) 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

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   a) Proton b) Alpha particles
   c) Neutron d) Beta particle
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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

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   c) inexpensive d) all (a) to (c)

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   c) $I \tan Ø$ d) $I \cot Ø$

10) Acid rain is caused by the release of the following components from combustion of fuels _____.
   a) SOx and NOx b) Sox and CO_2
   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
   c) natural gas for fertilizer plant d) LPG for soft coke

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   a) Surface temperature b) Flame temperature
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   a) Induction motors b) Induction generators
   c) Synchronous motors d) Synchronous generators

14) Reactive power is measured in terms of _____.
   a) kW b) kVA
   c) kVAR d) None of these

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **R**

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

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) 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
   e) Photon

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) $I \cos Ø$
   b) $I \sin Ø$
   c) $I \tan Ø$
   d) $I \cot Ø$

13) Acid rain is caused by the release of the following components from combustion of fuels _____.
   a) SOx and NOx
   b) Sox and CO_2
   c) CO2 and NOx
   d) H_2O

14) 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
   c) natural gas for fertilizer plant
   d) LPG for soft coke

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **S**

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

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) Which one is a secondary form of energy?
   a) furnace oil b) natural gas
   c) electricity d) Coal

2) 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

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 particles
   c) Neutron d) Beta particle
   e) Photon

5) 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

6) 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)

7) The current flowing through the resistance is given by _____.
   a) $I \cos \emptyset$ b) $I \sin \emptyset$
   c) $I \tan \emptyset$ d) $I \cot \emptyset$

8) Acid rain is caused by the release of the following components from combustion of fuels _____.
   a) SOx and NOx b) Sox and CO_2
   c) CO2 and NOx d) H_2O

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
   c) natural gas for fertilizer plant
   d) LPG for soft coke

10) Infrared thermometer is used to measure _____.
   a) Surface temperature
   b) Flame temperature
   c) Flue gas temperature
   d) Hot water temperature

11) Phase advancers are used to improve the power factor of _____.
   a) Induction motors
   b) Induction generators
   c) Synchronous motors
   d) Synchronous generators

12) Reactive power is measured in terms of _____.
   a) kW
   b) kVA
   c) kVAR
   d) None of these

13) 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

14) Particles that participate in the strong nuclear interaction are called _____.
   a) Neutrinos
   b) Hadrons
   c) Leptons
   d) Electrons
   e) Photons

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
ENERGY AUDIT AND MANAGEMENT

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 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 Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) Reflection coefficient of voltage (K_r) for open circuit is _____.
   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 case of _____.
   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 in the transmission line?
   a) Series capacitor b) Synchronous capacitors
   c) Both a and b d) None of these

5) For 100% series compensation, resonance occur at _____.
   a) Power frequency b) 50% of Power frequency
   c) 40% of Power frequency d) None of these

6) The conductors of an EHV line is selected on the basis of _____.
   a) Current carrying capacity b) Corona and RI performance
   c) Line voltage d) None of these

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

9) 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) $\frac{2Z_0}{Z_0+Z_t}$
   b) $\frac{Z_0-Z_t}{Z_0+Z_t}$
   c) $\frac{2Z_t}{Z_0+Z_t}$
   d) $\frac{Z_t-Z_0}{Z_0+Z_t}$

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
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. **16**

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. **12**

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^o 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. **16**

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. **12**

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.

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Third mode of propagation is called as _____.
   a) Line to ground b) Phase to phase
   c) Homopolar d) Inter-phase _____

2) 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

3) 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

4) Operating 750 KV line gives AN at a level of _____.
   a) 50 dB b) 55.4 dB
   c) 52 dB d) 58.5 dB

5) The allowable noise level at one MHz is _____.
   a) 22 dB b) 26 dB
   c) 30 dB d) 32 dB

6) 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

7) 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) $\frac{2Z_t}{Z_0+Z_t}$ d) $\frac{Z_t-Z_0}{Z_0+Z_t}$

8) Reflection coefficient of voltage (K_r) for open circuit is _____.
   a) 0 b) +2
   c) +1 d) -1

9) 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 performance
   c) Line voltage
   d) None of these

14) The power loss is important for the design of _____.
   a) Generator
   b) Motor
   c) Feeder
   d) Transmission line

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
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. **16**

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. **12**

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^o 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. **16**

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. **12**

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.

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) For 100% series compensation, resonance occur at _____.
   a) Power frequency b) 50% of Power frequency
   c) 40% of Power frequency d) None of these

2) The conductors of an EHV line is selected on the basis of _____.
   a) Current carrying capacity b) Corona and RI performance
   c) Line voltage d) None of these

3) The power loss is important for the design of _____.
   a) Generator b) Motor
   c) Feeder d) Transmission line

4) Third mode of propagation is called as _____.
   a) Line to ground b) Phase to phase
   c) Homopolar d) Inter-phase

5) 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

6) 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

7) Operating 750 KV line gives AN at a level of _____.
   a) 50 dB b) 55.4 dB
   c) 52 dB d) 58.5 dB

8) The allowable noise level at one MHz is _____.
   a) 22 dB b) 26 dB
   c) 30 dB d) 32 dB

9) 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

10) 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) $\frac{2Z_t}{Z_0+Z_t}$ d) $\frac{Z_t-Z_0}{Z_0+Z_t}$

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 systems b) 11 kV systems
   c) Unbalanced 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 b) Synchronous capacitors
   c) Both a and b d) None of these

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
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. **16**

a) How the audible noise is generated and what are the characteristics?

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Q.3 Attempt any two. **12**

a) A power of 12000 MW is required to be transmitted over a distance of 1000 km. At voltage levels of 400 kV determine.
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b) Explain the charge potential relations of multi-conductor lines.

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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.

f) Explain in detail static reactive compensating system.

Q.5 Attempt any two. **12**

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.

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 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 Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) 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

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 _____.
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   c) +1 d) -1

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   a) Switched capacitors
   b) Fixed capacitor with controlled reactor
   c) Saturable reactor with capacitor bank
   d) Switched capacitor with controlled reactor

8) 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

9) 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

10) For 100% series compensation, resonance occur at _____.
   a) Power frequency b) 50% of Power frequency
   c) 40% of Power frequency d) None of these

11) The conductors of an EHV line is selected on the basis of _____.
   a) Current carrying capacity b) Corona and RI performance
   c) Line voltage d) None of these

12) The power loss is important for the design of _____.
   a) Generator b) Motor
   c) Feeder d) Transmission line

13) Third mode of propagation is called as _____.
   a) Line to ground b) Phase to phase
   c) Homopolar d) Inter-phase

14) 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

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
EXTRA HIGH VOLTAGE AC TRANSMISSION SYSTEM

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
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. **16**

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. **12**

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^o 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. **16**

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. **12**

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.

Seat No.	

Set **P**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 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 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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) 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

2) Input with a particular terminal number can be used _____.
   a) Many times in a Program b) Only once in a Program
   c) Only once in a Rung d) None of the above

3) 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.

4) PLC stands for _____.
   a) Programmable Logo Controller
   b) None of these
   c) Pneumatic Latching Circuit
   d) Programmable Logic Controller

5) 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

6) The first company to build PLC was _____.
   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

8) SCADA system is _____.
   a) Software
   b) Hardware
   c) Combination of Software & Hardware
   d) None of the above

9) The important function of SCDA is _____.
   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
   d) None of the above

11) In OSI model layer No 7 consist of _____.
   a) Physical Layer
   b) Data link layer
   c) Network Layer
   d) Application Layer

12) Which layer provides the services to user?
   a) Application Layer
   b) Data link layer
   c) Physical Layer
   d) Network Layer

13) High speed Ethernet works on _____.
   a) Coaxial cable
   b) Twisted pair cable
   c) Optical fiber
   d) None of the mentioned

14) OSI stands for _____.
   a) Open system interconnection
   b) Operating system interface
   c) Optical service implementation
   d) None of the above

Seat No.	

Set **P**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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: **16**

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: **12**

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: **16**

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. **12**

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

Seat No.	

Set **Q**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 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 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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

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 _____.
   a) Physical Layer b) Data link layer
   c) Network Layer d) Application Layer

5) Which layer provides the services to user?
   a) Application Layer b) Data link layer
   c) Physical Layer d) Network Layer

6) High speed Ethernet works on _____.
   a) Coaxial cable b) Twisted pair cable
   c) Optical fiber d) None of the mentioned

7) OSI stands for _____.
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   b) Operating system interface
   c) Optical service implementation
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   a) Program Statement b) Symbol of Circuit Element
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   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

Seat No.	

Set **Q**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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: **16**

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: **12**

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: **16**

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. **12**

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

Seat No.	

Set **R**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 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 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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) PLCs are designed for use in the control of a wide variety of manufacturing machines and systems _____.
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   b) Personal computers
   c) Electromechanical systems
   d) All of the above

2) The first company to build PLC was _____.
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   b) Discrete Analog Signals
   c) Continuously Variables digital signals
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4) SCADA system is _____.
   a) Software
   b) Hardware
   c) Combination of Software & Hardware
   d) None of the above

5) The important function of SCDA is _____.
   a) Data Acquisition b) Alarm processing
   c) Information Display d) All the above

6) RTU has _____.
   a) Static Memory b) Dynamic Memory
   c) Static & Dynamic Memory d) None of the above

7) In OSI model layer No 7 consist of _____.
   a) Physical Layer b) Data link layer
   c) Network Layer d) Application Layer

8) Which layer provides the services to user?
   a) Application Layer b) Data link layer
   c) Physical Layer d) Network Layer

9) High speed Ethernet works on _____.
   a) Coaxial cable
   b) Twisted pair cable
   c) Optical fiber
   d) None of the mentioned

10) OSI stands for _____.
   a) Open system interconnection
   b) Operating system interface
   c) Optical service implementation
   d) None of the above

11) In ladder diagram each rung is _____.
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   b) Symbol of Circuit Element
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   c) Series & parallel
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   b) None of these
   c) Pneumatic Latching Circuit
   d) Programmable Logic Controller

Seat No.	

Set **R**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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: **16**

a) Define programmable logic controller. Enlist brands of PLC.
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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: **12**

a) Develop PLC Logic for DC Motor In Forward & Reverse Direction.
1) Forward stop Reverse starter
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c) Draw and Explain Analysis of Rungs.

Section - II

Q.4 Solve any four: **16**

a) What are SCADA System desirable Properties?
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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. **12**

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

Seat No.	

Set **S**

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 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 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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

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 _____.
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   b) Discrete Analog Signals
   c) Continuously Variables digital signals
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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 Acquisition
   b) Alarm processing
   c) Information Display
   d) All the above

SLR-FM-442

Seat No.	

Set S

B.E. (Part - I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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: **16**

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: **12**

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: **16**

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. **12**

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

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) 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) $x(n)\, y(n) \leftrightarrow x(z)y(z)$

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) $|z| = 1$ b) $|z| < 1$
   c) $|z| > 1$ d) can 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

4) 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 b) P+Q+1
   c) P+Q-1 d) P-Q-1

5) Goertzel algorithm evaluates the _____.
   a) DTFT coefficients b) DFT coefficients
   c) z- transform d) FT coefficient

6) The size of input data blocks in overlap add method is _____.
   a) L b) L+M
   c) L+M-1 d) 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) $\{2,3,-1\}$ d) $\{3,2,-2\}$

8) FIR filter is always stable because _____.
   a) all its poles one at origin b) all its zeros are at origin
   c) $h(n) = h(N-1-n)$ d) none of above

9) FIR filter is also known as _____ filter.
   a) Cascade structure b) Transversal
   c) ARMA d) AR

10) In Bilinear transformation the relation between Ω and w is _____.
   a) $\Omega = wt$ b) $\Omega = w/t$
   c) $\Omega = \tan(\Omega T)$ d) $\Omega = \frac{2}{T}\tan\left(\frac{w}{2}\right)$

11) Which of following is frequency domain & specification?
   a) $O \geq 20\log|H(j\Omega)|$ b) $20\log|H(j\Omega)| \geq k_p$
   c) $20\log|H(i\Omega)| \leq K_s$ d) All of above

12) 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

13) The basic process that's going on inside a DSP chip is _____.
   a) Quantization b) MAC
   c) Logorithmic transformation d) None

14) FIR filters have ____ and IIR filters have _____.
   a) zeros, poles & zeros b) poles & zeros, zeros
   c) zeros, zeros d) none of above

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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).

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 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.
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3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) FIR filter is always stable because _____.
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   c) $h(n) = h(N-1-n)$ d) none of above

2) FIR filter is also known as _____ filter.
   a) Cascade structure b) Transversal
   c) ARMA d) AR

3) In Bilinear transformation the relation between Ω and w is _____.
   a) $\Omega = wt$ b) $\Omega = w/t$
   c) $\Omega = \tan(\Omega T)$ d) $\Omega = \frac{2}{T}\tan\left(\frac{w}{2}\right)$

4) Which of following is frequency domain & specification?
   a) $O \geq 20\log|H(j\Omega)|$ b) $20\log|H(j\Omega)| \geq k_p$
   c) $20\log|H(i\Omega)| \leq K_s$ d) All of above

5) 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

6) The basic process that's going on inside a DSP chip is _____.
   a) Quantization b) MAC
   c) Logorithmic transformation d) None

7) FIR filters have ____ and IIR filters have _____.
   a) zeros, poles & zeros b) poles & zeros, zeros
   c) zeros, zeros d) none of above

8) 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) $x(n)\, y(n) \leftrightarrow x(z)y(z)$

9) Which of condition is to be satisfied for the fourier transform of a sequence to be equal as z- transform of same sequence?
   a) $|z| = 1$ b) $|z| < 1$
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10) What is the highest frequency that is contained in the sampled signal?
   a) 2 fs
   b) fs/2
   c) Fs
   d) None of above

11) 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
   b) P+Q+1
   c) P+Q-1
   d) P-Q-1

12) Goertzel algorithm evaluates the _____.
   a) DTFT coefficients
   b) DFT coefficients
   c) z- transform
   d) FT coefficient

13) The size of input data blocks in overlap add method is _____.
   a) L
   b) L+M
   c) L+M-1
   d) L+M+1

14) 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) $\{3,2,-2\}$

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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).

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) Goertzel algorithm evaluates the _____.
   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 because _____.
   a) all its poles one at origin b) all its zeros are at origin
   c) $h(n) = h(N-1-n)$ 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) $\Omega = wt$ b) $\Omega = w/t$
   c) $\Omega = \tan(\Omega T)$ d) $\Omega = \frac{2}{T}\tan\left(\frac{w}{2}\right)$

7) Which of following is frequency domain & specification?
   a) $O \geq 20\log|H(j\Omega)|$ b) $20\log|H(j\Omega)| \geq k_p$
   c) $20\log|H(i\Omega)| \leq K_s$ 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

10) FIR filters have ____ and IIR filters have _____.
   a) zeros, poles & zeros
   b) poles & zeros, zeros
   c) zeros, zeros
   d) none of above

11) 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) $x(n)\, y(n) \leftrightarrow x(z)y(z)$

12) Which of condition is to be satisfied for the fourier transform of a sequence to be equal as z- transform of same sequence?
   a) $|z| = 1$
   b) $|z| < 1$
   c) $|z| > 1$
   d) can never be equal

13) What is the highest frequency that is contained in the sampled signal?
   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
   b) P+Q+1
   c) P+Q-1
   d) P-Q-1

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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).

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) In Bilinear transformation the relation between Ω and w is _____.
   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 domain & specification?
   a) $O \geq 20\log|H(j\Omega)|$ b) $20\log|H(j\Omega)| \geq k_p$
   c) $20\log|H(i\Omega)| \leq K_s$ d) All of above

3) 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

4) The basic process that's going on inside a DSP chip is _____.
   a) Quantization b) MAC
   c) Logorithmic transformation d) None

5) FIR filters have ____ and IIR filters have _____.
   a) zeros, poles & zeros b) poles & zeros, zeros
   c) zeros, zeros d) none of above

6) 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) $x(n)\,y(n) \leftrightarrow x(z)y(z)$

7) Which of condition is to be satisfied for the fourier transform of a sequence to be equal as z- transform of same sequence?
   a) $|z| = 1$ b) $|z| < 1$
   c) $|z| > 1$ d) can never be equal

8) What is the highest frequency that is contained in the sampled signal?
   a) 2 fs b) fs/2
   c) Fs d) None of above

9) 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 b) P+Q+1
   c) P+Q-1 d) P-Q-1

10) Goertzel algorithm evaluates the _____.
   a) DTFT coefficients b) DFT coefficients
   c) z- transform d) FT coefficient

11) The size of input data blocks in overlap add method is _____.
   a) L b) L+M
   c) L+M-1 d) L+M+1

12) 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) $\{3,2,-2\}$

13) FIR filter is always stable because _____.
   a) all its poles one at origin b) all its zeros are at origin
   c) $h(n) = h(N-1-n)$ d) none of above

14) FIR filter is also known as _____ filter.
   a) Cascade structure b) Transversal
   c) ARMA d) AR

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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).

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) For low head and high discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine b) Francis turbine
   c) Pelton wheel d) Jonual turbine

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) Water is re circulated through turbine

3) Cost of operation of which plant is least _____.
   a) Gas turbine plant b) Thermal power plant
   c) Nuclear power plant d) Hydroelectric plant

4) A Pelton wheel is _____.
   a) Inward flow impulse turbine b) Outward flow impulse turbine
   c) Inward flow reaction turbine d) Axial flow impulse turbine

5) In which of the following power plant the availability of power is least reliable?
   a) Solar power plant b) Wind power plant
   c) Tidal power plant d) Geothermal power plant

6) Geothermal energy is _____
   a) A renewable energy resource b) alternative energy source
   c) inexhaustible energy source d) any of the above

7) 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

8) 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

9) 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

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

Seat No.	

Set **P**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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. **16**

a) Explain solar water heating system.
b) Describe solar thermal power system.
c) Classification of concentrating solar energy collectors.
d) Different methods of solar energy storage.
e) Brief the components wind energy conversion system.
f) Explain horizontal axis wind mills.

Q.3 Attempt any two. **12**

a) Explain savonious and durries wind mill operation with diagram.
b) Describe solar Photovoltaic technology.
c) Explain operating characteristics of wind turbine with graph.

Section – II

Q.3 Attempt any four. **16**

a) Explains types of biogas digesters.
b) Brief combustion characteristics of biogas.
c) Potential in India for geothermal energy.
d) What are resources of geothermal energy?
e) Describe tidal and wave energy.
f) Explain carnot cycle.

Q.4 Attempt any two. **12**

a) Explain fixed drum type biogas plant.
b) Explain double chamber biogas plant.
c) Explain tidal energy conversion system with proper diagram.

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

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 turbine b) Francis turbine
   c) Pelton wheel d) Jonual turbine

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

10) Cost of operation of which plant is least _____.
   a) Gas turbine plant b) Thermal power plant
   c) Nuclear power plant d) Hydroelectric plant

11) A Pelton wheel is _____.
   a) Inward flow impulse turbine b) Outward flow impulse turbine
   c) Inward flow reaction turbine d) Axial flow impulse turbine

12) In which of the following power plant the availability of power is least reliable?
   a) Solar power plant b) Wind power plant
   c) Tidal power plant d) Geothermal power plant

13) Geothermal energy is _____
   a) A renewable energy resource b) alternative energy source
   c) inexhaustible energy source d) any of the above

14) 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

Seat No.	

Set **Q**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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. **16**

a) Explain solar water heating system.
b) Describe solar thermal power system.
c) Classification of concentrating solar energy collectors.
d) Different methods of solar energy storage.
e) Brief the components wind energy conversion system.
f) Explain horizontal axis wind mills.

Q.3 Attempt any two. **12**

a) Explain savonious and durries wind mill operation with diagram.
b) Describe solar Photovoltaic technology.
c) Explain operating characteristics of wind turbine with graph.

Section – II

Q.3 Attempt any four. **16**

a) Explains types of biogas digesters.
b) Brief combustion characteristics of biogas.
c) Potential in India for geothermal energy.
d) What are resources of geothermal energy?
e) Describe tidal and wave energy.
f) Explain carnot cycle.

Q.4 Attempt any two. **12**

a) Explain fixed drum type biogas plant.
b) Explain double chamber biogas plant.
c) Explain tidal energy conversion system with proper diagram.

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) In which of the following power plant the availability of power is least reliable?
   a) Solar power plant b) Wind power plant
   c) Tidal power plant d) Geothermal power plant

2) Geothermal energy is _____
   a) A renewable energy resource b) alternative energy source
   c) inexhaustible energy source d) any of the above

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
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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

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)2
   c) (velocity of stream)3 d) 1/velocity of stream

11) For low head and high discharge, the hydraulic turbine used is _____.
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12) In pumped storage _____.
   a) Power is produced by means of pumps
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   c) Downstream water is pumped up-stream during off load periods
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13) Cost of operation of which plant is least _____.
   a) Gas turbine plant b) Thermal power plant
   c) Nuclear power plant d) Hydroelectric plant

14) A Pelton wheel is _____.
   a) Inward flow impulse turbine b) Outward flow impulse turbine
   c) Inward flow reaction turbine d) Axial flow impulse turbine

Seat No.	

Set **R**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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. **16**

a) Explain solar water heating system.
b) Describe solar thermal power system.
c) Classification of concentrating solar energy collectors.
d) Different methods of solar energy storage.
e) Brief the components wind energy conversion system.
f) Explain horizontal axis wind mills.

Q.3 Attempt any two. **12**

a) Explain savonious and durries wind mill operation with diagram.
b) Describe solar Photovoltaic technology.
c) Explain operating characteristics of wind turbine with graph.

Section – II

Q.3 Attempt any four. **16**

a) Explains types of biogas digesters.
b) Brief combustion characteristics of biogas.
c) Potential in India for geothermal energy.
d) What are resources of geothermal energy?
e) Describe tidal and wave energy.
f) Explain carnot cycle.

Q.4 Attempt any two. **12**

a) Explain fixed drum type biogas plant.
b) Explain double chamber biogas plant.
c) Explain tidal energy conversion system with proper diagram.

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) The load factor for which of hydroelectric plant is high _____.
   a) Run-off river plant without pondage
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   c) Storage reservoir plants
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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
   b) For irrigation purpose water connection
   c) It discharge excess water
   d) None

4) The voltage of a single solar cell is _____.
   a) 0.5 V b) 1V
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   c) (velocity of stream)3 d) 1/velocity of stream

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   c) Inward flow reaction turbine
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   c) inexhaustible energy source
   d) any of the above

12) 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

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

14) 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

Seat No.	

Set **S**

B.E. (Part – I) (New) (CBCS) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday, 17-12-2019 Max. Marks: 56
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. **16**

a) Explain solar water heating system.
b) Describe solar thermal power system.
c) Classification of concentrating solar energy collectors.
d) Different methods of solar energy storage.
e) Brief the components wind energy conversion system.
f) Explain horizontal axis wind mills.

Q.3 Attempt any two. **12**

a) Explain savonious and durries wind mill operation with diagram.
b) Describe solar Photovoltaic technology.
c) Explain operating characteristics of wind turbine with graph.

Section – II

Q.3 Attempt any four. **16**

a) Explains types of biogas digesters.
b) Brief combustion characteristics of biogas.
c) Potential in India for geothermal energy.
d) What are resources of geothermal energy?
e) Describe tidal and wave energy.
f) Explain carnot cycle.

Q.4 Attempt any two. **12**

a) Explain fixed drum type biogas plant.
b) Explain double chamber biogas plant.
c) Explain tidal energy conversion system with proper diagram.

Seat No.	

Set **P**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 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 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) During regenerative braking mode, back emf is _____ than supply voltage.
   a) Less b) More
   c) Equal to d) None of these

2) What is meant by plugging?
   a) Phase sequence of supply is reversed
   b) Disconnecting source
   c) Stored energy is dissipated
   d) All of these

3) Speed control of IM drives is possible from _____.
   a) Rotor side only b) Stator side only
   c) Stator and Rotor side d) None of these

4) 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.

5) 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

6) 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

7) 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

8) 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

9) Full Converter operates in _____ & _____ quadrant.
   a) First, Third
   b) First, Fourth
   c) First, Second
   d) Third, Fourth

10) With rotor resistance control using chopper; “the equivalent resistance included in the rotor winding of an I.M. is _____.
   a) $R + \delta$
   b) $R(1 - \delta)$
   c) $\frac{R}{(1-\delta)}$
   d) None of these

11) As rotor resistance increases the maximum torque of I.M. _____.
   a) Increases
   b) Decreases
   c) Does not change
   d) First increases and then decreases

12) 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) $\frac{\sqrt{3}\pi}{2} Vd$
   d) $\frac{1}{\sqrt{3}} Vd$

13) The efficiency by using rotor resistance control in I.M is _____.
   a) High
   b) Low
   c) Very high
   d) None of these

14) 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

Seat No.	

Set **P**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

a) 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.

e) Explain variable frequency control of multiple synchronous motors fed by V.S.I.

Q.5 Solve any Two. **12**

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 **Q**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 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 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) 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) $R + \delta$ b) $R(1 - \delta)$
   c) $\frac{R}{(1-\delta)}$ d) None of these

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) $\frac{\sqrt{3}\pi}{2} Vd$ d) $\frac{1}{\sqrt{3}} Vd$

6) The efficiency by using rotor resistance control in I.M is _____.
   a) High b) Low
   c) Very high d) 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 b) More
   c) Equal to d) None of these

9) What is meant by plugging?
   a) Phase sequence of supply is reversed
   b) Disconnecting source
   c) Stored energy is dissipated
   d) All of these

10) Speed control of IM drives is possible from _____.
   a) Rotor side only
   b) Stator side only
   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.	

Set **Q**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

a) 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.

e) Explain variable frequency control of multiple synchronous motors fed by V.S.I.

Q.5 Solve any Two. **12**

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**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 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 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) 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

2) 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

3) 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

4) 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

5) Full Converter operates in _____ & _____ quadrant.
   a) First, Third b) First, Fourth
   c) First, Second d) Third, Fourth

6) With rotor resistance control using chopper; “the equivalent resistance included in the rotor winding of an I.M. is _____.
   a) $R + \delta$ b) $R(1 - \delta)$
   c) $\frac{R}{(1-\delta)}$ d) None of these

7) As rotor resistance increases the maximum torque of I.M. _____.
   a) Increases
   b) Decreases
   c) Does not change
   d) First increases and then decreases

8) 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) $\frac{\sqrt{3}\pi}{2} Vd$ d) $\frac{1}{\sqrt{3}} Vd$

9) The efficiency by using rotor resistance control in I.M is _____.
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10) 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

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12) What is meant by plugging?
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13) Speed control of IM drives is possible from _____.
   a) Rotor side only b) Stator side only
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14) 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.

Seat No.	

Set **R**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

a) 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.

e) Explain variable frequency control of multiple synchronous motors fed by V.S.I.

Q.5 Solve any Two. **12**

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 **S**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 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 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) With rotor resistance control using chopper; “the equivalent resistance included in the rotor winding of an I.M. is _____.
   a) $R + \delta$ b) $R(1 - \delta)$
   c) $\frac{R}{(1-\delta)}$ d) None of these

2) As rotor resistance increases the maximum torque of I.M. _____.
   a) Increases
   b) Decreases
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3) In VSI I.M drives, r.m.s value of the fundamental phase voltage is _____.
   a) $\frac{\sqrt{2}}{\pi} Vd$ b) $\frac{\pi}{\sqrt{2}} Vd$
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4) The efficiency by using rotor resistance control in I.M is _____.
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5) Effect of friction torque is more pronounced _____.
   a) when drive is running on full load
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   c) when drive is being stop
   d) when drive is running at half the rated speed

6) During regenerative braking mode, back emf is _____ than supply voltage.
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7) What is meant by plugging?
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13) To save the energy during braking _____.
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   c) regenerative braking is used d) mechanical braking is used

14) Full Converter operates in _____ & _____ quadrant.
   a) First, Third b) First, Fourth
   c) First, Second d) Third, Fourth

Seat No.	

Set **S**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL DRIVES & CONTROL

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

a) 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.

e) Explain variable frequency control of multiple synchronous motors fed by V.S.I.

Q.5 Solve any Two. **12**

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 **P**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 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 Marks: 14

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

1) 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

2) 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

3) 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

4) 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

5) 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

6) Up to what voltage a cartridge type of fuse can be used?
   a) 400 V b) 11 KV
   c) 20 KV d) 33 KV

7) Protective relays can be designed to respond to _____.
   a) Light intensity, impedance b) Temperature, resistance, reactance
   c) Voltage and current d) All of these

8) For ground fault, which of the relay is preferred _____?
   a) Plain impedance relay
   b) Directional relay
   c) Reactance relay
   d) Overcurrent relay

9) 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

10) 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

11) 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

12) 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

13) 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

14) 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

Seat No.	

Set **P**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
Time:02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

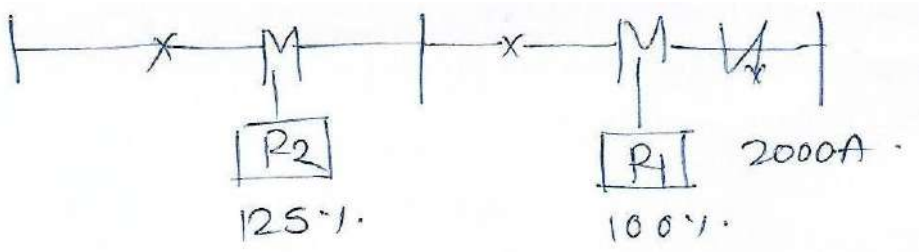
Q.2 Solve any Four **16**

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 **12**

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

PSM	2	3.6	5	8	10	15	20
Time in Sec	10	6	3.9	3.15	2.8	2.2	2.1



Section - II

Q.4 Solve any Four **16**

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.

Q.5 Solve any Two **12**

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.

Seat No.	

Set **Q**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 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 Marks: 14

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

1) For ground fault, which of the relay is preferred _____?
   a) Plain impedance relay b) Directional relay
   c) Reactance relay d) 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

8) 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

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) 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

Seat No.	

Set **Q**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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 **16**

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 **12**

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

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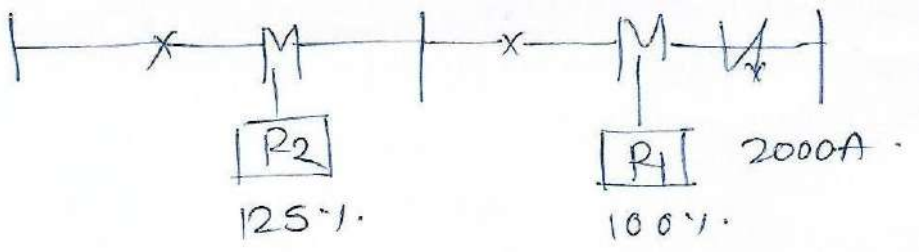

Section - II

Q.4 Solve any Four **16**

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.

Q.5 Solve any Two **12**

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.

Seat No.	

Set **R**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 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 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
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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

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   a) Bulk oil type b) Air blast
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7) In a single bus-bar system there will be complete shut down when _____.
   a) Fault occurs on the bus itself
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10) What happen in arc extinction using high resistance method?
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   a) Fact
   b) Sensitive
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   d) None of the above

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14) Protective relays are devices that detect abnormal conditions in circuits by measuring _____.
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Seat No.	

Set **R**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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 **16**

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 **12**

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

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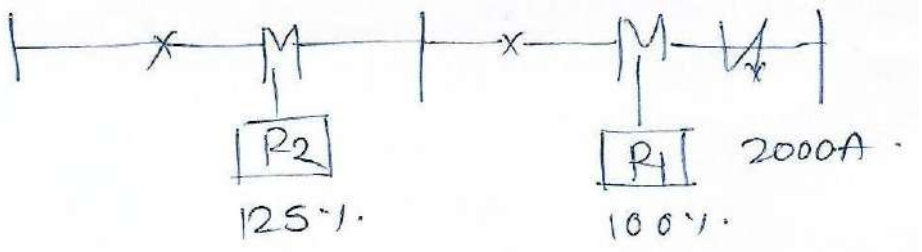

Section - II

Q.4 Solve any Four **16**

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.

Q.5 Solve any Two **12**

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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3) Critical value of resistance which will give no transient oscillation.
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Seat No.	

Set **S**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 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 Marks: 14

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

1) 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

2) In a single bus-bar system there will be complete shut down when _____.
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4) Why the resistance switching is used in air blast circuit breaker?
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   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

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Seat No.	

Set S

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
SWITCHGEAR & PROTECTION

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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 **16**

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 **12**

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

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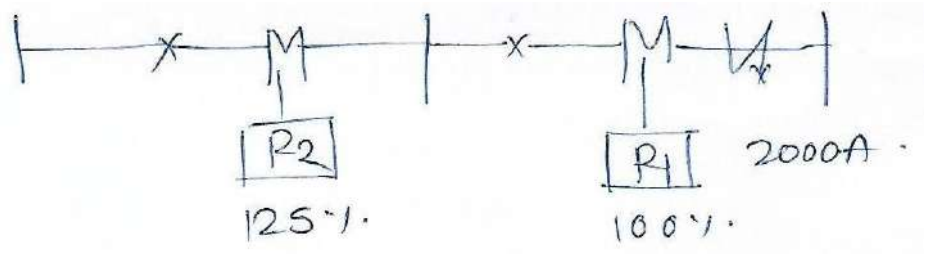

Section - II

Q.4 Solve any Four **16**

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.

Q.5 Solve any Two **12**

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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Seat No.	

Set **P**

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

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) 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 welding b) Spot welding
   c) Upset welding d) Flash welding

5) Maintenance requirements are least in case of _____.
   a) Electric locomotives b) Diesel locomotives
   c) Steam locomotives d) 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

9) Trapezoidal speed-time curve is the closer approximation for _____.
   a) main line service
   b) suburban service
   c) urban service
   d) urban and suburban service

10) Which of the following lamp gives nearly monochromatic light?
   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 _____.
   a) urban service
   b) sub-urban service
   c) main-line service
   d) equal for all types of services

13) Which of the following will need the highest level of illumination?
   a) Proof reading
   b) Bed rooms
   c) Hospital wards
   d) Railway platforms

14) 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 2001
   c) Indian Electricity Act 2010
   d) Energy Conservation Act 2007

Seat No.	

Set **P**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Section – II

Q.4 Solve any four of the following **16**

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 **12**

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.

Seat No.	

Set **Q**

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

Instructions: 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

Duration: 30 Minutes Marks: 14

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

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13) 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

14) The unit of luminous flux is _____.
   a) steradian
   b) candela
   c) lumen
   d) lux

Seat No.	

Set **Q**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Section – II

Q.4 Solve any four of the following **16**

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 **12**

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.

Seat No.	

Set **R**

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

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) Maintenance requirements are least in case of _____.
   a) Electric locomotives b) Diesel locomotives
   c) Steam locomotives 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 b) Schedule speed
   c) Notching speed d) Free running speed

3) The unit of luminous flux is _____.
   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
   c) urban service d) urban and suburban service

6) Which of the following lamp gives nearly monochromatic light?
   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
   c) work against the resistance to motion
   d) all of the above

8) Specific energy consumption is least in _____.
   a) urban service b) sub-urban service
   c) main-line service d) equal for all types of services

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 2001
   c) Indian Electricity Act 2010 d) Energy Conservation Act 2007

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.	

Set **R**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Section – II

Q.4 Solve any four of the following **16**

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 **12**

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.

Seat No.	

Set **S**

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

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) Which of the following lamp gives nearly monochromatic light?
   a) Sodium vapor lamp b) GLS lamp
   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
   c) work against the resistance to motion
   d) all of the above

3) Specific energy consumption is least in _____.
   a) urban service b) sub-urban service
   c) main-line service d) equal for all types of services

4) Which of the following will need the highest level of illumination?
   a) Proof reading b) Bed rooms
   c) Hospital wards d) Railway platforms

5) 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 2001
   c) Indian Electricity Act 2010 d) Energy Conservation Act 2007

6) In resistance furnace the atmosphere is _____.
   a) Oxidising b) Deoxidising
   c) Reducing d) Neutral

7) In direct arc furnace which of the following is of high value?
   a) Current b) Voltage
   c) Power Factor d) All of these

8) The main application of indirect arc furnace is to melt _____.
   a) Iron b) Steel
   c) Non-ferrous metals d) None of these

9) Projection welding can be considered as a mass production form of _____.
   a) Seam welding b) Spot welding
   c) Upset welding d) Flash welding

10) Maintenance requirements are least in case of _____.
   a) Electric locomotives
   b) Diesel locomotives
   c) Steam locomotives
   d) All of these

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
   d) Free running speed

12) The unit of luminous flux is _____.
   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
   d) urban and suburban service

Seat No.	

Set **S**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL UTILIZATION

Day & Date: Thursday, 12-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Section – II

Q.4 Solve any four of the following **16**

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 **12**

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.

Seat No.	

Set **P**

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

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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) How is the speed of operation of conventional relay system as compared to digital controllers?
   a) Very Slow b) Very Fast
   c) Same d) Almost Similar

2) The PLC is used in _____.
   a) machine tools
   b) automated assembly equipment
   c) moulding and extrusion machines
   d) all of the above

3) _____ is a method used to observe the operation or execution of a control 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.
   a) Normally Open Type b) Normally Closed Type
   c) Both a) And b) d) None of The Above

5) _____ of PLCs can be done in very little time.
   a) Programming b) Installation
   c) Commissioning d) All of the above

6) 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

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 _____.
   a) Physical layer
   b) Presentation Layer
   c) Network layer
   d) Transport layer

9) Talus 100 RTU and Talus 200 RTU are the product of _____ Company.
   a) ABB
   b) Motorola
   c) Rockwell Automation
   d) Schneider Electric

10) The important function of SCDA is _____.
   a) Data Acquisition
   b) Information Display
   c) Alarm processing
   d) All the above

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.
   a) FTP
   b) SMTP
   c) SNMP
   d) Telnet

13) Which of the following protocol used for HVAC control, Building Automation?
   a) Modbus
   b) Device Net
   c) DNP 3.0
   d) BACNet

14) High speed Ethernet works on _____.
   a) Coaxial cable
   b) Twisted pair cable
   c) Optical Fibre
   d) None of the mentioned

Seat No.	

Set **P**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Saturday,14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicate full marks.

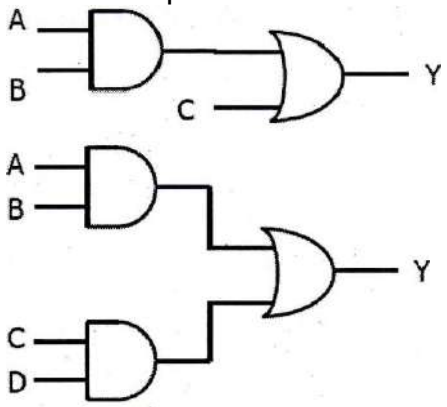
Section - I

Q.2 Solve any Four: **16**

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: **12**

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

I1	I2	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.

Section - II

Q.4 Solve any four: **16**

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. **12**

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.

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

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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) In OSI model layer No 6 consist of _____.
   a) Physical layer b) Presentation Layer
   c) Network layer d) Transport layer

2) Talus 100 RTU and Talus 200 RTU are the product of _____ Company.
   a) ABB b) Motorola
   c) Rockwell Automation d) Schneider Electric

3) The important function of SCDA is _____.
   a) Data Acquisition b) Information Display
   c) Alarm processing d) All the above

4) Ethernet frame consists of _____.
   a) MAC adder b) IP address
   c) both a) and b) d) none of the mentioned

5) _____ helps to transfer of files between computers.
   a) FTP b) SMTP
   c) SNMP d) Telnet

6) Which of the following protocol used for HVAC control, Building Automation?
   a) Modbus b) Device Net
   c) DNP 3.0 d) BACNet

7) High speed Ethernet works on _____.
   a) Coaxial cable b) Twisted pair cable
   c) Optical Fibre d) None of the mentioned

8) How is the speed of operation of conventional relay system as compared to digital controllers?
   a) Very Slow b) Very Fast
   c) Same d) Almost Similar

9) The PLC is used in _____.
   a) machine tools
   b) automated assembly equipment
   c) moulding and extrusion machines
   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
   b) Test rung scan
   c) Single 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 Type
   c) Both a) And b)
   d) None of The Above

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
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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.	

Set **Q**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Saturday,14-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicate full marks.

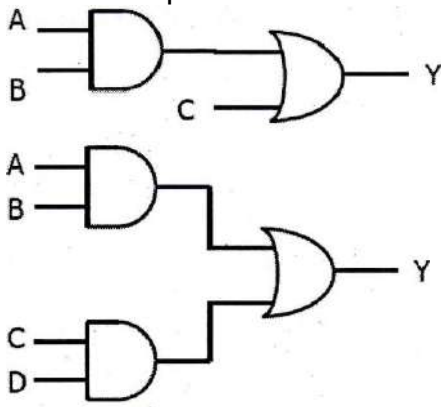
Section - I

Q.2 Solve any Four: **16**

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: **12**

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

I1	I2	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.

Section - II

Q.4 Solve any four: **16**

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. **12**

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.

Seat No.	

Set **R**

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

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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) _____ of PLCs can be done in very little time.
   a) Programming b) Installation
   c) Commissioning d) All of the above

2) 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

3) 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
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4) In OSI model layer No 6 consist of _____.
   a) Physical layer b) Presentation Layer
   c) Network layer d) Transport layer

5) Talus 100 RTU and Talus 200 RTU are the product of _____ Company.
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6) The important function of SCDA is _____.
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7) Ethernet frame consists of _____.
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   b) Normally Closed Type
   c) Both a) And b)
   d) None of The Above

Seat No.	

Set **R**

B.E. (Part - I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
PLC AND SCADA

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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: **16**

a) What are the different types of PLC timer? Explain OFF Delay (TOFF) timer.
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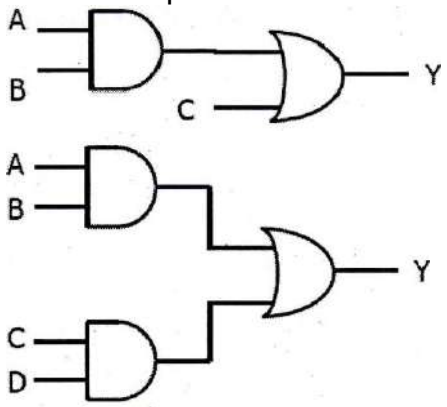
Q.3 Solve any Two: **12**

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

I1	I2	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.

Section - II

Q.4 Solve any four: **16**

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. **12**

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.

Seat 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

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 Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) The important function of SCDA is _____.
   a) Data Acquisition b) Information Display
   c) Alarm processing d) All the above

2) Ethernet frame consists of _____.
   a) MAC adder b) IP address
   c) both a) and b) d) none of the mentioned

3) _____ helps to transfer of files between computers.
   a) FTP b) SMTP
   c) SNMP d) Telnet

4) Which of the following protocol used for HVAC control, Building Automation?
   a) Modbus b) Device Net
   c) DNP 3.0 d) BACNet

5) High speed Ethernet works on _____.
   a) Coaxial cable b) Twisted pair cable
   c) Optical Fibre d) None of the mentioned

6) How is the speed of operation of conventional relay system as compared to digital controllers?
   a) Very Slow b) Very Fast
   c) Same d) Almost Similar

7) The PLC is used in _____.
   a) machine tools
   b) automated assembly equipment
   c) moulding and extrusion machines
   d) all of the above

8) _____ is a method used to observe the operation or execution of a control program one time.
   a) Step scan b) Test rung scan
   c) Single scan d) All of the above

9) When _____ contacts are actuated, they disrupt the power supply through them.
   a) Normally Open Type b) Normally Closed Type
   c) Both a) And b) d) None of The Above

10) _____ of PLCs can be done in very little time.
   a) Programming
   b) Installation
   c) Commissioning
   d) All of the above

11) 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

12) 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

13) In OSI model layer No 6 consist of _____.
   a) Physical layer
   b) Presentation Layer
   c) Network layer
   d) Transport layer

14) Talus 100 RTU and Talus 200 RTU are the product of _____ Company.
   a) ABB
   b) Motorola
   c) Rockwell Automation
   d) Schneider Electric

Seat 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: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figure to the right indicate full marks.

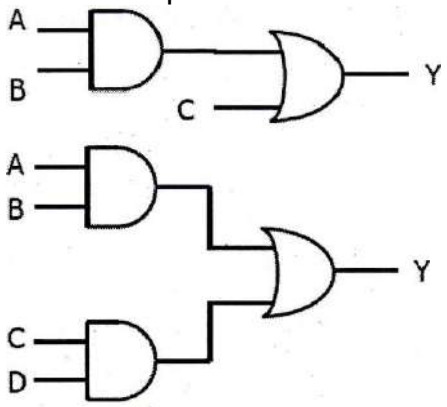
Section - I

Q.2 Solve any Four: **16**

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: **12**

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

I1	I2	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.

Section - II

Q.4 Solve any four: **16**

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. **12**

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.

Seat No.	

Set **P**

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

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. **14**

1) Fourier Transform of a train of impulse is _____.
   a) Sync function b) Train of impulse
   c) Modified sync d) 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 is _____.
   a) Overlap save b) Overlap add
   c) a & b d) None of above

7) Two digital filter can be operated in cascade, the same effect can be achieved by _____.
   a) adding their coefficient b) subtracting their coefficient
   c) convolving their coefficient d) averaging their coefficient

8) Application of convolution _____.
   a) FIR filtering b) Addition
   c) Manipulation d) None

9) IIR filter design is based on _____.
   a) Analog b) Digital
   c) Discrete time d) None

10) DWT is transform which captures _____.
   a) Frequency b) Location
   c) Frequency & location d) None

11) The basic process that's going on inside a DSP chip is _____.
   a) Quantization b) MAC
   c) Logarithmic transformation d) Vector calculation

12) For a Blackman window function the width of the main lobe is (M is length of filter).
   a) $12 * \mathrm{Pi} \times \mathrm{M}$ b) $\mathrm{Pi}/8\ \mathrm{M}$
   c) $\mathrm{Pi} * \mathrm{M}/8$ d) $12 * \mathrm{Pi}/\mathrm{M}$

13) Goertzel Algorithm evaluates the _____.
   a) DTFT coefficient b) DFT coefficient
   c) Z transform coefficient d) FT coefficient

14) FIR filters are _____ generally as sensitive to coefficient round off
   a) not b) less
   c) most d) none

Seat No.	

Set **P**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

a) If $H(z) = 8z^3 - 4z^2 + 11z - 2/(z - ¼)\ (z^2 - z + ½)$
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 **16**

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 **12**

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.

SLR-FM-450

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

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. 14

1) Application of convolution _____.
   a) FIR filtering b) Addition
   c) Manipulation d) None

2) IIR filter design is based on _____.
   a) Analog b) Digital
   c) Discrete time d) None

3) DWT is transform which captures _____.
   a) Frequency b) Location
   c) Frequency & location d) None

4) The basic process that's going on inside a DSP chip is _____.
   a) Quantization b) MAC
   c) Logarithmic transformation d) Vector calculation

5) For a Blackman window function the width of the main lobe is (M is length of filter).
   a) $12 * \mathrm{Pi} \times \mathrm{M}$ b) $\mathrm{Pi}/8\ \mathrm{M}$
   c) $\mathrm{Pi} * \mathrm{M}/8$ d) $12 * \mathrm{Pi}/\mathrm{M}$

6) Goertzel Algorithm evaluates the _____.
   a) DTFT coefficient b) DFT coefficient
   c) Z transform coefficient d) FT coefficient

7) FIR filters are _____ generally as sensitive to coefficient round off
   a) not b) less
   c) most d) none

8) Fourier Transform of a train of impulse is _____.
   a) Sync function b) Train of impulse
   c) Modified sync d) Rectangular window

9) 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) $e^{-j2\pi KN}$

10) 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

11) DFT of $x(n) = \delta(n)$
   a) 1 b) 0
   c) $w = e^{-j\frac{2\pi}{N}}$ d) None

12) DFT of $n(n) = \delta(n - n_0)$
   a) e^{-jwn_0} b) e^{jwn_0}
   c) 1 d) None

13) Fast Convolution techniques is _____.
   a) Overlap save b) Overlap add
   c) a & b d) None of above

14) Two digital filter can be operated in cascade, the same effect can be achieved by _____.
   a) adding their coefficient b) subtracting their coefficient
   c) convolving their coefficient d) averaging their coefficient

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: 56
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 **16**

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 **12**

a) If $H(z) = 8z^3 - 4z^2 + 11z - 2/(z - ¼)\ (z^2 - z + ½)$
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 **16**

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 **12**

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.

SLR-FM-450

Seat No.	

Set R

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

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. 14

1) DFT of $n(n) = \delta(n - n_0)$
   a) e^{-jwn_0} b) e^{jwn_0}
   c) 1 d) None

2) Fast Convolution techniques is _____.
   a) Overlap save b) Overlap add
   c) a & b d) None of above

3) Two digital filter can be operated in cascade, the same effect can be achieved by _____.
   a) adding their coefficient b) subtracting their coefficient
   c) convolving their coefficient d) averaging their coefficient

4) Application of convolution _____.
   a) FIR filtering b) Addition
   c) Manipulation d) None

5) IIR filter design is based on _____.
   a) Analog b) Digital
   c) Discrete time d) None

6) DWT is transform which captures _____.
   a) Frequency b) Location
   c) Frequency & location d) None

7) The basic process that's going on inside a DSP chip is _____.
   a) Quantization b) MAC
   c) Logarithmic transformation d) Vector calculation

8) For a Blackman window function the width of the main lobe is (M is length of filter).
   a) $12 * Pi \times M$ b) $Pi/8\ M$
   c) $Pi * M/8$ d) $12 * Pi/M$

9) Goertzel Algorithm evaluates the _____.
   a) DTFT coefficient b) DFT coefficient
   c) Z transform coefficient d) FT coefficient

10) FIR filters are _____ generally as sensitive to coefficient round off
   a) not b) less
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11) Fourier Transform of a train of impulse is _____.
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   a) $e^{(-j2\pi N)}$
   b) $e^{(-j2\pi/N)}$
   c) $e^{-j2\pi}$
   d) $e^{-j2\pi KN}$

13) 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

14) DFT of $x(n) = \delta(n)$
   a) 1
   b) 0
   c) $w = e^{-j\frac{2\pi}{N}}$
   d) None

Seat No.	

Set **R**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

a) If $H(z) = 8z^3 - 4z^2 + 11z - 2/(z - ¼)\ (z^2 - z + ½)$
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.
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using DIT FFT algorithm.

Section – II

Q.4 Solve any four **16**

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 **12**

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.

Seat No.	

Set **S**

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

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. **14**

1) DWT is transform which captures _____.
   a) Frequency b) Location
   c) Frequency & location d) None

2) The basic process that's going on inside a DSP chip is _____.
   a) Quantization b) MAC
   c) Logarithmic transformation d) Vector calculation

3) For a Blackman window function the width of the main lobe is (M is length of filter).
   a) $12 * \mathrm{Pi} \times \mathrm{M}$ b) $\mathrm{Pi}/8\ \mathrm{M}$
   c) $\mathrm{Pi} * \mathrm{M}/8$ d) $12 * \mathrm{Pi}/\mathrm{M}$

4) Goertzel Algorithm evaluates the _____.
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7) The compare valued phase factor W_N can be represented as _____.
   a) $\mathrm{e}^{(-\mathrm{j}2\pi\mathrm{N})}$ b) $\mathrm{e}^{(-\mathrm{j}2\pi/\mathrm{N})}$
   c) $\mathrm{e}^{-\mathrm{j}2\pi}$ d) $\mathrm{e}^{-\mathrm{j}2\pi\mathrm{KN}}$

8) 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

9) DFT of $\mathrm{x}(\mathrm{n}) = \delta(\mathrm{n})$
   a) 1 b) 0
   c) $\mathrm{w} = \mathrm{e}^{-\mathrm{j}\frac{2\pi}{\mathrm{N}}}$ d) None

10) DFT of $n(n) = \delta(n - n_0)$
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11) Fast Convolution techniques is _____.
   a) Overlap save b) Overlap add
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   a) adding their coefficient b) subtracting their coefficient
   c) convolving their coefficient d) averaging their coefficient

13) Application of convolution _____.
   a) FIR filtering b) Addition
   c) Manipulation d) None

14) IIR filter design is based on _____.
   a) Analog b) Digital
   c) Discrete time d) None

SLR-FM-450

Seat No.	

Set S

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
DIGITAL SIGNAL PROCESSING

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

a) If $H(z) = 8z^3 - 4z^2 + 11z - 2/(z - ¼)\ (z^2 - z + ½)$
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 **16**

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 **12**

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.

SLR-FM-451

Seat No.	

Set P

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

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. 14

1) 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

2) 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

3) Conservation laws that describe events involving the elementary particles include the conservation of _____.
   a) Energy b) Linear and angular momentum
   c) Electric charge d) Baryon and lepton number
   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 b) Management policy
   c) Energy policy d) Energy efficiency

5) Particles that participate in the strong nuclear interaction are called _____.
   a) Neutrinos b) Hadrons
   c) Leptons d) Electrons
   e) Photon

6) Which one is a secondary form of energy?
   a) Furnace oil b) Natural gas
   c) Electricity d) Coal

7) 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

8) Non-contact speed measurements can be carried out by _____.
   a) Tachometer b) Stroboscope
   c) Oscilloscope d) Speedometer

9) The future value of one dollar in “n” periods at interest rate of “I” present is known as _____.
   a) Single payment compound amount
   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

11) 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

12) A moderator is used to slow _____.
   a) Proton
   b) Alpha particles
   c) Neutron
   d) Beta particle
   e) Photon

13) 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

14) Acid rain is caused by the release of the following components from combustion of fuels _____.
   a) SOx and NOx
   b) Sox and CO_2
   c) CO_2 and NOx
   d) H_2O

Seat No.	

Set **P**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENERGY AUDIT & MANAGEMENT

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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 **12**

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

Seat No.	

Set **Q**

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

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. **14**

1) Non-contact speed measurements can be carried out by _____.
   a) Tachometer b) Stroboscope
   c) Oscilloscope d) Speedometer

2) The future value of one dollar in “n” periods at interest rate of “I” present is known as _____.
   a) Single payment compound amount
   b) Single payment present worth
   c) Uniform series compound amount
   d) Sinking fund payment

3) Lux meter is used to measure _____ (EA)
   a) Illumination level
   b) Sound intensity and illumination level
   c) Harmonics
   d) Speed

4) 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

5) A moderator is used to slow _____.
   a) Proton b) Alpha particles
   c) Neutron d) Beta particle
   e) Photon

6) 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

7) Acid rain is caused by the release of the following components from combustion of fuels _____.
   a) SOx and NOx b) Sox and CO_2
   c) CO_2 and NOx d) H_2O

8) 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

9) 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

10) Conservation laws that describe events involving the elementary particles include the conservation of _____.
   a) Energy b) Linear and angular momentum
   c) Electric charge d) Baryon and lepton number
   e) All of these are correct

11) The support for energy management is expressed in a formal written declaration of commitment. This is called _____.
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   c) Energy policy d) Energy efficiency

12) Particles that participate in the strong nuclear interaction are called _____.
   a) Neutrinos b) Hadrons
   c) Leptons d) Electrons
   e) Photon

13) Which one is a secondary form of energy?
   a) Furnace oil b) Natural gas
   c) Electricity d) Coal

14) 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

Seat No.	

Set **Q**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENERGY AUDIT & MANAGEMENT

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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 **12**

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

Seat No.	

Set **R**

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

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. 14

1) Particles that participate in the strong nuclear interaction are called _____.
   a) Neutrinos b) Hadrons
   c) Leptons d) Electrons
   e) Photon

2) Which one is a secondary form of energy?
   a) Furnace oil b) Natural gas
   c) Electricity d) Coal

3) 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

4) Non-contact speed measurements can be carried out by _____.
   a) Tachometer b) Stroboscope
   c) Oscilloscope d) Speedometer

5) The future value of one dollar in “n” periods at interest rate of “I” 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 slow _____.
   a) Proton b) Alpha particles
   c) Neutron d) Beta particle
   e) Photon

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 CO_2
   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?
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   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
   c) Electric charge
   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
   b) Management policy
   c) Energy policy
   d) Energy efficiency

Seat No.	

Set **R**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENERGY AUDIT & MANAGEMENT

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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 **12**

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

Seat No.	

Set **S**

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

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. **14**

1) Lux meter is used to measure _____ (EA)
   a) Illumination level
   b) Sound intensity and illumination level
   c) Harmonics
   d) Speed

2) 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

3) A moderator is used to slow _____.
   a) Proton b) Alpha particles
   c) Neutron d) Beta particle
   e) Photon

4) Sankey diagram is an useful tool to represent _____.
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   b) Management philosophy
   c) Input and output energy flow
   d) Human resource strength

5) Acid rain is caused by the release of the following components from combustion of fuels _____.
   a) SOx and NOx b) Sox and CO_2
   c) CO_2 and NOx d) H_2O

6) 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

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   a) Chemicals b) Water/air
   c) Recycle d) By product

8) Conservation laws that describe events involving the elementary particles include the conservation of _____.
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   c) Electric charge
   d) Baryon and lepton number
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   c) Energy policy
   d) Energy efficiency

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   a) Neutrinos
   b) Hadrons
   c) Leptons
   d) Electrons
   e) Photon

11) Which one is a secondary form of energy?
   a) Furnace oil
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   c) Electricity
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12) In material balance of a process, recycle product is always considered as _____.
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   b) output to process
   c) both (a) and (b)
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13) Non-contact speed measurements can be carried out by _____.
   a) Tachometer
   b) Stroboscope
   c) Oscilloscope
   d) Speedometer

14) The future value of one dollar in “n” periods at interest rate of “I” present is known as _____.
   a) Single payment compound amount
   b) Single payment present worth
   c) Uniform series compound amount
   d) Sinking fund payment

Seat No.	

Set **S**

B.E. (Part – I) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENERGY AUDIT & MANAGEMENT

Day & Date: Saturday, 14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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 **12**

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

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 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 right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Select appropriate options **14**

1) TSC- TCR type var generator is made for_____.
   a) dynamic compensation b) minimizing standly losses
   c) increasing operating flexibility d) all of the above

2) 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

3) 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

4) 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) $Q = (2V^2X/X_L)\,(1 - \sin\delta/2)$

5) In mid-point compensation Vsm & Vmr are _____.
   a) Same b) Different
   c) Unity d) None of above

6) 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

7) The area “A margin” between _____& _____represent transient stability margin of the system.
   a) $\delta_1 \& \delta_2$ b) $\delta_1 \& \pi/2$
   c) $\delta_3 \& \delta_{crit}$ d) None of the above

8) The voltage injection in transmission line is the method of _____.
   a) Series compensator b) Shunt compensator
   c) a + b d) none of above

9) The minimum losses produced by compensator is very loss in _____.
   a) TSSC b) GCSC
   c) TCSC d) SSSC

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
   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
   b) More
   c) the same
   d) all of the above.

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Max. Marks: 70
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 **16**

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=12Ω, P=56 kW. The Particulars of TCSC are $\delta=80^0$, C=20μF, 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 **12**

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 **16**

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 **12**

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.

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 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 right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Select 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 _____.
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4) 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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5) Passive filters acts as source of _____.
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6) The first commercially used HVDC link was built in _____.
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7) As compared to HVAC line, the corona and radio interference on a HVDC line are _____.
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   a) stepwise manner b) continuous manner
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   b) Magnitude of sending end voltage
   c) Phase angle between sending end & receiving end voltage
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   a) $Q = (2V^2/x)\,(1 - \cos\delta)$
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   c) $Q = E1\,E2/X\sin\delta$
   d) $Q = (2V^2X/X_L)\,(1 - \sin\delta/2)$

12) In mid-point compensation Vsm & Vmr are _____.
   a) Same
   b) Different
   c) Unity
   d) None of above

13) 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
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14) The area “A margin” between _____& _____represent transient stability margin of the system.
   a) $\delta_1 \& \delta_2$
   b) $\delta_1 \& \pi/2$
   c) $\delta_3 \& \delta_{crit}$
   d) None of the above

SLR-FM-453

Seat No.	

Set Q

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Max. Marks: 70
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 **16**

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=12Ω, P=56 kW. The Particulars of TCSC are $\delta=80^0$, C=20μF, 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 **12**

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 **16**

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 **12**

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.

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 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 right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Select appropriate options **14**

1) In mid-point compensation Vsm & Vmr are _____.
   a) Same b) Different
   c) Unity 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 b) Decreasing δ angle
   c) Comparing δ angle d) None of above

3) The area "A margin" between _____& _____represent transient stability margin of the system.
   a) $\delta_1 \& \delta_2$ b) $\delta_1 \& \pi/2$
   c) $\delta_3 \& \delta_{crit}$ d) None of the above

4) The voltage injection in transmission line is the method of _____.
   a) Series compensator b) Shunt compensator
   c) a + b d) none of above

5) The minimum losses produced by compensator is very loss in _____.
   a) TSSC b) GCSC
   c) TCSC d) SSSC

6) UPFC is an example of _____.
   a) Combined series -shunt controller
   b) Combined series- series controller
   c) series controller
   d) shunt controller

7) The best location for use of a booster transformer in a transmission line is _____.
   a) At the sending end b) At the receiving end
   c) At the intermediate point d) Anywhere in the line

8) Passive filters acts as source of _____.
   a) Active power b) Reactive power
   c) Apparent power d) Only (a) and (c)

9) The first commercially used HVDC link was built in _____.
   a) 2006 b) 1954
   c) 1986 d) yet to be built

10) 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.

11) TSC- TCR type var generator is made for_____.
   a) dynamic compensation
   b) minimizing standly losses
   c) increasing operating flexibility
   d) all of the above

12) 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
   b) Magnitude of sending end voltage
   c) Phase angle between sending end & receiving end voltage
   d) All of these

14) Reactive power a capacitive compensation is a _____.
   a) $Q = (2V^2/x)\ (1 - \cos\delta)$
   b) $Q = (V^2/X)\sin\ (\delta/2)$
   c) $Q = E1\ E2/X \sin\delta$
   d) $Q = (2V^2X/X_L)\ (1 - \sin\delta/2)$

SLR-FM-453

Seat No.	

Set R

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Max. Marks: 70
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 **16**

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=12Ω, P=56 kW. The Particulars of TCSC are $\delta=80^0$, C=20μF, 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 **12**

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 **16**

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 **12**

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.

Seat No.	

Set | S

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 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 right indicate full marks.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Select appropriate options **14**

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 b) At the receiving end
   c) At the intermediate point d) Anywhere in the line

3) Passive filters acts as source of _____.
   a) Active power b) Reactive 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

7) 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

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) $Q = (2V^2X/X_L)\,(1 - \sin\delta/2)$

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) $\delta_1 \& \pi/2$
   c) $\delta_3 \& \delta_{crit}$ 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 b) GCSC
   c) TCSC d) SSSC

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day & Date: Friday, 22-11-2019 Max. Marks: 70
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 **16**

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=12Ω, P=56 kW. The Particulars of TCSC are $\delta=80^0$, C=20μF, 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 **12**

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 **16**

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 **12**

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.

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

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 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 Marks: 14

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

1) Do's and Don'ts are observed carefully in safety precautions as per _____.
   a) IS 5216-1962 b) IS 5216-1964
   c) IS 5216-1966 d) IS 5216-1969

2) The torque of induction motor is _____.
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversly proportional to V d) Inversly proportional to V^2

3) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is _____.
   a) 2 sec b) 5 sec
   c) 8 sec d) 9.5 sec

4) In moisture proofness test, humidity is maintained to _____.
   a) 70% b) 80%
   c) 90% d) 110%

5) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour
   c) 30 min d) 5 min

6) For class A insulating material, maximum operating temperature is _____.
   a) 60^oC b) 90^oC
   c) 95^oC d) 105^oC

7) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5
   c) 2 d) 2.5

8) 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

9) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is _____.
   a) 100kv b) 150kv
   c) 220kv d) 325kv

10) Which of the following factors affects on life of insulating material?
   a) Temperature b) Deposition of dust
   c) Impurities d) All of these

11) In lead acid battery positive plate (anode) made up of _____.
   a) PbO_2 b) Pb
   c) SO_2 d) PbO_3

12) The type of ELCB are _____.
   a) Voltage operated b) Current operated
   c) Both a and b d) Frequency operated

13) While installing electrical machines, checking of foundation for correct level is to be carried out then, we use _____.
   a) Spirit level b) Dial indicator
   c) Bearing puller d) Filler gauge

14) For rotating machinery, the concrete foundation should be about _____ larger in length and breadth.
   a) 5 cms b) 15 cms
   c) 25 cms d) None of these

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 Balance	
			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. **12**

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
Shunt field resistance = 200 Ω
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. **16**

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. **12**

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.

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

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 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 Marks: 14

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

1) 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

2) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is _____.
   a) 100kv b) 150kv
   c) 220kv d) 325kv

3) Which of the following factors affects on life of insulating material?
   a) Temperature b) Deposition of dust
   c) Impurities d) All of these

4) In lead acid battery positive plate (anode) made up of _____.
   a) PbO_2 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, checking of foundation for correct level is to be carried out then, we use _____.
   a) Spirit level b) Dial indicator
   c) Bearing puller d) Filler gauge

7) For rotating machinery, the concrete foundation should be about _____ larger in length and breadth.
   a) 5 cms b) 15 cms
   c) 25 cms d) None of these

8) Do's and Don'ts are observed carefully in safety precautions as per _____.
   a) IS 5216-1962 b) IS 5216-1964
   c) IS 5216-1966 d) IS 5216-1969

9) The torque of induction motor is _____.
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversly proportional to V d) Inversly proportional to V^2

10) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is _____.
   a) 2 sec b) 5 sec
   c) 8 sec d) 9.5 sec

11) In moisture proofness test, humidity is maintained to _____.
   a) 70% b) 80%
   c) 90% d) 110%

12) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour
   c) 30 min d) 5 min

13) For class A insulating material, maximum operating temperature is _____.
   a) 60^oC b) 90^oC
   c) 95^oC d) 105^oC

14) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5
   c) 2 d) 2.5

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 Balance	
			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. **12**

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
Shunt field resistance = 200 Ω
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. **16**

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. **12**

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.

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

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 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 Marks: 14

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

1) In dielectric absorption test by using megger, insulation resistance is 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^oC b) 90^oC
   c) 95^oC d) 105^oC

3) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5
   c) 2 d) 2.5

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 _____.
   a) 100kv b) 150kv
   c) 220kv d) 325kv

6) Which of the following factors affects on life of insulating material?
   a) Temperature b) Deposition of dust
   c) Impurities d) All of these

7) In lead acid battery positive plate (anode) made up of _____.
   a) PbO_2 b) Pb
   c) SO_2 d) PbO_3

8) The type of ELCB are _____.
   a) Voltage operated b) Current operated
   c) Both a and b d) Frequency operated

9) While installing electrical machines, checking of foundation for correct level is to be carried out then, we use _____.
   a) Spirit level b) Dial indicator
   c) Bearing puller d) Filler gauge

10) For rotating machinery, the concrete foundation should be about _____ larger in length and breadth.
   a) 5 cms b) 15 cms
   c) 25 cms d) None of these

11) Do's and Don'ts are observed carefully in safety precautions as per _____.
   a) IS 5216-1962 b) IS 5216-1964
   c) IS 5216-1966 d) IS 5216-1969

12) The torque of induction motor is _____.
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversly proportional to V d) Inversly proportional to V^2

13) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is _____.
   a) 2 sec b) 5 sec
   c) 8 sec d) 9.5 sec

14) In moisture proofness test, humidity is maintained to _____.
   a) 70% b) 80%
   c) 90% d) 110%

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 Balance	
			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. **12**

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
Shunt field resistance = 200 Ω
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. **16**

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. **12**

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.

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

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 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 Marks: 14

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

1) Which of the following factors affects on life of insulating material?
   a) Temperature b) Deposition of dust
   c) Impurities d) All of these

2) In lead acid battery positive plate (anode) made up of _____.
   a) PbO_2 b) Pb
   c) SO_2 d) PbO_3

3) The type of ELCB are _____.
   a) Voltage operated b) Current operated
   c) Both a and b d) Frequency operated

4) While installing electrical machines, checking of foundation for correct level is to be carried out then, we use _____.
   a) Spirit level b) Dial indicator
   c) Bearing puller d) Filler gauge

5) For rotating machinery, the concrete foundation should be about _____ larger in length and breadth.
   a) 5 cms b) 15 cms
   c) 25 cms d) None of these

6) Do's and Don'ts are observed carefully in safety precautions as per _____.
   a) IS 5216-1962 b) IS 5216-1964
   c) IS 5216-1966 d) IS 5216-1969

7) The torque of induction motor is _____.
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversly proportional to V d) Inversly proportional to V^2

8) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is _____.
   a) 2 sec b) 5 sec
   c) 8 sec d) 9.5 sec

9) In moisture proofness test, humidity is maintained to _____.
   a) 70% b) 80%
   c) 90% d) 110%

10) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour
   c) 30 min d) 5 min

11) For class A insulating material, maximum operating temperature is _____.
   a) $60^{o}C$ b) $90^{o}C$
   c) $95^{o}C$ d) $105^{o}C$

12) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5
   c) 2 d) 2.5

13) 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

14) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is _____.
   a) 100kv b) 150kv
   c) 220kv d) 325kv

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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 Balance	
			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. **12**

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
Shunt field resistance = 200 Ω
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. **16**

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. **12**

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.

SLR-FM-455

Seat No.	

Set P

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 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.
3) Assume the suitable data wherever 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) Which among the following factors influence the cost of generation of electric power?
   a) Generator efficiency b) Fuel cost
   c) Transmission losses d) All of these

2) The most efficient unit is loaded first then the less efficient unit follow, is called _____.
   a) Priority ordering b) Dynamic Programming
   c) Patton's Security d) None of these

3) 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

4) 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

5) 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

6) 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 X^{th} unit
   d) Minimum Cost in Rs/hr of X MW by N^{th} unit

7) What is the result of frequency instability?
   a) Voltage collapse
   b) Frequency swings
   c) Tripping of generating units
   d) Both (b) and (c)

8) The real power transfer over a line depends mainly on _____.
   a) Power angle
   b) Sending end voltage V_s
   c) Receiving end voltage V_r
   d) $V_s - V_r$

9) What is the main cause of voltage instability?
   a) Generators
   b) Transformers
   c) Load
   d) 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

Seat No.	

Set **P**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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: **16**

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

$$\frac{dF1}{dP1} = 0.25P_1 + 40 \text{Rs/MWhr}$$

$$\frac{dF2}{dP2} = 0.20P_2 + 50 \text{Rs/MWhr}$$

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: **12**

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: **16**

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.

Q.5 Solve any two **12**

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.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 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.
3) Assume the suitable data wherever 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 real power transfer over a line depends mainly on _____.
   a) Power angle b) Sending end voltage V_s
   c) Receiving end voltage V_r d) $V_s - V_r$

2) What is the main cause of voltage instability?
   a) Generators b) Transformers
   c) Load d) Line losses

3) 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

4) 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

5) 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

6) 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

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

8) Which among the following factors influence the cost of generation of electric power?
   a) Generator efficiency
   b) Fuel cost
   c) 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
   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
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   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 X^{th} unit
   d) Minimum Cost in Rs/hr of X MW by N^{th} 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.	

Set **Q**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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: **16**

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

$$\frac{dF1}{dP1} = 0.25P_1 + 40 \text{Rs/MWhr}$$

$$\frac{dF2}{dP2} = 0.20P_2 + 50 \text{Rs/MWhr}$$

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: **12**

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: **16**

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.

Q.5 Solve any two **12**

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.	

Set | R

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 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.
3) Assume the suitable data wherever 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) How is the voltage and frequency controlled in automatic generation control?
   a) By controlling the excitation
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2) 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 X^{th} unit
   d) Minimum Cost in Rs/hr of X MW by N^{th} unit

3) What is the result of frequency instability?
   a) Voltage collapse b) Frequency swings
   c) Tripping of generating units d) Both (b) and (c)

4) The real power transfer over a line depends mainly on _____.
   a) Power angle b) Sending end voltage V_s
   c) Receiving end voltage V_r d) $V_s - V_r$

5) What is the main cause of voltage instability?
   a) Generators b) Transformers
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6) Why are the series capacitors used?
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   b) Reduce the fault level
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   c) An equation between electrical power generated to the angular displacement of stator windings
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9) If a power system observes an accumulated time error, it should correct it by _____.
   a) Increasing its own generation
   b) Decreasing its own generation
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   d) Any of the above

10) Which among these phenomenon is/are associated with angle stability?
   a) Imbalance between the two generator torque
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   c) Surplus energy is stored up in the rotating masses
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11) Which among the following factors influence the cost of generation of electric power?
   a) Generator efficiency
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12) The most efficient unit is loaded first then the less efficient unit follow, is called _____.
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13) 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

14) 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

Seat No.	

Set **R**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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: **16**

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

$$\frac{dF1}{dP1} = 0.25P_1 + 40 \text{Rs/MWhr}$$

$$\frac{dF2}{dP2} = 0.20P_2 + 50 \text{Rs/MWhr}$$

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: **12**

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: **16**

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.

Q.5 Solve any two **12**

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.	

Set | S

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 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.
3) Assume the suitable data wherever 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) 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
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4) If a power system observes an accumulated time error, it should correct it by _____.
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   d) Any of the above

5) Which among these phenomenon is/are associated with angle stability?
   a) Imbalance between the two generator torque
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   c) Surplus energy is stored up in the rotating masses
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   c) Patton's Security
   d) None of these

8) For economic operation, the generator with highest positive incremental transmission loss will operate at _____.
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   c) The highest positive incremental cost of production
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9) The rate of drop is frequency control inlet valve due to an increase in generation of power on prime mover is called _____.
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   b) Speed efficiency
   c) Governer operation
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10) How is the voltage and frequency controlled in automatic generation control?
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12) What is the result of frequency instability?
   a) Voltage collapse
   b) Frequency swings
   c) Tripping of generating units
   d) Both (b) and (c)

13) The real power transfer over a line depends mainly on _____.
   a) Power angle
   b) Sending end voltage V_s
   c) Receiving end voltage V_r
   d) V_s - V_r

14) What is the main cause of voltage instability?
   a) Generators
   b) Transformers
   c) Load
   d) Line losses

Seat No.	

Set **S**

B.E. (Part - II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM OPERATION AND CONTROL

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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: **16**

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

$$\frac{dF1}{dP1} = 0.25P_1 + 40 \text{Rs/MWhr}$$

$$\frac{dF2}{dP2} = 0.20P_2 + 50 \text{Rs/MWhr}$$

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: **12**

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
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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: **16**

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.

Q.5 Solve any two **12**

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.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS

Day & Date: Tuesday, 26-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) 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

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) 2 p.u.
   c) 1.0 p.u. d) 0.5 p.u.

3) If the excitation of the synchronous generator fails, it acts as a:
   a) Synchronous motor b) Synchronous generator
   c) Induction motor d) Induction generator

4) 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

5) 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)

6) 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)

7) 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

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
   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) $0^o < \delta < 45^o$
   b) $45^o < \delta < 90^o$
   c) $0° < \delta < 90^o$
   d) $0^o < \delta < 120^o$

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) Controls flow rate
   c) Controls volume
   d) Controls discharge

13) The excitation system and speed of alternator has _____.
   a) linear response
   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.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS

Day & Date: Tuesday, 26-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) 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
   b) Reduce the fault level
   c) Compensate for line inductive reactance and improve the stability of the power system
   d) Improves the power factor

3) What is the range of 'δ' for stable operation?
   a) $0^o < \delta < 45^o$
   b) $45^o < \delta < 90^o$
   c) $0° < \delta < 90^o$
   d) $0^o < \delta < 120^o$

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)

5) What is the purpose of a steam turbine governing?
   a) Controls speed b) Controls flow rate
   c) Controls volume d) Controls discharge

6) The excitation system and speed of alternator has _____.
   a) linear response
   b) exponential response
   c) Rectangular hyperbola response
   d) circular response

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:
   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 b) Voltage drop
   c) Stability limit d) Corona loss

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) (b) and (c)

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 No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS

Day & Date: Tuesday, 26-11-2019 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

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 _____.
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   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) $0^o < \delta < 45^o$
   b) $45^o < \delta < 90^o$
   c) $0° < \delta < 90^o$
   d) $0^o < \delta < 120^o$

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
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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 _____.
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   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 motor
   b) Synchronous generator
   c) Induction motor
   d) Induction generator

14) 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

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS

Day & Date: Tuesday, 26-11-2019 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

Duration: 30 Minutes Marks: 14

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

1) What is the range of 'δ' for stable operation?
   a) $0^o < \delta < 45^o$
   b) $45^o < \delta < 90^o$
   c) $0° < \delta < 90^o$
   d) $0^o < \delta < 120^o$

2) What is / 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)

3) What is the purpose of a steam turbine governing?
   a) Controls speed b) Controls flow rate
   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

5) 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

6) 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

7) 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.

8) If the excitation of the synchronous generator fails, it acts as a:
   a) Synchronous motor
   b) Synchronous generator
   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
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   c) decreases virtual surge impedance loading of the line
   d) (b) and (c)

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   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 _____.
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   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.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM DYNAMICS

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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. **12**

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.

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 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) Assume suitable data if necessary & mention it clearly.
3) 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) 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

2) 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

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 _____.
   a) less than 10^{-4} torr b) less than 10^{-2} torr
   c) less than 10^{-1} torr d) none of the above

4) 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

5) The breakdown of solid materials is roughly given by _____.
   a) $V_b t_b = \text{constant}$ b) $V_b \ln t_b = \text{constant}$
   c) $t_b \ln V_b = \text{constant}$ d) None of the above

6) 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

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 T_0
   d) None of the above is true

8) The insulation of the modern EHV lines is designed based on _____.
   a) The lightning voltage
   b) The switching voltage
   c) Corona
   d) 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 by _____.
   a) listening to hissing sound
   b) a high tan δ
   c) optical methods
   d) all of the above

12) Non-destructive testing methods require measurement of _____.
   a) Dielectric strength
   b) Insulation resistance
   c) tan δ
   d) (a) and (b)
   e) (b) and (c)

13) The mechanism responsible for dielectric loss in a dielectric are _____.
   a) Conduction
   b) Polarisation
   c) Ionisation
   d) (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
   c) higher frequency a.c. voltages and impulse voltage
   d) all kinds of voltages

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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 μA 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 μA 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. **12**

a) Derive the following expression by using townsend second ionization coefficient

$$n = \frac{\mathrm{n}_0 e^{\alpha d}}{1 - \mathrm{v}\,(e^{\alpha d} - 1)}$$

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. **16**

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. **12**

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.

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 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.
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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 insulation of the modern EHV lines is designed based on _____.
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   c) Standardization on the magnitude of voltage to be applied is available
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3) 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

4) Partial discharge can be detected by _____.
   a) listening to hissing sound b) a high tan δ
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5) Non-destructive testing methods require measurement of _____.
   a) Dielectric strength b) Insulation resistance
   c) tan δ d) (a) and (b)
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7) 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
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8) Liquids with solid impurities _____.
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   b) of large size have higher dielectric strength
   c) has lower dielectric strength as compared to pure liquids
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9) The electric field in a gas bubble which is immersed in a liquid of permittivity ε_z is _____.
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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 _____.
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   b) greater than 2 ppm
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   b) $V_b \ln t_b = \text{constant}$
   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 _____.
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   b) the electric stress is high at its corner
   c) the electric stress is same all along the samples
   d) No definite consideration

14) In case of impulse thermal breakdown of solid insulating materials, the critical electric filed is _____.
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   b) proportional to square of critical absolute temperature
   c) proportional to square of T_0
   d) None of the above is true

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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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 μA 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 μA 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. **12**

a) Derive the following expression by using townsend second ionization coefficient

$$n = \frac{\mathrm{n}_0 e^{\alpha d}}{1 - \mathrm{v}\,(e^{\alpha d} - 1)}$$

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. **16**

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. **12**

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.

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 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) Assume suitable data if necessary & mention it clearly.
3) 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) The breakdown of solid materials is roughly given by _____.
   a) $V_b t_b = \text{constant}$ b) $V_b \ln t_b = \text{constant}$
   c) $t_b \ln V_b = \text{constant}$ d) None of the above

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
   b) the electric stress is high at its corner
   c) the electric stress is same all along the samples
   d) No definite consideration

3) 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

4) The insulation of the modern EHV lines is designed based on _____.
   a) The lightning voltage b) The switching voltage
   c) Corona d) RI

5) 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

6) 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

7) Partial discharge can be detected by _____.
   a) listening to hissing sound b) a high tan δ
   c) optical methods d) all of the above

8) Non-destructive testing methods require measurement of _____.
   a) Dielectric strength
   b) Insulation resistance
   c) tan δ
   d) (a) and (b)
   e) (b) and (c)

9) The mechanism responsible for dielectric loss in a dielectric are _____.
   a) Conduction
   b) Polarisation
   c) Ionisation
   d) (a) and (b)
   e) (b) and (c)

10) 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
   c) higher frequency a.c. voltages and impulse voltage
   d) all kinds of voltages

11) 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

12) 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

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 _____.
   a) less than 10^{-4} torr
   b) less than 10^{-2} torr
   c) less than 10^{-1} torr
   d) none of the above

14) 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

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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 μA 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 μA 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. **12**

a) Derive the following expression by using townsend second ionization coefficient

$$n = \frac{\mathrm{n}_0 e^{\alpha d}}{1 - \mathrm{v}\,(e^{\alpha d} - 1)}$$

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. **16**

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. **12**

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.

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 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) Assume suitable data if necessary & mention it clearly.
3) 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) 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

2) Partial discharge can be detected by _____.
   a) listening to hissing sound b) a high tan δ
   c) optical methods d) all of the above

3) Non-destructive testing methods require measurement of _____.
   a) Dielectric strength b) Insulation resistance
   c) tan δ d) (a) and (b)
   e) (b) and (c)

4) The mechanism responsible for dielectric loss in a dielectric are _____.
   a) Conduction b) Polarisation
   c) Ionisation d) (a) and (b)
   e) (b) and (c)

5) 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
   c) higher frequency a.c. voltages and impulse voltage
   d) all kinds of voltages

6) 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

7) 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

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 _____.
   a) less than 10^{-4} torr
   b) less than 10^{-2} torr
   c) less than 10^{-1} torr
   d) none of the above

9) During reconditioning of transformer oil it is economical to use electrostatic filters if the water content of oil is _____.
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   b) greater than 2 ppm
   c) less than 2 ppm
   d) electrostatic filters are never used

10) The breakdown of solid materials is roughly given by _____.
   a) $V_b t_b = \text{constant}$
   b) $V_b \ln t_b = \text{constant}$
   c) $t_b \ln V_b = \text{constant}$
   d) None of the above

11) 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

12) 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

13) The insulation of the modern EHV lines is designed based on _____.
   a) The lightning voltage
   b) The switching voltage
   c) Corona
   d) RI

14) 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

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
HIGH VOLTAGE ENGINEERING

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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 μA 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 μA 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. **12**

a) Derive the following expression by using townsend second ionization coefficient

$$n = \frac{\mathrm{n}_0 e^{\alpha d}}{1 - \mathrm{v}\,(e^{\alpha d} - 1)}$$

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. **16**

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. **12**

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.

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 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 Marks: 14

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

1) The percentage of the incoming radiation reflected back to space by the earth is _____.
   a) 10% b) 20%
   c) 30% d) 40%

2) 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

3) Solar constant is_____.
   a) 140 Wm^{-2} b) 1.4 Wm^{-2}
   c) 1.4k Wm^{-2} d) 1.4 MWm^{-2}

4) The concentration-type solar collector _____.
   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

5) Use of booster mirrors with a flat plate collector _____.
   a) Increases the reflection to the atmosphere
   b) Decreases the reflection to the atmosphere
   c) Increases the diffused radiation component on the absorber
   d) Increases the beam radiation component on the absorber

6) Which of the following is a disadvantage of most of the renewable energy sources?
   a) Highly polluting b) High waste disposal cost
   c) Unreliable supply d) High running cost

7) The amount of energy available in the wind at any instant is proportional to_____ of the wind speed.
   a) Square root power of two b) Square root power of three
   c) Square power d) Cube power

8) The term biomass most often refers to_____.
   a) Inorganic matter b) Organic matter
   c) Chemicals d) Ammonium compounds

9) Biomass is useful to produce_____.
   a) Chemicals b) Fibres
   c) Biochemicals d) Transportation fuels

10) 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

11) 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

12) The following is (are) the visible sign(s) of the large amount of heat lying in the earth's interior _____.
   a) Volcanoes b) Geysers
   c) Hot springs d) All of the above

13) 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

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 No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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. **12**

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?

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 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 Marks: 14

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

1) The term biomass most often refers to_____.
   a) Inorganic matter b) Organic matter
   c) Chemicals d) Ammonium compounds

2) Biomass is useful to produce_____.
   a) Chemicals b) Fibres
   c) Biochemicals d) Transportation fuels

3) 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

4) 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

5) The following is (are) the visible sign(s) of the large amount of heat lying in the earth's interior _____.
   a) Volcanoes b) Geysers
   c) Hot springs d) All of the above

6) 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

7) 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

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} d) 1.4 MWm^{-2}

11) The concentration-type solar collector _____.
   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

12) Use of booster mirrors with a flat plate collector _____.
   a) Increases the reflection to the atmosphere
   b) Decreases the reflection to the atmosphere
   c) Increases the diffused radiation component on the absorber
   d) Increases the beam radiation component on the absorber

13) Which of the following is a disadvantage of most of the renewable energy sources?
   a) Highly polluting b) High waste disposal cost
   c) Unreliable supply d) High running cost

14) The amount of energy available in the wind at any instant is proportional to_____ of the wind speed.
   a) Square root power of two b) Square root power of three
   c) Square power d) Cube power

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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. **12**

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?

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 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 Marks: 14

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

1) Use of booster mirrors with a flat plate collector _____.
   a) Increases the reflection to the atmosphere
   b) Decreases the reflection to the atmosphere
   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?
   a) Highly polluting b) High waste disposal cost
   c) Unreliable supply d) High running cost

3) The amount of energy available in the wind at any instant is proportional to_____ of the wind speed.
   a) Square root power of two b) Square root power of three
   c) Square power d) Cube power

4) The term biomass most often refers to_____.
   a) Inorganic matter b) Organic matter
   c) Chemicals d) Ammonium compounds

5) Biomass is useful to produce_____.
   a) Chemicals b) Fibres
   c) Biochemicals d) Transportation fuels

6) 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

7) 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

8) The following is (are) the visible sign(s) of the large amount of heat lying in the earth's interior _____.
   a) Volcanoes
   b) Geysers
   c) Hot springs
   d) All of the above

9) 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

10) Two-basin tidal schemes _____.
   a) Are more economical than single basin schemes
   b) Operate on ebb cycles in both basins
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11) The percentage of the incoming radiation reflected back to space by the earth is _____.
   a) 10%
   b) 20%
   c) 30%
   d) 40%

12) Thousands of mirrors or curved metals are used to focus solar energy to make it very hot, in _____.
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   c) solar furnace
   d) solar battery

13) Solar constant is_____.
   a) 140 Wm^{-2}
   b) 1.4 Wm^{-2}
   c) 1.4k Wm^{-2}
   d) 1.4 MWm^{-2}

14) The concentration-type solar collector _____.
   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

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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. **12**

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?

Seat No.	

Set | S

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 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 Marks: 14

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

1) In energy farming, the plantation and harvesting is planned & managed so as to _____.
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   c) insure multiple harvesting per year
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2) Hot water or steam carrying geothermal energy often comes up to surface in _____.
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   c) Germany d) both a and b

3) The following is (are) the visible sign(s) of the large amount of heat lying in the earth's interior _____.
   a) Volcanoes b) Geysers
   c) Hot springs d) All of the above

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   c) Both a) and b) d) None of the above

5) 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

6) The percentage of the incoming radiation reflected back to space by the earth is _____.
   a) 10% b) 20%
   c) 30% d) 40%

7) 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

8) Solar constant is_____.
   a) 140 Wm^{-2} b) 1.4 Wm^{-2}
   c) 1.4k Wm^{-2} d) 1.4 MWm^{-2}

9) The concentration-type solar collector _____.
   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

10) Use of booster mirrors with a flat plate collector _____.
   a) Increases the reflection to the atmosphere
   b) Decreases the reflection to the atmosphere
   c) Increases the diffused radiation component on the absorber
   d) Increases the beam radiation component on the absorber

11) Which of the following is a disadvantage of most of the renewable energy sources?
   a) Highly polluting b) High waste disposal cost
   c) Unreliable supply d) High running cost

12) The amount of energy available in the wind at any instant is proportional 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 b) Organic matter
   c) Chemicals d) Ammonium compounds

14) Biomass is useful to produce_____.
   a) Chemicals b) Fibres
   c) Biochemicals d) Transportation fuels

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
RENEWABLE ENERGY SOURCES

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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. **12**

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?

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER QUALITY

Day & Date: Tuesday,26-11-2019 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 Marks: 14

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

1) 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

2) Shunt compensation in EHV line is resorted to ____.
   a) Improve voltage profile b) Reduce fault current
   c) Improve stability d) Increase current

3) The main reason for generation of harmonics in a transformer could be _____.
   a) fluctuating load b) poor insulation
   c) mechanical vibrations d) saturation of core

4) 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

5) What is the actuating quantity for the relays?
   a) Magnitude b) Frequency
   c) Phase angle d) All of these

6) Active filters are generally made up of _____.
   a) L circuits b) RL circuits
   c) RLC circuits d) RC circuits

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

8) Harmonics cause which of the following _____.
   a) All the Options are Correct b) Nuisance Tripping
   c) Capacitor Failure d) Heating in windings

9) 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

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
   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 noise
   c) All the options are correct
   d) DC offset

14) Continuous and rapid variations in the load current magnitude which causes voltage variations.
   a) Flicker
   b) Voltage distortion
   c) Harmonics
   d) Voltage sag

Seat No.	

Set **P**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER QUALITY

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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. **16**

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

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER QUALITY

Day & Date: Tuesday,26-11-2019 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 Marks: 14

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

1) Harmonics cause which of the following _____.
   a) All the Options are Correct b) Nuisance Tripping
   c) Capacitor Failure d) 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 by system overload?
   a) Brown out b) Black out
   c) Voltage surge d) Voltage dip

6) Which one of the following is waveform distortion?
   a) Notching b) Electrical noise
   c) All the options are correct d) DC offset

7) Continuous and rapid variations in the load current magnitude which causes voltage variations.
   a) Flicker b) Voltage distortion
   c) Harmonics 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

9) Shunt compensation in EHV line is resorted to ____.
   a) Improve voltage profile
   b) Reduce fault current
   c) Improve stability
   d) Increase current

10) The main reason for generation of harmonics in a transformer could be _____.
   a) fluctuating load
   b) poor insulation
   c) mechanical vibrations
   d) saturation of core

11) 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

12) What is the actuating quantity for the relays?
   a) Magnitude
   b) Frequency
   c) Phase angle
   d) All of these

13) Active filters are generally made up of _____.
   a) L circuits
   b) RL circuits
   c) RLC circuits
   d) RC circuits

14) 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

Seat No.	

Set **Q**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER QUALITY

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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. **16**

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

Seat No.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER QUALITY

Day & Date: Tuesday,26-11-2019 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 Marks: 14

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

1) What is the actuating quantity for the relays?
   a) Magnitude b) Frequency
   c) Phase angle d) All of these

2) Active filters are generally made up of _____.
   a) L circuits b) RL circuits
   c) RLC circuits d) RC circuits

3) 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

4) Harmonics cause which of the following _____.
   a) All the Options are Correct b) Nuisance Tripping
   c) Capacitor Failure d) Heating in windings

5) 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

6) 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
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7) 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

8) 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

9) Which one of the following is waveform distortion?
   a) Notching b) Electrical noise
   c) All the options are correct d) DC offset

10) Continuous and rapid variations in the load current magnitude which causes voltage variations.
   a) Flicker
   b) Voltage distortion
   c) Harmonics
   d) Voltage sag

11) 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

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
   c) 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.	

Set **R**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER QUALITY

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

a) Explain with neat diagram transients produced by:
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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 **16**

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.
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a) Define grounding. Explain reasons of grounding. Explain different problems associated with wiring and grounding.
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c) Explain with neat diagram following grounding systems:
1) Properly grounded electrical system
2) Isolated grounded electrical system

Seat No.	

Set | S

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER QUALITY

Day & Date: Tuesday,26-11-2019 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 Marks: 14

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

1) 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

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4) Which one of the following is waveform distortion?
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5) Continuous and rapid variations in the load current magnitude which causes voltage variations.
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   c) Harmonics d) Voltage sag

6) Which one of the following device is used for improving the power factor of the system?
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9) Which fractional pitch will eliminate the seventh harmonic from the voltage waveform of an alternator?
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   a) All the Options are Correct b) Nuisance Tripping
   c) Capacitor Failure d) Heating in windings

14) 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

Seat No.	

Set **S**

B.E. (Part – II) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER QUALITY

Day & Date: Tuesday,26-11-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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. **16**

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

Seat No.	

Set **P**

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

Day & Date: Saturday, 07-12-2019 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) Use of Non programmable Calculator is allowed

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 $\frac{1}{D^2}e^{2x}$ is _____.

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) $c_1e^{2x}+e^x\left[c_2cos\sqrt{3}x+c_3sin\sqrt{3}x\right]$

b) $c_1e^{-2x}+e^x\left[c_2cos\sqrt{3}x+c_3sin\sqrt{3}x\right]$

c) $c_1e^{x}+e^{2x}\left[c_2cos\sqrt{3}x+c_3sin\sqrt{3}x\right]$

d) $c_1e^{-x}+e^{2x}\left[c_2cos\sqrt{3}x+c_3sin\sqrt{3}x\right]$

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 _____.

a) $c_1+c_2x^2$ b) $x-\frac{1}{x^2}$

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

5) The solution of $\sqrt{p}+\sqrt{q}=1$ is _____.

a) $z=ax+a,y+c$ b) $z=ax+\left(1-\sqrt{a}\right)^2y+c$

c) $z=ax+a^2y+c$ d) None of these

6) If $Z\{1\}=$ _____.

a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$

c) $\frac{1}{z+1}$ d) $\frac{z}{z+1}$

7) Inverse Z Transform of $\frac{1}{z-a}$ $k \geq 1$ $|z| > a$ _____.

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) $e^{-3t}\frac{t^4}{4!}$ b) $e^{+3t}\frac{t^6}{6!}$

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 _____.

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) $4x - 6y + 8z$ b) $4xi - 6yj + 8z\,k$

c) 0 d) 3

11) 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 $\nabla.\psi(x, y, z)$ along $\bar{r}$

12) Fourier series of $f(x) = 1 - x^2$ in $(0,1)$ contains _____.

a) Only sine terms

b) Only cosine terms

c) Both sine and cosine terms

d) Neither sine terms nor cosine terms

13) In the internal $(0, \pi)$ the constant term in the sine series of $f(x) = x$ is _____.

a) $\pi/2$ b) π

c) $\pi/4$ d) 0

14) 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) $i + j + k$ d) None of these

Seat No.	

Set **P**

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

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

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 $(D^2 + 3D + 2)y = e^{e^x}$. **03**

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 $yp - x^2q = x^2y$. **03**

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 **03**
$\{x_k\} = c^k \cos \alpha k,\ k \geq 0$

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 **04**

$$\frac{d^2Q}{dt^2} + \frac{Q}{Lc} = \frac{E}{L}\sin nt$$

Then show that charge at any time t is given by

$Q = \frac{E}{2n^2L}[\sin nt - nt\cos nt]$ 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 **a)** Find Inverse Laplace Transform of $\log\sqrt{\frac{s^2+4}{s^2}}$ **03**

b) Find the laplace transform of $e^t\left(\int_0^t \frac{\sin(t)}{t}dt\right)$ **03**

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**

b) Obtain half range cosine series for $f(x) = \begin{cases} 1 & if\ 0 < x < l/2 \\ -1 & if\ l/2 < x < l \end{cases}$ **04**

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 $x = e^t\ cost + 10, y = e^t \sin t - 10$ at t=0. **03**

c) Find the value of n such that $r^n\vec{r}$ is solenoidal. **03**

Q.9 **a)** Find the fourier series of $f(x) = e^x\ in\ (0,2\pi)$ **06**

b) **Attempt any one of the following questions.** **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.	

Set **Q**

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

Day & Date: Saturday, 07-12-2019 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) Use of Non programmable Calculator is allowed

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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

1) $L^{-1}\left\{\frac{1}{(s+3)^5}\right\}$ is _____.

a) $e^{-3t}\frac{t^4}{4!}$ b) $e^{+3t}\frac{t^6}{6!}$

c) $e^{-3t}\frac{t^5}{5!}$ d) $e^{3t}\frac{t^6}{5!}$

2) 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) $5\cosh 5t$

3) 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

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 $\nabla.\psi(x, y, z)$ along $\bar{r}$

5) Fourier series of $f(x) = 1 - x^2$ in $(0,1)$ contains _____.

a) Only sine terms
b) Only cosine terms
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) $\pi/2$ b) π

c) $\pi/4$ d) 0

7) The directional derivative of $\phi = \mathrm{x} + \mathrm{y} + \mathrm{z}$ at $(1,1,1)$ is maximum along the vector _____.

a) $\mathrm{i} + 2\mathrm{j} + 2\mathrm{k}$ b) $2\mathrm{i} + 2\mathrm{j} - \mathrm{k}$

c) $\mathrm{i} + \mathrm{j} + \mathrm{k}$ d) None of these

8) The value of $\frac{1}{D^2}e^{2x}$ is _____.

a) $\frac{e^{2x}}{4}$ b) $\frac{e^{2x}}{3}$

c) $\frac{e^{2x}}{2}$ d) $\frac{e^{2x}}{9}$

9) The complimentary function of $(D^3 + 8)y = 0$ is _____.

a) $c_1e^{2x} + e^x\left[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x\right]$

b) $c_1e^{-2x} + e^x\left[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x\right]$

c) $c_1e^{x} + e^{2x}\left[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x\right]$

d) $c_1e^{-x} + e^{2x}\left[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x\right]$

10) 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) $e^{ax}V\frac{1}{f(D+a)}$

11) The Particular Integral of $(x^2D^2 + 2xD)y = \frac{1}{x^2}$ is _____.

a) $c_1 + c_2x^2$ b) $x - \frac{1}{x^2}$

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

12) The solution of $\sqrt{p} + \sqrt{q} = 1$ is _____.

a) $z = ax + a, y + c$ b) $z = ax + \left(1 - \sqrt{a}\right)^2 y + c$

c) $z = ax + a^2y + c$ d) None of these

13) If $\mathrm{Z}\{1\} =$ _____.

a) $\frac{\mathrm{z}}{\mathrm{z}-1}$ b) $\frac{1}{\mathrm{z}-1}$

c) $\frac{1}{\mathrm{z}+1}$ d) $\frac{\mathrm{z}}{\mathrm{z}+1}$

14) Inverse Z Transform of $\frac{1}{\mathrm{z}-\mathrm{a}}$ $\mathrm{k} \geq 1$ $|\mathrm{z}| > a$ _____.

a) $\mathrm{a}^{\mathrm{k}-1}$ b) $\mathrm{a}^{\mathrm{k}+1}$

c) $-\mathrm{a}^{\mathrm{k}+1}$ d) $-\mathrm{a}^{-\mathrm{k}-1}$

Seat No.	

Set **Q**

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

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

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 $(D^2 + 3D + 2)y = e^{e^x}$. **03**

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 $yp - x^2q = x^2y$. **03**

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 **03**
$\{x_k\} = c^k \cos \alpha k,\ k \geq 0$

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 **04**

$$\frac{d^2Q}{dt^2} + \frac{Q}{Lc} = \frac{E}{L}\sin nt$$

Then show that charge at any time t is given by

$Q = \frac{E}{2n^2L}[\sin nt - nt\cos nt]$ 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 **a)** Find Inverse Laplace Transform of $\log\sqrt{\frac{s^2+4}{s^2}}$ **03**

b) Find the laplace transform of $e^t\left(\int_0^t \frac{\sin(t)}{t}dt\right)$ **03**

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**

b) Obtain half range cosine series for $f(x) = \begin{cases} 1 & if\ 0 < x < l/2 \\ -1 & if\ l/2 < x < l \end{cases}$ **04**

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 $x = e^t\ cost + 10, y = e^t \sin t - 10$ at t=0. **03**

c) Find the value of n such that $r^n\vec{r}$ is solenoidal. **03**

Q.9 **a)** Find the fourier series of $f(x) = e^x\ in\ (0,2\pi)$ **06**

b) **Attempt any one of the following questions.** **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.	

Set **R**

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

Day & Date: Saturday, 07-12-2019 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) Use of Non programmable Calculator is allowed

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 $\sqrt{p}+\sqrt{q}=1$ is _____.
   a) $z=ax+a,y+c$ b) $z=ax+\left(1-\sqrt{a}\right)^2y+c$
   c) $z=ax+a^2y+c$ d) None of these

2) If $Z\{1\}=$ _____.
   a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$
   c) $\frac{1}{z+1}$ d) $\frac{z}{z+1}$

3) Inverse Z Transform of $\frac{1}{z-a}$ $k\geq 1$ $|z|>a$ _____.
   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 _____.
   a) $4x-6y+8z$ b) $4xi-6yj+8z\,k$
   c) 0 d) 3

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 $\nabla^2\psi(x,y,z)$ along $\bar{r}$
   c) Magnitude of $\nabla\psi(x,y,z)$ along $\bar{r}$
   d) Magnitude of $\nabla.\psi(x,y,z)$ along $\bar{r}$

8) Fourier series of $f(x) = 1 - x^2$ in $(0,1)$ contains _____.
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9) In the internal $(0, \pi)$ the constant term in the sine series of $f(x) = x$ is _____.
   a) $\pi/2$ b) π
   c) $\pi/4$ d) 0

10) The directional derivative of $\phi = \mathrm{x} + \mathrm{y} + \mathrm{z}$ at $(1,1,1)$ is maximum along the vector _____.
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   c) $\mathrm{i} + \mathrm{j} + \mathrm{k}$ d) None of these

11) The value of $\frac{1}{D^2} e^{2x}$ is _____.
   a) $\frac{e^{2x}}{4}$ b) $\frac{e^{2x}}{3}$
   c) $\frac{e^{2x}}{2}$ d) $\frac{e^{2x}}{9}$

12) The complimentary function of $(D^3 + 8)y = 0$ is _____.
   a) $c_1 e^{2x} + e^x \left[c_2 cos\sqrt{3}x + c_3 sin\sqrt{3}x\right]$
   b) $c_1 e^{-2x} + e^x \left[c_2 cos\sqrt{3}x + c_3 sin\sqrt{3}x\right]$
   c) $c_1 e^{x} + e^{2x} \left[c_2 cos\sqrt{3}x + c_3 sin\sqrt{3}x\right]$
   d) $c_1 e^{-x} + e^{2x} \left[c_2 cos\sqrt{3}x + c_3 sin\sqrt{3}x\right]$

13) 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) $e^{ax} V \frac{1}{f(D+a)}$

14) The Particular Integral of $(x^2 D^2 + 2xD)y = \frac{1}{x^2}$ is _____.
   a) $c_1 + c_2 x^2$ b) $x - \frac{1}{x^2}$
   c) $\frac{1}{x^2}$ d) $\frac{1}{2x^2}$

Seat No.	

Set **R**

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

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

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 $(D^2+3D+2)y = e^{e^x}$. **03**

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 $yp - x^2q = x^2y$. **03**

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 **03**
$\{x_k\} = c^k \cos \alpha k,\ k \geq 0$

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 **04**

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Then show that charge at any time t is given by

$Q = \frac{E}{2n^2L}[\sin nt - nt\cos nt]$ 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 **a)** Find Inverse Laplace Transform of $\log\sqrt{\frac{s^2+4}{s^2}}$ **03**

b) Find the laplace transform of $e^t\left(\int_0^t \frac{\sin(t)}{t}dt\right)$ **03**

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**

b) Obtain half range cosine series for $f(x) = \begin{cases} 1 & if\ 0 < x < l/2 \\ -1 & if\ l/2 < x < l \end{cases}$ **04**

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 $x = e^t\ cost + 10, y = e^t \sin t - 10$ at t=0. **03**

c) Find the value of n such that $r^n\vec{r}$ is solenoidal. **03**

Q.9 **a)** Find the fourier series of $f(x) = e^x\ in\ (0,2\pi)$ **06**

b) **Attempt any one of the following questions.** **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.	

Set **S**

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

Day & Date: Saturday, 07-12-2019 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) Use of Non programmable Calculator is allowed

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 curl (grad f), where $f = 2x^2 - 3y^2 + 4z^2$ is _____.
   a) $4\mathrm{x} - 6\mathrm{y} + 8\mathrm{z}$ b) $4\mathrm{xi} - 6\mathrm{yj} + 8\mathrm{z\,k}$
   c) 0 d) 3

2) 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 $\nabla^2\psi(\mathrm{x,y,z})$ along $\bar{r}$
   c) Magnitude of $\nabla\psi(x, y, z)$ along $\bar{r}$
   d) Magnitude of $\nabla.\psi(x, y, z)$ along $\bar{r}$

3) Fourier series of $f(x) = 1 - x^2$ in $(0,1)$ contains _____.
   a) Only sine terms
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4) In the internal $(0, \pi)$ the constant term in the sine series of $f(x) = x$ is _____.
   a) $\pi/2$ b) π
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5) The directional derivative of $\phi = \mathrm{x} + \mathrm{y} + \mathrm{z}$ at $(1,1,1)$ is maximum along the vector _____.
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   c) $\mathrm{i} + \mathrm{j} + \mathrm{k}$ d) None of these

6) The value of $\frac{1}{D^2}e^{2x}$ is _____.
   a) $\frac{e^{2x}}{4}$ b) $\frac{e^{2x}}{3}$
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7) The complimentary function of $(D^3 + 8)y = 0$ is _____.
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   c) $c_1e^{x} + e^{2x}\left[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x\right]$
   d) $c_1e^{-x} + e^{2x}\left[c_2cos\sqrt{3}x + c_3sin\sqrt{3}x\right]$

8) 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) $e^{ax}V\frac{1}{f(D+a)}$

9) The Particular Integral of $(x^2D^2+2xD)y=\frac{1}{x^2}$ is _____.

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12) Inverse Z Transform of $\frac{1}{z-a}$ $k\geq 1$ $|z|>a$ _____.

a) a^{k-1} b) a^{k+1}

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13) $L^{-1}\left\{\frac{1}{(s+3)^5}\right\}$ is _____.

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14) 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) $5\cosh 5t$

SLR-FM-720

Seat No.	

Set S

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

Day & Date: Saturday, 07-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

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.
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Section – I

Q.2 **a)** Solve $(D^2 + 3D + 2)y = e^{e^x}$. **03**

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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 **03**
$\{x_k\} = c^k \cos \alpha k,\ k \geq 0$

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 **04**

$$\frac{d^2Q}{dt^2} + \frac{Q}{Lc} = \frac{E}{L}\sin nt$$

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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 **a)** Find Inverse Laplace Transform of $\log\sqrt{\frac{s^2+4}{s^2}}$ **03**

b) Find the laplace transform of $e^t\left(\int_0^t \frac{\sin(t)}{t}dt\right)$ **03**

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b) Obtain half range cosine series for $f(x) = \begin{cases} 1 & if\ 0 < x < l/2 \\ -1 & if\ l/2 < x < l \end{cases}$ **04**

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 $x = e^t\ cost + 10, y = e^t \sin t - 10$ at t=0. **03**

c) Find the value of n such that $r^n\vec{r}$ is solenoidal. **03**

Q.9 **a)** Find the fourier series of $f(x) = e^x\ in\ (0,2\pi)$ **06**

b) **Attempt any one of the following questions.** **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.	

Set **P**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 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) 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

1) 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

2) 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

3) 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

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 b) voltage of conductor
   c) resultant force on conductor d) none of the above

6) 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

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.
   a) less than 15 A
   b) more than 15 A
   c) 15 A
   d) none of the above

10) The efficiencies of transformers compared with that of electric motors of the same power are.
   a) about the same
   b) much smaller
   c) much higher
   d) somewhat smaller

11) 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

12) A shunt generator delivers 195A at 250V. Ra=0.02 Ω and Rsh=50Ω. What 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

Seat No.	

Set **P**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Section – II

Q.4 Solve any four **16**

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 star-connected 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. **12**

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.

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 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) 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

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 b) more 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 smaller
   c) much higher d) somewhat smaller

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=50Ω. 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

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

9) 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

10) 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

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
   c) less than full-load current
   d) more than full-load current

12) 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

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

Seat No.	

Set **Q**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Section – II

Q.4 Solve any four **16**

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 star-connected 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. **12**

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.

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 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) 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

1) 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

2) 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

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

4) A transformer core is laminated to _____.
   a) reduce hysteresis loss b) reduce eddy current losses
   c) reduce copper losses 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

6) The efficiencies of transformers compared with that of electric motors of the same power are.
   a) about the same b) much smaller
   c) much higher d) somewhat smaller

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=50Ω. 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
   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

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

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

13) 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

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

Seat No.	

Set **R**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Section – II

Q.4 Solve any four **16**

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 star-connected 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. **12**

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.

Seat No.	

Set **S**

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 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) 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

1) The efficiencies of transformers compared with that of electric motors of the same power are.
   a) about the same b) much smaller
   c) much higher 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=50Ω. What is the value of generated emf?
   a) 246V b) 270V
   c) 254V d) 282V

4) Interpole flux should be sufficient to _____.
   a) neutralise the commutating self induced e.m.f
   b) neutralise the armature reaction flux
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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

6) 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

7) In case of D.C. shunt motors the speed is dependent on back e.m.f. only because _____.
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   b) armature drop is negligible
   c) flux is proportional to armature current
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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

9) In a D.C. shunt motor, under the conditions of maximum power, the current in the armature will be
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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 _____.
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   b) voltage of conductor
   c) resultant force on conductor
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11) Three point starter can be used for _____.
   a) series motor only
   b) shunt motor only
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12) The current drawn by the armature of D.C. motor is directly proportional to _____.
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   c) the voltage across the terminals
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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.		Set	S

S.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – I

Day & Date: Tuesday, 10-12-2019 Max. Marks: 56
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. **16**

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. **12**

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.

Section – II

Q.4 Solve any four **16**

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 star-connected 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. **12**

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.

Seat No.	

Set **P**

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

Day & Date: Thursday,12-12-2019 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.
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 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

2) In measurement systems, which of the following static characteristics are desirable?
   a) Accuracy b) Sensitivity
   c) Reproducibility d) All of the above

3) 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

4) 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

5) 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

6) 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

7) 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

8) 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

9) 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

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 _____.
   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

12) Maxwell's inductance-capacitance bridge is used for measurement of inductance of _____.
   a) Low Q coils
   b) Medium Q coils
   c) High Q coils
   d) Low and medium Q coils

13) An aquadag is used in a CRO to collect _____.
   a) Primary electrons
   b) Secondary emission electrons
   c) 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

Seat No.	

Set **P**

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

Day & Date: Thursday,12-12-2019 Max. Marks: 56
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. **16**

a) Explain the following terms:
1) repeatability 2) dead zone 3) resolution 4) static error

b) Write a short on synchroscope.

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^{-6}Nm/degree. Determine angular deflection at full scale.

Q.3 Attempt any two. **12**

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 90^0 at 1.5 A. is given by the expression $L=(200+ 40\theta - 4\theta^2 - \theta^3)$ μH 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. **16**

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. **12**

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.

Seat No.	

Set **Q**

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

Day & Date: Thursday,12-12-2019 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.
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 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

2) 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

3) Standardization of potentiometers is done in order that, they become
   a) Accurate b) Precise
   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
   c) Correct for changes in battery voltage
   d) Eliminate the effect of thermo-electric emfs

5) Maxwell's inductance-capacitance bridge is used for measurement of inductance of _____.
   a) Low Q coils b) Medium Q coils
   c) High Q coils d) Low and medium Q coils

6) An aquadag is used in a CRO to collect _____.
   a) Primary electrons
   b) Secondary emission electrons
   c) Both Primary and Secondary emission electrons
   d) None of the above

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 _____.
   a) Threshold
   b) Dynamic error
   c) Dead zone
   d) None of these

9) In measurement systems, which of the following static characteristics are desirable?
   a) Accuracy
   b) Sensitivity
   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
   d) None of the above

12) 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

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 _____.
   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

Seat No.	

Set **Q**

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

Day & Date: Thursday,12-12-2019 Max. Marks: 56
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. **16**

a) Explain the following terms:
1) repeatability 2) dead zone 3) resolution 4) static error

b) Write a short on synchroscope.

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^{-6}Nm/degree. Determine angular deflection at full scale.

Q.3 Attempt any two. **12**

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 90^0 at 1.5 A. is given by the expression $L=(200+ 40\theta - 4\theta^2 - \theta^3)$ μH 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. **16**

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. **12**

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.

Seat No.	

Set **R**

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

Day & Date: Thursday,12-12-2019 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.
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 _____.
   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

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 _____.
   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

4) 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

5) 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

6) Standardization of potentiometers is done in order that, they become
   a) Accurate b) Precise
   c) Accurate and direct reading d) Accurate and Precise

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 _____.
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   b) Eliminate the effect of resistance of leads
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8) Maxwell's inductance-capacitance bridge is used for measurement of inductance of _____.
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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?
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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

Seat No.	

Set **R**

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

Day & Date: Thursday,12-12-2019 Max. Marks: 56
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. **16**

a) Explain the following terms:
1) repeatability 2) dead zone 3) resolution 4) static error

b) Write a short on synchroscope.

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^{-6}Nm/degree. Determine angular deflection at full scale.

Q.3 Attempt any two. **12**

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 90^0 at 1.5 A. is given by the expression $L=(200+ 40\theta - 4\theta^2 - \theta^3)$ μH 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. **16**

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. **12**

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.

Seat No.	

Set **S**

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

Day & Date: Thursday,12-12-2019 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.
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) Standardization of potentiometers is done in order that, they become
   a) Accurate b) Precise
   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 _____.
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   b) Eliminate the effect of resistance of leads
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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 d) Low and medium Q coils

4) An aquadag is used in a CRO to collect _____.
   a) Primary electrons
   b) Secondary emission electrons
   c) Both Primary and Secondary emission electrons
   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
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   d) Post-accelerating

6) 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

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10) In an electrodynamometer type of wattmeters _____.
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12) The ratio of transformation in the case of potential transformers _____.
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14) Nominal ratio of a current transformer is _____.
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   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

Seat No.		Set	S

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

Day & Date: Thursday,12-12-2019 Max. Marks: 56
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. **16**

a) Explain the following terms:
1) repeatability 2) dead zone 3) resolution 4) static error

b) Write a short on synchroscope.

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^{-6}Nm/degree. Determine angular deflection at full scale.

Q.3 Attempt any two. **12**

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 90^0 at 1.5 A. is given by the expression $L=(200+ 40\theta - 4\theta^2 - \theta^3)$ μH 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. **16**

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. **12**

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.

Seat No.	

Set **P**

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

Day & Date: Saturday,14-12-2019 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) 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 equipment installed in power plants to reduce air pollution due to smoke is _____.
   a) Induced draft fans b) De-super heaters
   c) Electrostatic precipitators d) Re-heaters

2) Which of the following enters the super heater of a boiler?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam

3) For high head and minimum discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine b) Francis turbine
   c) Pelton wheel d) None of the above

4) Which auxiliary of gas turbine consumes most of the power?
   a) Compressor b) Combustion chamber
   c) Burner d) Fuel pump

5) A Thermalpower plant works on _____.
   a) Carnot cycle b) Brayton cycle
   c) Dual cycle d) Rankine cycle

6) Diesel engines for power plants are usually _____.
   a) Horizontal b) Supercharged
   c) Slow speed d) Air cooled

7) A surge tank is provided near _____.
   a) Penstock b) Trash rack
   c) Spillway d) Turbine

8) Running cost of which plant is least?
   a) Hydroelectric plant b) Thermal power plant
   c) Nuclear power plant d) Gas turbine plant

9) Water is supplied to a boiler _____.
   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

10) 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

11) In a steam turbine cycle, the lowest pressure occurs in _____.
   a) turbine inlet
   b) condenser
   c) boiler
   d) super heater

12) A graphical representation of the discharge and time is known as: _____.
   a) Load curve
   b) Load-duration curve
   c) Monograph
   d) Hydrograph

13) In a steam power plant water is used for cooling purposes in _____.
   a) boiler
   b) economizer
   c) condenser
   d) super-heaters

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

Seat No.	

Set **P**

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

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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.

Q.5 Solve any two **12**

a) With brief layout explain solar thermal power plant.

b) 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 **Q**

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

Day & Date: Saturday,14-12-2019 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) 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) Running cost of which plant is least?
   a) Hydroelectric plant b) Thermal power plant
   c) Nuclear power plant d) Gas turbine plant

2) Water is supplied to a boiler _____.
   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

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 b) economizer
   c) condenser d) super-heaters

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

8) The equipment installed in power plants to reduce air pollution due to smoke is _____.
   a) Induced draft fans b) De-super heaters
   c) Electrostatic precipitators d) Re-heaters

9) Which of the following enters the super heater of a boiler?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam

10) For high head and minimum discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine b) Francis turbine
   c) Pelton wheel d) None of the above

11) Which auxiliary of gas turbine consumes most of the power?
   a) Compressor 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 _____.
   a) Horizontal b) Supercharged
   c) Slow speed d) Air cooled

14) A surge tank is provided near _____.
   a) Penstock b) Trash rack
   c) Spillway d) Turbine

Seat No.	

Set **Q**

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

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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.

Q.5 Solve any two **12**

a) With brief layout explain solar thermal power plant.

b) 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**

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

Day & Date: Saturday,14-12-2019 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) 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) A Thermalpower plant works on _____.
   a) Carnot cycle b) Brayton cycle
   c) Dual cycle d) Rankine cycle

2) Diesel engines for power plants are usually _____.
   a) Horizontal b) Supercharged
   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 _____.
   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

6) 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

7) In a steam turbine cycle, the lowest pressure occurs in _____.
   a) turbine inlet b) condenser
   c) boiler d) super heater

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

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

11) The equipment installed in power plants to reduce air pollution due to smoke is _____.
   a) Induced draft fans
   b) De-super heaters
   c) Electrostatic precipitators
   d) Re-heaters

12) Which of the following enters the super heater of a boiler?
   a) Cold water
   b) Hot water
   c) Wet steam
   d) Super-heated steam

13) For high head and minimum discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine
   b) Francis turbine
   c) Pelton wheel
   d) None of the above

14) Which auxiliary of gas turbine consumes most of the power?
   a) Compressor
   b) Combustion chamber
   c) Burner
   d) Fuel pump

Seat No.	

Set **R**

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

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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.

Q.5 Solve any two **12**

a) With brief layout explain solar thermal power plant.

b) 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 **S**

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

Day & Date: Saturday,14-12-2019 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) 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 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

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 b) Load-duration curve
   c) Monograph d) Hydrograph

4) In a steam power plant water is used for cooling purposes in _____.
   a) boiler b) economizer
   c) condenser d) super-heaters

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

6) The equipment installed in power plants to reduce air pollution due to smoke is _____.
   a) Induced draft fans b) De-super heaters
   c) Electrostatic precipitators d) Re-heaters

7) Which of the following enters the super heater of a boiler?
   a) Cold water b) Hot water
   c) Wet steam d) Super-heated steam

8) For high head and minimum discharge, the hydraulic turbine used is _____.
   a) Kaplan turbine b) Francis turbine
   c) Pelton wheel d) None of the above

9) Which auxiliary of gas turbine consumes most of the power?
   a) Compressor b) Combustion chamber
   c) Burner d) Fuel pump

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 _____.
   a) Horizontal
   b) Supercharged
   c) Slow speed
   d) Air cooled

12) A surge tank is provided near _____.
   a) Penstock
   b) Trash rack
   c) Spillway
   d) Turbine

13) Running cost of which plant is least?
   a) Hydroelectric plant
   b) Thermal power plant
   c) Nuclear power plant
   d) Gas turbine plant

14) Water is supplied to a boiler _____.
   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.	

Set **S**

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

Day & Date: Saturday,14-12-2019 Max. Marks: 56
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 **16**

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 **12**

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 **16**

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.

Q.5 Solve any two **12**

a) With brief layout explain solar thermal power plant.

b) 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 **P**

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

Day & Date: Tuesday,17-12-2019 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 Page No.3
2) Assume suitable data if required.
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**

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 _____.
   a) voltage divider biasing
   b) base resistance biasing
   c) emitter resistor biasing
   d) feedback resistor biasing

3) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
   a) True b) False

4) The unit of h_{ie} parameter is _____.
   a) Mho b) Farad
   c) Ohm d) Unitless

5) 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 b) II & III
   c) Only I d) None of these

6) An FET is _____.
   a) Bipolar transistor b) Unipolar transistor
   c) Tri-polar transistor d) None of these

7) The ideal value of input impedance of JFET is _____.
   a) Zero b) Infinite
   c) Non zero d) None of these

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) 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.	

Set **P**

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

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

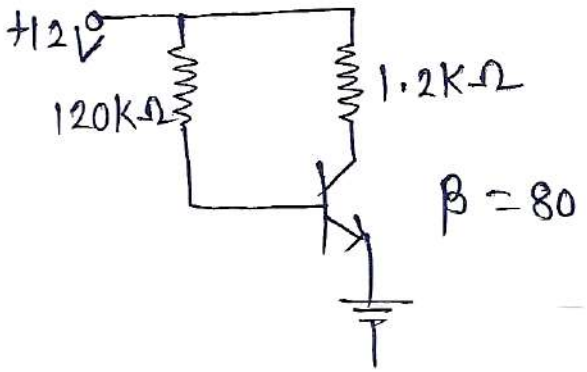
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four **16**

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.



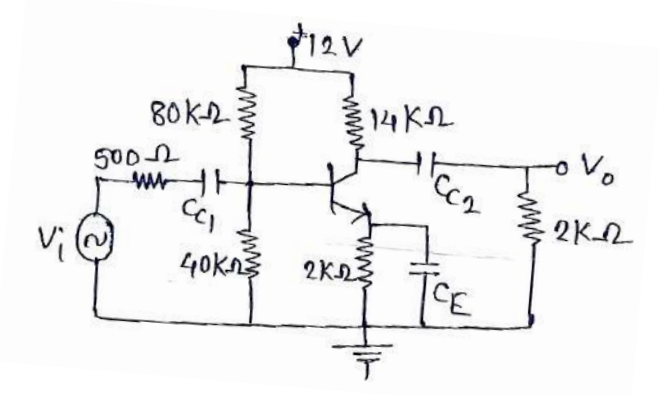
c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.

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 **12**

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.



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 **16**

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. **12**

a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at 2KΩ 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.

Seat No.	

Set **Q**

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

Day & Date: Tuesday,17-12-2019 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 Page No.3
2) Assume suitable data if required.
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**

1) The unit of h_{ie} parameter is _____.
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4) The ideal value of input impedance of JFET is _____.
   a) Zero b) Infinite
   c) Non zero d) None of these

5) 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
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6) The biasing circuit that gives best stability to Q point is _____.
   a) voltage divider biasing
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   c) emitter resistor biasing
   d) feedback resistor biasing

7) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
   a) True b) False

8 to 11: Match the correct pairs

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12) The input impedance of voltage series feedback amplifier, with negative feedback _____.
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   b) Becomes zero
   c) Increases
   d) Is unchanged

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.	

Set **Q**

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

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

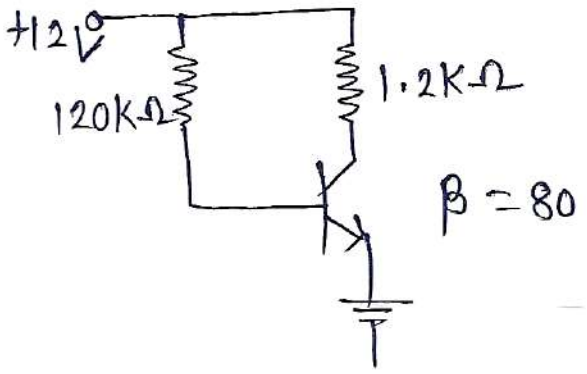
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four **16**

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.



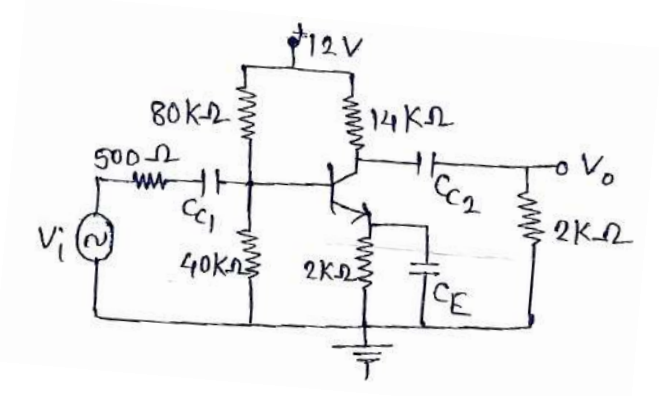
c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.

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 **12**

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.



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 **16**

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. **12**

a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at 2KΩ 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.

Seat No.	

Set **R**

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

Day & Date: Tuesday,17-12-2019 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 Page No.3
2) Assume suitable data if required.
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**

1) An FET is _____.
   a) Bipolar transistor b) Unipolar transistor
   c) Tri-polar transistor d) None of these

2) The ideal value of input impedance of JFET is _____.
   a) Zero b) Infinite
   c) Non zero d) None of these

3) 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

4) The biasing circuit that gives best stability to Q point is _____.
   a) voltage divider biasing
   b) base resistance biasing
   c) emitter resistor biasing
   d) feedback resistor biasing

5) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
   a) True b) False

6) The unit of h_{ie} parameter is _____.
   a) Mho b) Farad
   c) Ohm d) Unitless

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 b) II & III
   c) Only I d) None of these

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) 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.	

Set **R**

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

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

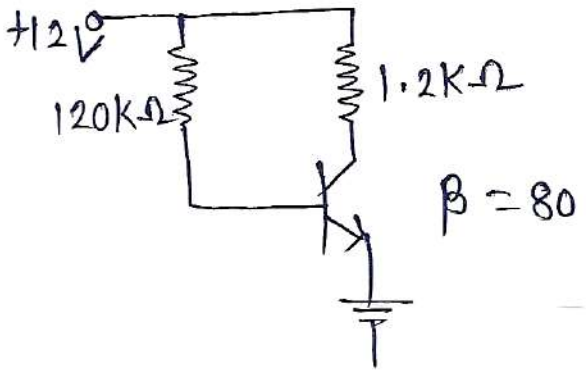
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four **16**

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.



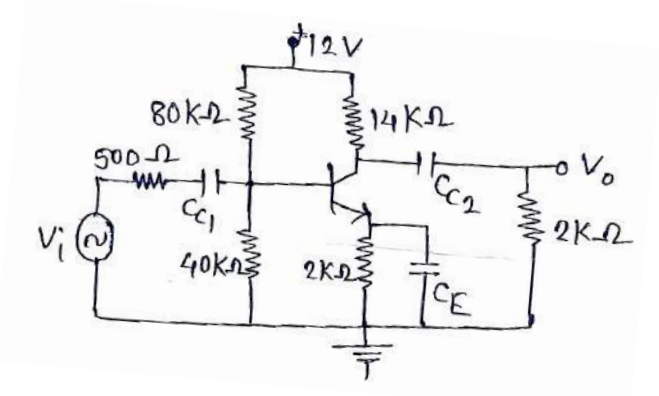
c) Explain drain & transfer characteristics of p channel enhancement type MOSFET with neat diagram.

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 **12**

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.



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 **16**

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. **12**

a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at 2KΩ 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.

Seat No.	

Set **S**

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

Day & Date: Tuesday,17-12-2019 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 Page No.3
2) Assume suitable data if required.
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**

1) The biasing circuit that gives best stability to Q point is _____.
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   c) emitter resistor biasing
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2) The frequency response of BJT amplifier in low frequency region decreases with decrease in frequency.
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   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.	

Set **S**

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

Day & Date: Tuesday,17-12-2019 Max. Marks: 56
Time: 10:00 AM To 01:00 PM

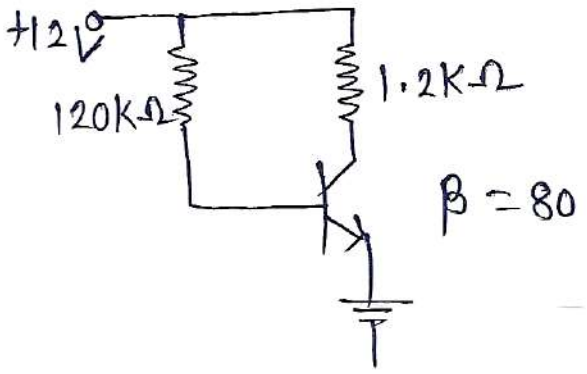
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Section – I

Q.2 Solve any four **16**

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.

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2) Amplification factor
3) DC drain resistance
4) Transconductance

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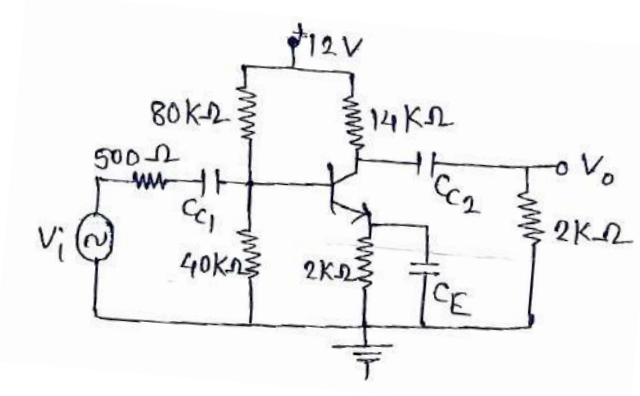
a) Determine the amplifier parameters current gain, voltage gain, input impedance and output impendence and output for the given CE amplifier, has h_{ie}=5 Kohm, $h_{re}=3*10^{-4}$, h_{fe}=140 $h_{oe}=8.8*10^{-5}$ A/V.



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 **16**

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b) Differentiate between positive & negative feedback amplifiers.

c) Explain crossover distortion in power amplifier with suitable diagram.

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a) Design stabilized power supply using inductor filter to give DC output voltage of 33V at 2KΩ 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.

SLR-FM-725

Seat No.	

Set P

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Max. Marks: 70
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

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

1) Modification of _____ is called Romberg's method.
   a) Trapezoidal Rule b) Simson's (1/3)rd Rule
   c) Simpson's (3/8)th Rule d) Weddles Rule

2) The degree of y(x) in Trapezoidal Rule is _____.
   a) 1 b) 2
   c) 3 d) 6

3) The method used to find the dominant Eigen value is _____.
   a) Gauss Method b) Newton's Method
   c) Euler's Method d) Power Method

4) Newton-Raphson method has a _____ convergence.
   a) linear b) quadratic
   c) cubic d) bi quadratic

5) The root of the equation $e^x=4x$ lies between _____.
   a) (0,1) b) (1, 2)
   c) (2, 3) d) (3, 4)

6) The most popular Runge-Kutta method is _____.
   a) First order b) Second order
   c) Third order d) Fourth order

7) The modification of Gauss Elimination Method is _____.
   a) Gauss Jordan b) Gauss Jacobi
   c) Gauss Elimination d) Gauss Seidel

8) 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) $y_{n+1} = y_n + hf\ (x_n, y_{n-1})$

9) The order of Euler method is _____.
   a) h b) h^2
   c) h^3 d) h^4

10) Lagrange's interpolation formula is used to compute the values for ____ intervals.
   a) equal
   b) unequal
   c) open
   d) closed

11) Gauss Elimination Method & Gauss Jordan Methods are _____ methods.
   a) direct
   b) indirect
   c) self correcting
   d) step by step

12) Newton-Raphson method is applicable the solution of _____.
   a) both algebraic and transcendental equations
   b) both algebraic and transcendental and also used when the roots are complex
   c) algebraic equations only
   d) transcendental equations only

13) 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

14) The forward difference operator is denoted by the symbol _____.
   a) Δ
   b) Ω
   c) ∂
   d) ∞

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Section – I Q.No.5 is compulsory. Solve any two from the remaining questions.
2) Section – II Q.No.9 is compulsory. Solve any two from the remaining questions.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.2 Solve the following.

a) Find a real root of the equation $x \log_{10} x = 1.2$ by regula falsi method correct to four decimal places. (Take (2, 3) as search interval). **03**

b) Using Newton's iterative method, find the real root of $x \log_{10} x = 1.2$ correct to four decimal places taking $x_0 = 2$ as initial approximation. **03**

c) Find the positive real root of the equation $4x_3 - 2x - 6 = 0$ correct to three decimal places by using bisection method. (Perform four iterations only) **03**

Q.3 Solve the following.

a) Solve the following system of equations by Gauss- elimination method. **03**
$x + y + z = 9;\ 2x - 3y + 4z = 13;\ 3x + 4y + 5z = 40$

b) Solve the following system of equations by L-U decomposition method. **06**
$x + y + z = 1;\ 4x + 3y - z = 6;\ 3x + 5y + 3z = 4$

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
y:	1	1.8	1.3	2.5	6.3

b) Using Lagrange's formula of interpolation find f(9.5) given. **03**

x	7	8	9	10
y	3	1	1	9

c) Find $\frac{dy}{dx}$ at $x = 9$ from the following table by using Newton's divided difference formula. **03**

x:	5	7	11	13	17
y:	150	392	1452	2366	5202

Q.5 Solve the following.

a) Obtain cubic spline for the following data **04**

x	0	1	2	3
y	1	2	33	244

b) Solve the following system of equations by using Jacobi's method. **06**
$27x + 6y - z = 85;\ \ x + y + 54z = 110;\ \ 6x + 15y + 2z = 72$

Section – II

Q.6 Solve the following.

a) 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 Solve the following.

a) Determine the largest eigen value and corresponding eigen vector of the matrix. **05**

$$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$ Using power method

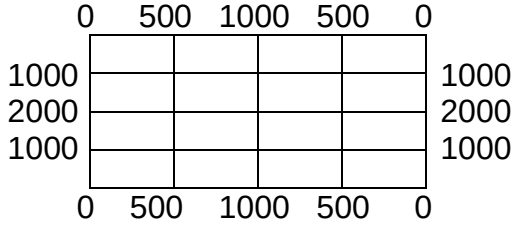
Taking $[1, 0, 0]^T$ as an initial eigen vector.

b) Using Jacobi's Method, find all eigen values and eigen vectors. **04**

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$$

Q.8 Solve the following.

a) Solve the equation $\nabla^2 u = 0$ for the following mesh by using Leibmann's method. (Perform Four Iterations): **05**



b) Apply Runge Kutta Method to find approximate value of y for $x = 0.1$ in steps of 0.1, if $\frac{dy}{dx} = \frac{y-x}{y+x}$ given that $y = 1$ where $x = 0$. **04**

Q.9 Solve the following.

a) 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**

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Max. Marks: 70
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.
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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) 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) $y_{n+1} = y_n + hf(x_n, y_n)$
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2) The order of Euler method is _____.
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Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

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Section – I

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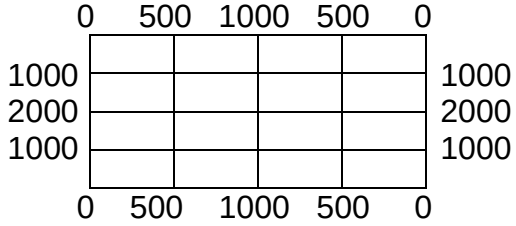

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Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Max. Marks: 70
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.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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   a) (0,1) b) (1, 2)
   c) (2, 3) d) (3, 4)

2) The most popular Runge-Kutta method is _____.
   a) First order b) Second order
   c) Third order d) Fourth order

3) The modification of Gauss Elimination Method is _____.
   a) Gauss Jordan b) Gauss Jacobi
   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) $y_{n+1} = y_n + hf\ (x_n, y_{n-1})$

5) The order of Euler method is _____.
   a) h b) h^2
   c) h^3 d) h^4

6) Lagrange's interpolation formula is used to compute the values for ____ intervals.
   a) equal b) unequal
   c) open d) closed

7) Gauss Elimination Method & Gauss Jordan Methods are _____ methods.
   a) direct b) indirect
   c) self correcting d) step by step

8) Newton-Raphson method is applicable the solution of _____.
   a) both algebraic and transcendental equations
   b) both algebraic and transcendental and also used when the roots are complex
   c) algebraic equations only
   d) transcendental equations only

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 Rule b) Simson's (1/3)rd Rule
   c) Simpson's (3/8)th Rule d) Weddles Rule

12) The degree of y(x) in Trapezoidal Rule is _____.
   a) 1 b) 2
   c) 3 d) 6

13) The method used to find the dominant Eigen value is _____.
   a) Gauss Method b) Newton's Method
   c) Euler's Method d) Power Method

14) Newton-Raphson method has a _____ convergence.
   a) linear b) quadratic
   c) cubic d) bi quadratic

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Section – I Q.No.5 is compulsory. Solve any two from the remaining questions.
2) Section – II Q.No.9 is compulsory. Solve any two from the remaining questions.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.2 Solve the following.

a) Find a real root of the equation $x \log_{10} x = 1.2$ by regula falsi method correct to four decimal places. (Take (2, 3) as search interval). **03**

b) Using Newton's iterative method, find the real root of $x \log_{10} x = 1.2$ correct to four decimal places taking $x_0 = 2$ as initial approximation. **03**

c) Find the positive real root of the equation $4x_3 - 2x - 6 = 0$ correct to three decimal places by using bisection method. (Perform four iterations only) **03**

Q.3 Solve the following.

a) Solve the following system of equations by Gauss- elimination method. **03**
$x + y + z = 9;\ 2x - 3y + 4z = 13;\ 3x + 4y + 5z = 40$

b) Solve the following system of equations by L-U decomposition method. **06**
$x + y + z = 1;\ 4x + 3y - z = 6;\ 3x + 5y + 3z = 4$

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
y:	1	1.8	1.3	2.5	6.3

b) Using Lagrange's formula of interpolation find f(9.5) given. **03**

x	7	8	9	10
y	3	1	1	9

c) Find $\frac{dy}{dx}$ at $x = 9$ from the following table by using Newton's divided difference formula. **03**

x:	5	7	11	13	17
y:	150	392	1452	2366	5202

Q.5 Solve the following.

a) Obtain cubic spline for the following data **04**

x	0	1	2	3
y	1	2	33	244

b) Solve the following system of equations by using Jacobi's method. **06**
$27x + 6y - z = 85;\ \ x + y + 54z = 110;\ 6x + 15y + 2z = 72$

Section – II

Q.6 Solve the following.

a) 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 Solve the following.

a) Determine the largest eigen value and corresponding eigen vector of the matrix. **05**

$$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$ Using power method

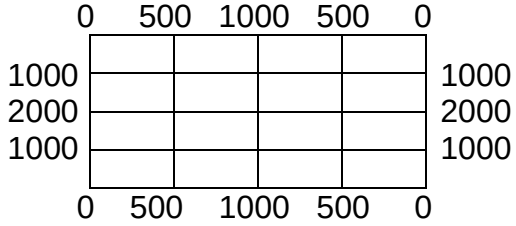
Taking $[1, 0, 0]^T$ as an initial eigen vector.

b) Using Jacobi's Method, find all eigen values and eigen vectors. **04**

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$$

Q.8 Solve the following.

a) Solve the equation $\nabla^2 u = 0$ for the following mesh by using Leibmann's method. (Perform Four Iterations): **05**



b) Apply Runge Kutta Method to find approximate value of y for $x = 0.1$ in steps of 0.1, if $\frac{dy}{dx} = \frac{y-x}{y+x}$ given that $y = 1$ where $x = 0$. **04**

Q.9 Solve the following.

a) 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**

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Max. Marks: 70
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

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.
   a) equal b) unequal
   c) open d) closed

2) Gauss Elimination Method & Gauss Jordan Methods are _____ methods.
   a) direct b) indirect
   c) self correcting d) step by step

3) Newton-Raphson method is applicable the solution of _____.
   a) both algebraic and transcendental equations
   b) both algebraic and transcendental and also used when the roots are complex
   c) algebraic equations only
   d) transcendental equations only

4) 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

5) The forward difference operator is denoted by the symbol _____.
   a) Δ b) Ω
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6) Modification of _____ is called Romberg's method.
   a) Trapezoidal Rule b) Simson's (1/3)rd Rule
   c) Simpson's (3/8)th Rule d) Weddles Rule

7) The degree of y(x) in Trapezoidal Rule is _____.
   a) 1 b) 2
   c) 3 d) 6

8) The method used to find the dominant Eigen value is _____.
   a) Gauss Method b) Newton's Method
   c) Euler's Method d) Power Method

9) Newton-Raphson method has a _____ convergence.
   a) linear b) quadratic
   c) cubic d) bi quadratic

10) The root of the equation $e^x=4x$ lies between _____.
   a) (0,1) b) (1, 2)
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11) The most popular Runge-Kutta method is _____.
   a) First order b) Second order
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12) The modification of Gauss Elimination Method is _____.
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13) In Euler's method: Given initial value problem $y' = dy/dx = f(x, y)$ with $y(x0) = y0$, then approximation is given by _____.
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14) The order of Euler method is _____.
   a) h b) h^2
   c) h^3 d) h^4

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
NUMERICAL METHODS & COMPUTER PROGRAMMING

Day & Date: Friday, 22-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) Section – I Q.No.5 is compulsory. Solve any two from the remaining questions.
2) Section – II Q.No.9 is compulsory. Solve any two from the remaining questions.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.

Section – I

Q.2 Solve the following.

a) Find a real root of the equation $x \log_{10} x = 1.2$ by regula falsi method correct to four decimal places. (Take (2, 3) as search interval). **03**

b) Using Newton's iterative method, find the real root of $x \log_{10} x = 1.2$ correct to four decimal places taking $x_0 = 2$ as initial approximation. **03**

c) Find the positive real root of the equation $4x_3 - 2x - 6 = 0$ correct to three decimal places by using bisection method. (Perform four iterations only) **03**

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a) Solve the following system of equations by Gauss- elimination method. **03**
$x + y + z = 9;\ 2x - 3y + 4z = 13;\ 3x + 4y + 5z = 40$

b) Solve the following system of equations by L-U decomposition method. **06**
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Q.4 Solve the following.

a) Fit parabola of the form $y = a + bx + cx^2$ to the data given below. **03**

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b) Using Lagrange's formula of interpolation find f(9.5) given. **03**

x	7	8	9	10
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c) Find $\frac{dy}{dx}$ at $x = 9$ from the following table by using Newton's divided difference formula. **03**

x:	5	7	11	13	17
y:	150	392	1452	2366	5202

Q.5 Solve the following.

a) Obtain cubic spline for the following data **04**

x	0	1	2	3
y	1	2	33	244

b) Solve the following system of equations by using Jacobi's method. **06**
$27x + 6y - z = 85;\ \ x + y + 54z = 110;\ 6x + 15y + 2z = 72$

Section – II

Q.6 Solve the following.

a) 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 Solve the following.

a) Determine the largest eigen value and corresponding eigen vector of the matrix. **05**

$$\begin{bmatrix} 2 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 2 \end{bmatrix}$$ Using power method

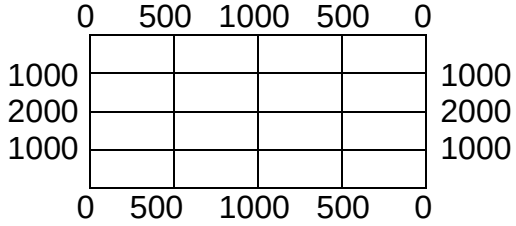
Taking $[1, 0, 0]^T$ as an initial eigen vector.

b) Using Jacobi's Method, find all eigen values and eigen vectors. **04**

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 3 & -1 \\ 0 & -1 & 3 \end{bmatrix}$$

Q.8 Solve the following.

a) Solve the equation $\nabla^2 u = 0$ for the following mesh by using Leibmann's method. (Perform Four Iterations): **05**



b) Apply Runge Kutta Method to find approximate value of y for $x = 0.1$ in steps of 0.1, if $\frac{dy}{dx} = \frac{y-x}{y+x}$ given that $y = 1$ where $x = 0$. **04**

Q.9 Solve the following.

a) 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**

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – 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

Duration: 30 Minutes Marks: 14

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

1) An Induction motor is analogous to _____.
   a) DC motor b) Transformer
   c) Synchronous motor d) DC Generator

2) 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

3) The starting torque of induction motor varies as: _____.
   a) f b) $1/f^2$
   c) 1/f d) f^2

4) For high starting torque, the commonly used 3-phase induction motor is _____.
   a) Squirrel-cage type b) Slip-ring type
   c) Deep bar squirrel-cage type d) Double-cage induction motor

5) The speed characteristics of an induction motor closely resemble the speed-load characteristics of which of the following machines?
   a) D.C. series motor b) D.C. shunt motor
   c) Universal motor d) None of the above

6) Star-delta starting of motors is not possible in case of _____.
   a) single phase motors b) variable speed motors
   c) low horse power motors d) high speed motors

7) DOL starting of induction motors is usually restricted to _____.
   a) low horsepower motors b) variable speed motors
   c) high horsepower motors d) high speed motors

8) In a SCIM, torque with autostarter is _____ times the torque with direct-switching.
   a) K^2 b) 1/K
   c) K d) none of the above

9) If the stator voltage of an IM is reduced by 10%, the torque of the motor will drop by _____.
   a) 10% b) 40%
   c) 20% d) 30%

10) Line joining tangent and output line in a circle diagram gives _____.
   a) Cu loss b) Stator loss
   c) Maximum output d) Maximum Torque

11) No load test is conducted at _____.
   a) High voltage b) Rated current
   c) High current d) Rated voltage

12) Parameter from no load test is _____.
   a) Ri and Xi b) Ro and Xo
   c) Copper loss d) Impedance

13) A capacitor start single phase induction motor will usually have a power 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?
   a) 2 poles b) 4 poles
   c) 6 poles d) 12 poles

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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.

Q.5 Attempt any two of the following questions. **12**

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

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – 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

Duration: 30 Minutes Marks: 14

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

1) In a SCIM, torque with autostarter is _____ times the torque with direct-switching.
   a) K^2 b) 1/K
   c) K d) none of the above

2) If the stator voltage of an IM is reduced by 10%, the torque of the motor will drop by _____.
   a) 10% b) 40%
   c) 20% d) 30%

3) Line joining tangent and output line in a circle diagram gives _____.
   a) Cu loss b) Stator loss
   c) Maximum output d) Maximum Torque

4) No load test is conducted at _____.
   a) High voltage b) Rated current
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5) Parameter from no load test is _____.
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6) A capacitor start single phase induction motor will usually have a power factor of _____.
   a) unity b) 0.8 leading
   c) 0.6 leading d) 0.6 lagging

7) For how many poles is a split-phase motor wound if it operates at 1750 rpm at full load from a 60 Hz source?
   a) 2 poles b) 4 poles
   c) 6 poles d) 12 poles

8) An Induction motor is analogous to _____.
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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.
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11) For high starting torque, the commonly used 3-phase induction motor is _____.
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13) Star-delta starting of motors is not possible in case of _____.
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   a) low horsepower motors b) variable speed motors
   c) high horsepower motors d) high speed motors

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

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Q.3 Attempt any two of the following questions. **12**

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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.

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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.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – 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

Duration: 30 Minutes Marks: 14

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

1) The speed characteristics of an induction motor closely resemble the speed-load characteristics of which of the following machines?
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   c) Synchronous motor
   d) DC Generator

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: _____.
   a) F
   b) $1/f^2$
   c) 1/f
   d) f^2

14) For high starting torque, the commonly used 3-phase induction motor is _____.
   a) Squirrel-cage type
   b) Slip-ring type
   c) Deep bar squirrel-cage type
   d) Double-cage induction motor

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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.

Q.5 Attempt any two of the following questions. **12**

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

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – 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

Duration: 30 Minutes Marks: 14

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

1) Line joining tangent and output line in a circle diagram gives _____.
   a) Cu loss b) Stator loss
   c) Maximum output d) Maximum Torque

2) No load test is conducted at _____.
   a) High voltage b) Rated current
   c) High current d) Rated voltage

3) Parameter from no load test is _____.
   a) Ri and Xi b) Ro and Xo
   c) Copper loss d) Impedance

4) A capacitor start single phase induction motor will usually have a power factor of _____.
   a) unity b) 0.8 leading
   c) 0.6 leading d) 0.6 lagging

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?
   a) 2 poles b) 4 poles
   c) 6 poles d) 12 poles

6) An Induction motor is analogous to _____.
   a) DC motor b) 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.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

8) The starting torque of induction motor varies as: _____.
   a) f b) $1/f^2$
   c) 1/f d) f^2

9) For high starting torque, the commonly used 3-phase induction motor is _____.
   a) Squirrel-cage type b) Slip-ring type
   c) Deep bar squirrel-cage type d) Double-cage induction motor

10) The speed characteristics of an induction motor closely resemble the speed-load characteristics of which of the following machines?
   a) D.C. series motor
   b) D.C. shunt motor
   c) Universal motor
   d) None of the above

11) Star-delta starting of motors is not possible in case of _____.
   a) single phase motors
   b) variable speed motors
   c) low horse power motors
   d) high speed motors

12) DOL starting of induction motors is usually restricted to _____.
   a) low horsepower motors
   b) variable speed motors
   c) high horsepower motors
   d) high speed motors

13) In a SCIM, torque with autostarter is _____ times the torque with direct-switching.
   a) K^2
   b) 1/K
   c) K
   d) none of the above

14) If the stator voltage of an IM is reduced by 10%, the torque of the motor will drop by _____.
   a) 10%
   b) 40%
   c) 20%
   d) 30%

Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE - II

Day & Date: Saturday, 23-11-2019 Max. Marks: 56
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. **16**

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. **12**

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. **16**

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.

Q.5 Attempt any two of the following questions. **12**

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

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 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 Marks: 14

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) AD+CD=1
   c) AB-CD=-1 d) -AD+BC=-1

2) The material used for the manufacture of ground wire is _____.
   a) AL b) Galvanized steel
   c) Cast iron d) Stainless steel

3) 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

4) Suspension insulators are used for voltage beyond _____.
   a) 33kV b) 11kV
   c) 400V d) 66kV

5) 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

6) 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

7) 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

8) Which of the following voltage regulation is considered to be the best?
   a) 2% b) 30%
   c) 70% d) 98%

9) The highest transmission voltage used in India is _____.
   a) 400kv b) 220kv
   c) 132kv d) 765kv

10) ACSR conductors have _____.
   a) All conductors made of AL b) Outer conductor made AL
   c) Inner conductor made AL d) No conductor made AL

11) For medium transmission line A is _____.
   a) Equal to B b) Equal to C
   c) Equal to D d) None of the above

12) The effect of corona is _____.
   a) increased energy loss b) increased reactance
   c) increased inductance d) None

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 b) Voltage
   c) Power factor d) both B and C

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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. **16**

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 cm^2. 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. **12**

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. **16**

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.

Q.5 Attempt any two. **12**

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 = 0.1 Ω
Inductive reactance/km/phase = 0.2 Ω
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.

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Seat No.	

Set Q

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 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 Marks: 14

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

1) Which of the following voltage regulation is considered to be the best?
   a) 2% b) 30%
   c) 70% d) 98%

2) The highest transmission voltage used in India is _____.
   a) 400kv b) 220kv
   c) 132kv d) 765kv

3) ACSR conductors have _____.
   a) All conductors made of AL b) Outer conductor made AL
   c) Inner conductor made AL d) No conductor made AL

4) For medium transmission line A is _____.
   a) Equal to B b) Equal to C
   c) Equal to D d) None of the above

5) The effect of corona is _____.
   a) increased energy loss b) increased reactance
   c) increased inductance d) None

6) 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

7) The volume of copper required for an ac transmission line is inversely 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

9) The material used for the manufacture of ground wire is _____.
   a) AL b) Galvanized steel
   c) Cast iron d) Stainless steel

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 b) 11Kv
   c) 400V 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

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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. **16**

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 cm^2. 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. **12**

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. **16**

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.

Q.5 Attempt any two. **12**

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 = 0.1 Ω
Inductive reactance/km/phase = 0.2 Ω
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.

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Seat No.	

Set R

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 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 Marks: 14

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

3) 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 AL
   c) Inner conductor made AL d) No conductor made AL

7) For medium transmission line A is _____.
   a) Equal to B b) Equal to C
   c) Equal to D d) None of the above

8) The effect of corona is _____.
   a) increased energy loss b) increased reactance
   c) increased inductance d) None

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
   d) both B and C

11) Which of the following is correct?
   a) -AB+CD=-1
   b) AD+CD=1
   c) AB-CD=-1
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12) The material used for the manufacture of ground wire is _____.
   a) AL
   b) Galvanized steel
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   d) Stainless steel

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
   b) 11kV
   c) 400V
   d) 66kV

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Seat No.	

Set R

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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. **16**

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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. **16**

a) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal π-method.
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Q.5 Attempt any two. **12**

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?

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c) A 3-phase, 50-Hz overhead transmission line 100 km long has the following constants
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Seat No.	

Set S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 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 Marks: 14

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

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3) The effect of corona is _____.
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4) The sag of transmission line is least affected owing to _____.
   a) weight of conductor
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   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
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6) Which of the following is correct?
   a) -AB+CD=-1 b) AD+CD=1
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9) Suspension insulators are used for voltage beyond _____.
   a) 33kV b) 11kV
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10) Bedding on cable consists of _____.
   a) jute strands
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11) In the analysis of which of the following lines shunt capacitance is neglected?
   a) Short transmission lines
   b) Medium transmission lines
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   d) Medium as well as long transmission lines

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   a) reduce line loss b) reduce skin effect
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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

SLR-FM-727

Seat No.	

Set S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELEMENTS OF POWER SYSTEMS

Day & Date: Monday, 25-11-2019 Max. Marks: 56
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. **16**

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 cm^2. 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. **12**

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. **16**

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.

Q.5 Attempt any two. **12**

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 = 0.1 Ω
Inductive reactance/km/phase = 0.2 Ω
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.

SLR-FM-728

Seat No.	

Set P

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019
Electrical Engineering
ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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

1) The large signal bandwidth of an op-amp is limited by its
   a) loop gain b) slew rate
   c) output impedance d) input frequency

2) _____ is not the internal circuit of operational amplifier.
   a) Differential Amplifier b) Level Translator
   c) Output driver d) Clamper

3) 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

4) 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

5) For an inverting amplifier, if R_f=100kΩ and R_i=1kΩ then closed loop gain is
   a) 1,00,000 b) 1,000
   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?
   a) Input stage b) Intermediate stage
   c) Output stage d) Level shifting stage

7) Basic differentiator circuit contains feedback
   a) Resistor b) Capacitor
   c) Inductor d) None of the above

8) A multiplexer is also known as a_____
   a) data accumulator b) data restorer
   c) data selector d) data distributor

9) A flip flop has two outputs which are
   a) always 0 b) always 1
   c) always complementary d) all of the above

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
   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.	

Set **P**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019
Electrical Engineering
ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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. **12**

a) Derive an expression for closed loop gain, input resistance, bandwidth and output resistance for voltage shunt feedback amplifier.
b) Explain the following terms:
1) input offset voltage 2) input bias current
3) input offset current 4) CMRR
5) SVRR 6) Slew rate
c) Explain instrumentation amplifier.

Section – II

Q.4 Attempt any four **16**

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. **12**

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.

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Seat No.	

Set Q

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019
Electrical Engineering
ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 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.
3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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

1) A multiplexer is also known as a_____
   a) data accumulator b) data restorer
   c) data selector d) data distributor

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   c) always complementary d) all of the above

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   a) dynamic shift register b) flip flop shift register
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   a) past inputs only b) Present inputs only
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   a) loop gain b) slew rate
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   b) Output voltage is phase reversal
   c) Both a) and b)
   d) None of the above

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   a) Differential voltage gain
   b) Common mode voltage gain
   c) Both a and b
   d) None of the above

12) For an inverting amplifier, if R_f=100kΩ and R_i=1kΩ then closed loop gain is
   a) 1,00,000
   b) 1,000
   c) 101
   d) 100

13) In a typical op-amp, which stage is supposed to be a dual-input unbalanced output or single-ended output differential amplifier?
   a) Input stage
   b) Intermediate stage
   c) Output stage
   d) Level shifting stage

14) Basic differentiator circuit contains feedback
   a) Resistor
   b) Capacitor
   c) Inductor
   d) None of the above

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019
Electrical Engineering
ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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5) SVRR 6) Slew rate
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b) Simplify the following function using K-map and realize it using NOR gates only.
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c) Explain universal shift registers.

Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019
Electrical Engineering
ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 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.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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   a) 1,00,000 b) 1,000
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Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019
Electrical Engineering
ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are Compulsory.
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Section – I

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Seat No.	

Set **S**

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019
Electrical Engineering
ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 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
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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SLR-FM-728

Seat No.	

Set S

S.E. (Part – II) (Old) (CGPA) Examination Nov/Dec -2019
Electrical Engineering
ANALOG & DIGITAL INTEGRATED CIRCUITS

Day & Date: Tuesday, 26-11-2019 Max. Marks: 56
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. **16**

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Q.3 Attempt any two. **12**

a) Derive an expression for closed loop gain, input resistance, bandwidth and output resistance for voltage shunt feedback amplifier.
b) Explain the following terms:
1) input offset voltage 2) input bias current
3) input offset current 4) CMRR
5) SVRR 6) Slew rate
c) Explain instrumentation amplifier.

Section – II

Q.4 Attempt any four **16**

a) Define flip-flop. Draw the logical diagram and truth table of SR flip flop.
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d) Differentiate TTL and CMOS families.
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b) Simplify the following function using K-map and realize it using NOR gates only.
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c) Explain universal shift registers.

Seat No.	

Set **P**

S.E. (Part – II) (Old) (CGPA) 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

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 Marks: 14

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) 10 Ω b) 3 Ω
   c) 9 Ω d) 27 Ω

2) In an electric circuit dual of inductance is _____.
   a) Conductance b) Resistance
   c) Capacitance d) Susceptance

3) Current between two open terminals is _____.
   a) Maximum b) Zero
   c) Minimum d) None of these

4) 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
   c) 1.5 ohms and 3 ohms d) 1.5 ohms and 0.5 ohms

5) 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

6) 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

7) Indicate the dual of series network consists of voltage source, capacitance, inductance in _____.
   a) Parallel combination of resistance, capacitance and inductance
   b) Series combination of current source, capacitance and inductance
   c) Parallel combination of current source, inductance and capacitance
   d) None of the above

8) Ohm's law is valid only when temperature is _____.
   a) Variable b) Constant
   c) Varies with constant rate d) None of these

9) 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

10) The h parameters of h11 and h21 obtained _____.
   a) by shorting input terminals
   b) by shorting output terminals
   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/s
   c) s^2
   d) $1/s^2$

14) Laplace transform of unit ramp function _____.
   a) s
   b) 1/s
   c) s^2
   d) $1/s^2$

Seat No.	

Set **P**

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

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

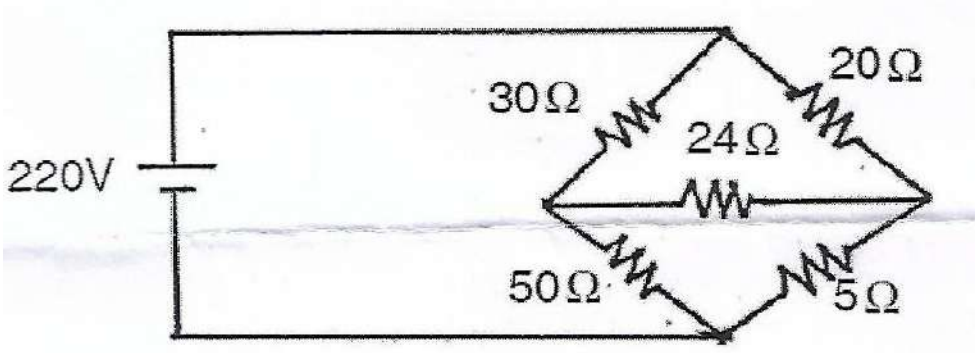
Instructions: 1) All questions are compulsory.
2) Figure to the right indicates full marks.

Section – I

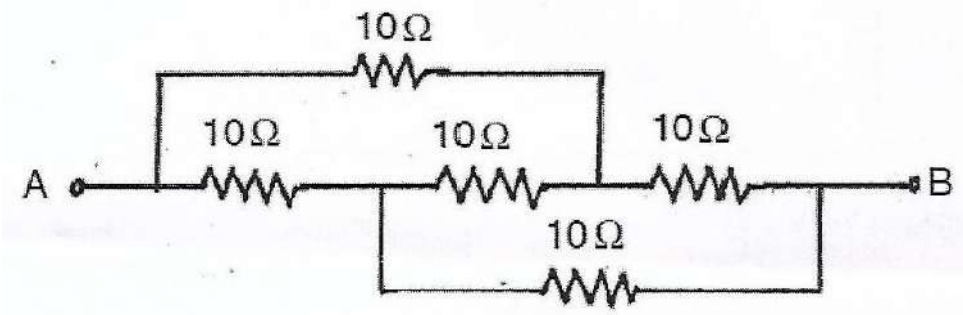
Q.2 Solve any three. **12**

a) State and explain maximum power transfer theorem.

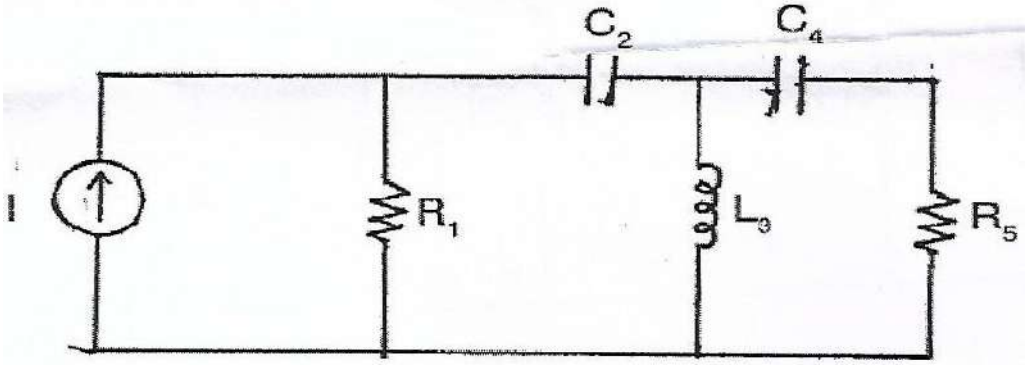
b) Determine current through 24 Ω resistor using Thevenin's Theorem.



c) Find an equivalent resistance between A and B.

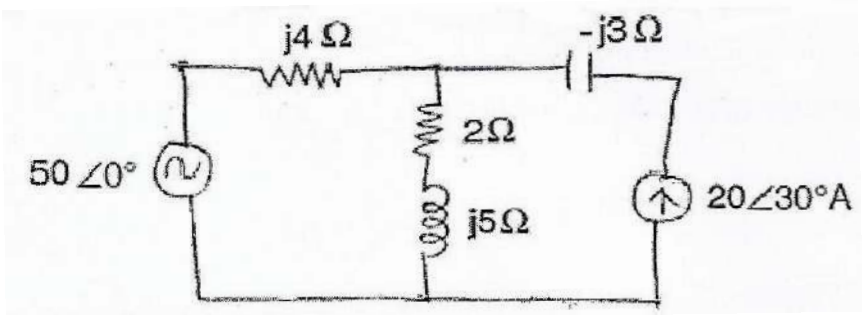


d) Draw the dual of the given network.

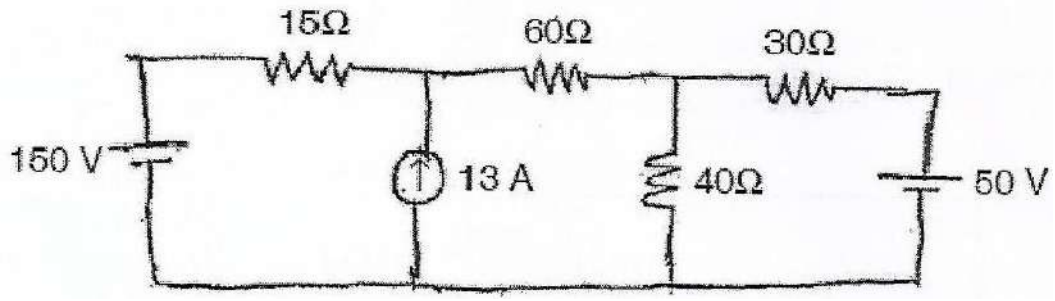


Q.3 Solve any two. **16**

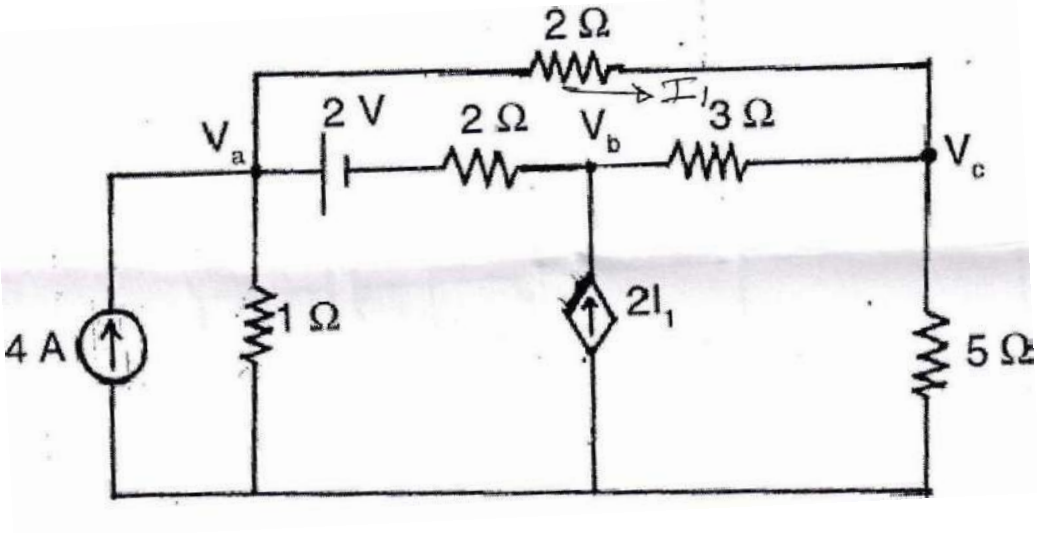
a) State and explain Super position theorem. Determine the voltage across the (2+j5) ohm impedance in fig. shown below using Super position theorem.



b) State and Explain Thevenin's Theorem. Find the current through the 30 Ω resistor using Thevenin's Theorem.



c) Find voltages Va_1 Vb_1 Vc using nodal analysis technique.

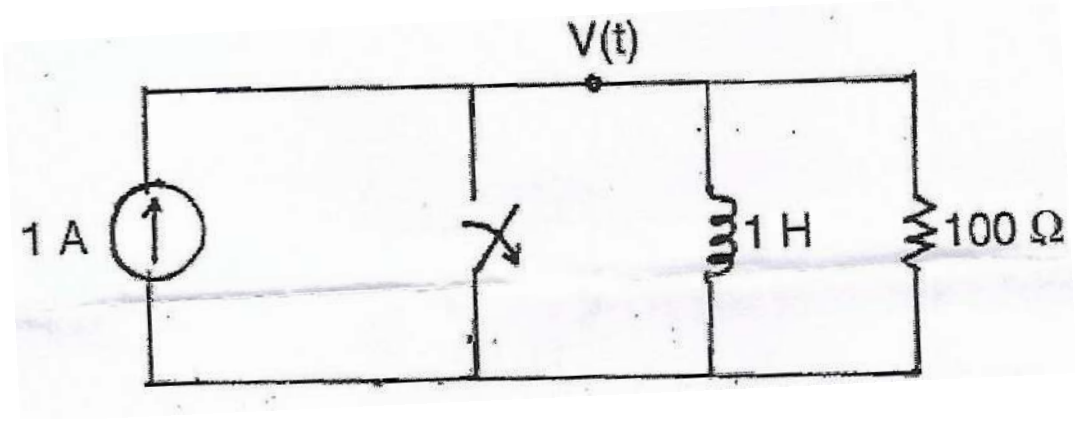


Section – II

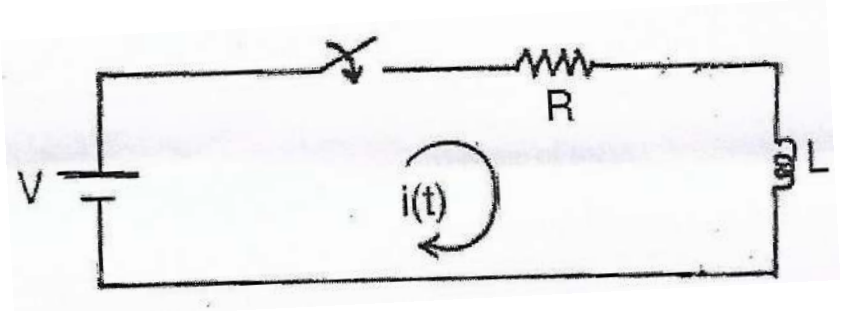
Q.4 Solve any three. **12**

a) Derive h parameter in terms of Z-parameter.

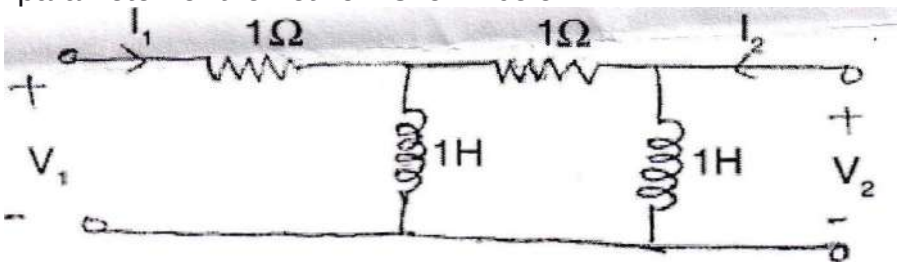
b) In the given network at t=0 switch is opened. Calculate v & dv/dt at $t = 0^+$



c) Derive an expression for i(t) for following circuit.



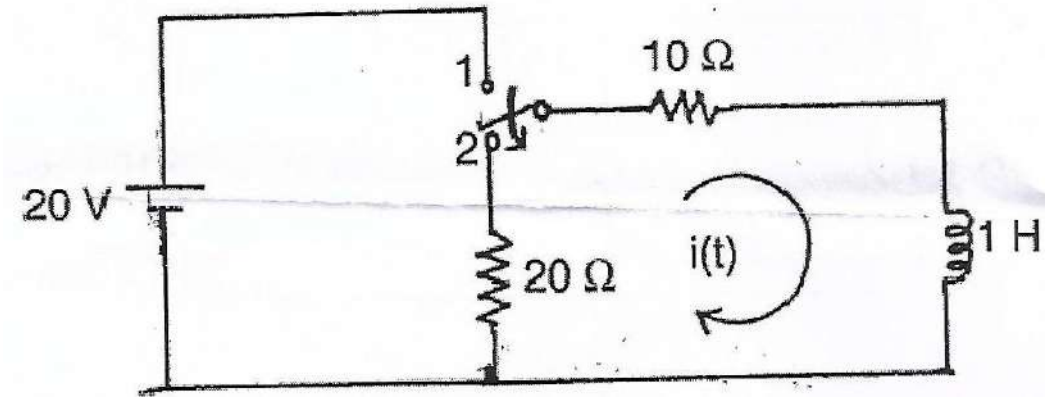
d) Find Z parameter for the network shown below.



Q.5 Solve any two. **16**

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, d^2i/dt^2.



c) Give the Laplace transform of following function.

1) unit step function
2) unit ramp function
3) unit impluse function
4) Exponential function

Seat No.	

Set **Q**

S.E. (Part – II) (Old) (CGPA) 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

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 Marks: 14

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
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   c) Current source open circuited
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3) The h parameters of h11 and h21 obtained _____.
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4) In series RLC circuit which phase's are in phase opposition _____.
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5) In a graph having b branches and n noads, the no. f-circuits or tiesets will be _____.
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6) Laplace transform of unit step function _____.
   a) S b) 1/s
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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) $10\ \Omega$ b) $3\ \Omega$
   c) $9\ \Omega$ d) $27\ \Omega$

9) In an electric circuit dual of inductance is _____.
   a) Conductance b) Resistance
   c) Capacitance d) Susceptance

10) Current between two open terminals is _____.
   a) Maximum
   b) Zero
   c) 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
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12) At t = 0+ with zero initial condition, which of the following acts as short circuit?
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13) For a two port network to be reciprocal.
   a) $Z_{11} = Z_{22}$
   b) $Y_{12} = Y_{21}$
   c) $h_{22} = h_{12} + h_{21}$
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14) Indicate the dual of series network consists of voltage source, capacitance, inductance in _____.
   a) Parallel combination of resistance, capacitance and inductance
   b) Series combination of current source, capacitance and inductance
   c) Parallel combination of current source, inductance and capacitance
   d) None of the above

Seat No.	

Set **Q**

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

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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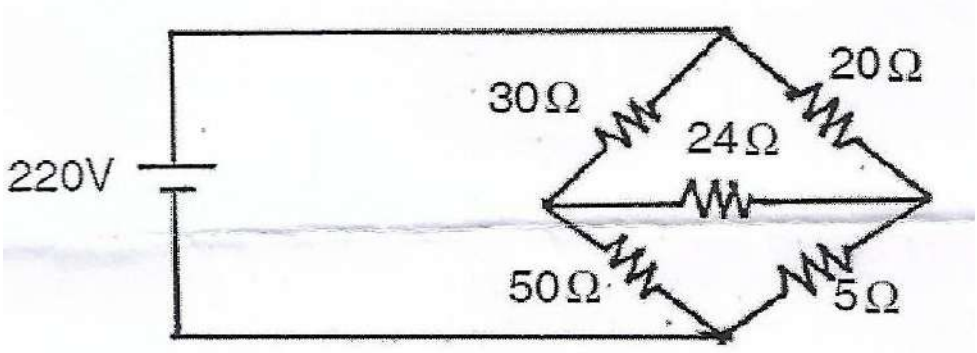
Section – I

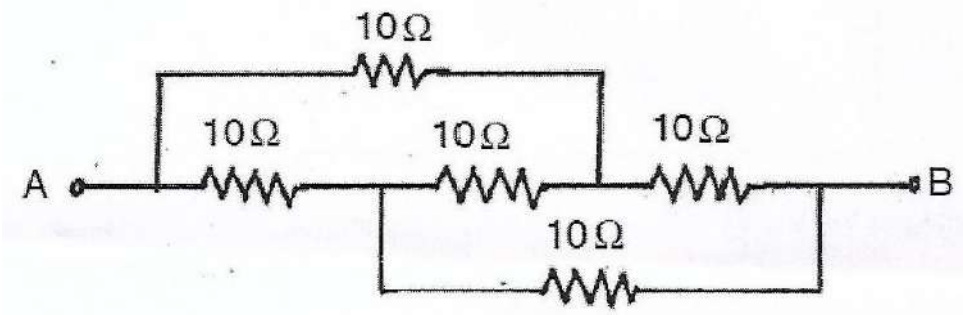
Q.2 Solve any three. **12**

a) State and explain maximum power transfer theorem.

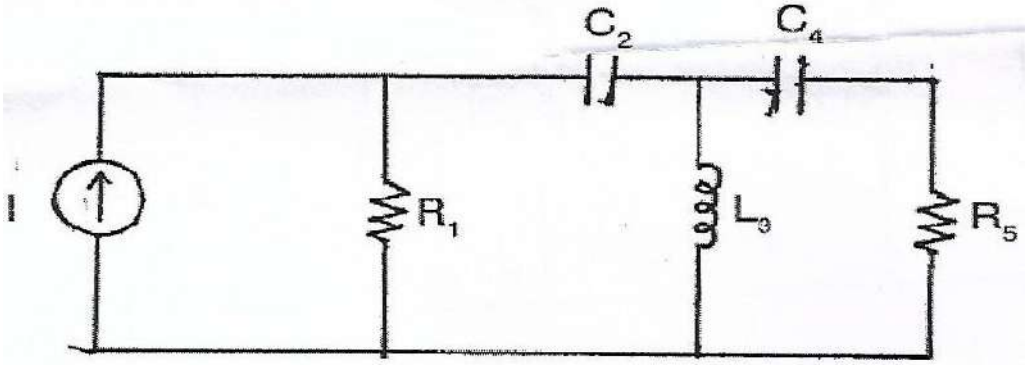
b) Determine current through 24 Ω resistor using Thevenin's Theorem.



c) Find an equivalent resistance between A and B.

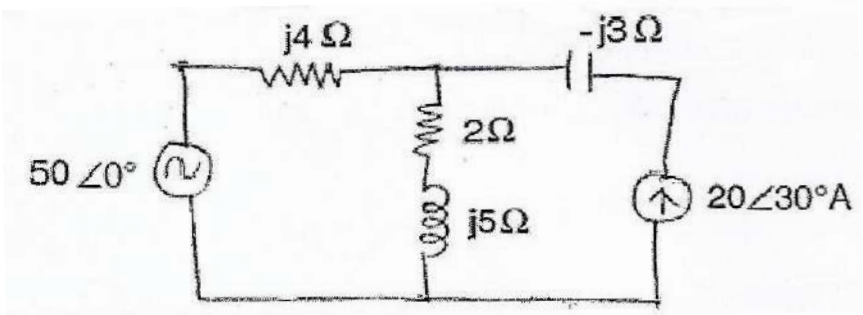


d) Draw the dual of the given network.

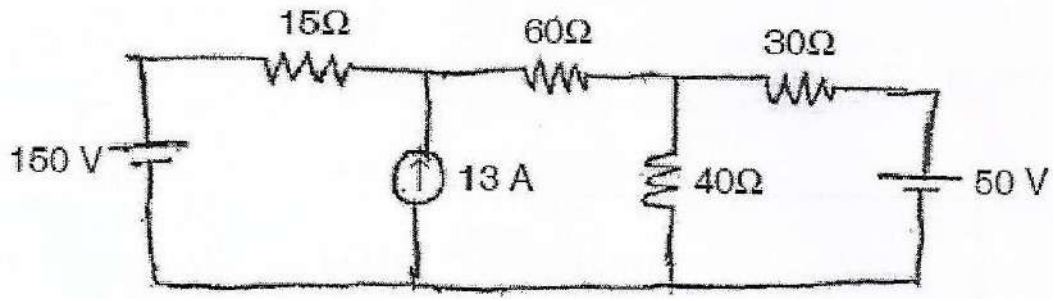


Q.3 Solve any two. **16**

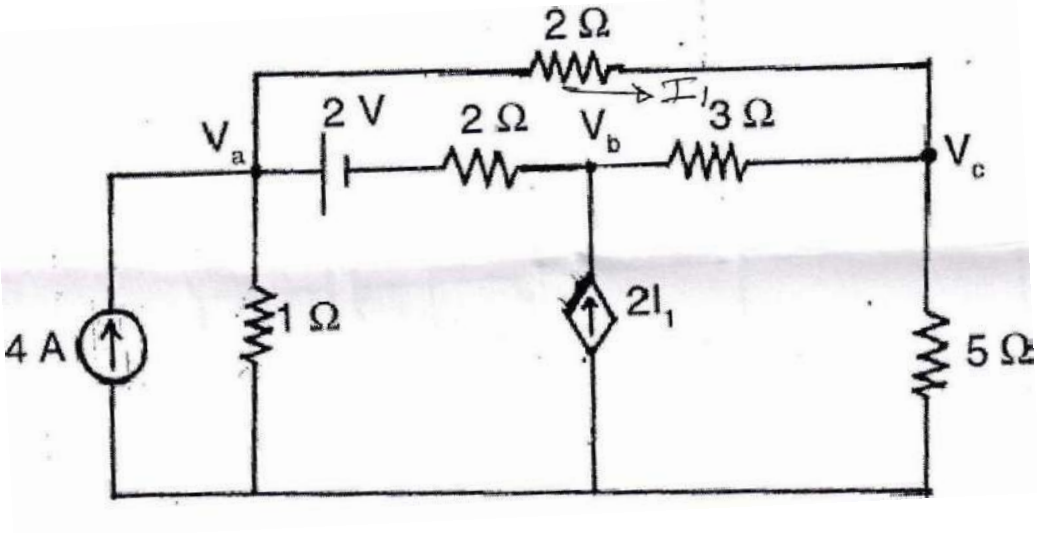
a) State and explain Super position theorem. Determine the voltage across the (2+j5) ohm impedance in fig. shown below using Super position theorem.



b) State and Explain Thevenin's Theorem. Find the current through the 30 Ω resistor using Thevenin's Theorem.



c) Find voltages Va_1 Vb_1 Vc using nodal analysis technique.

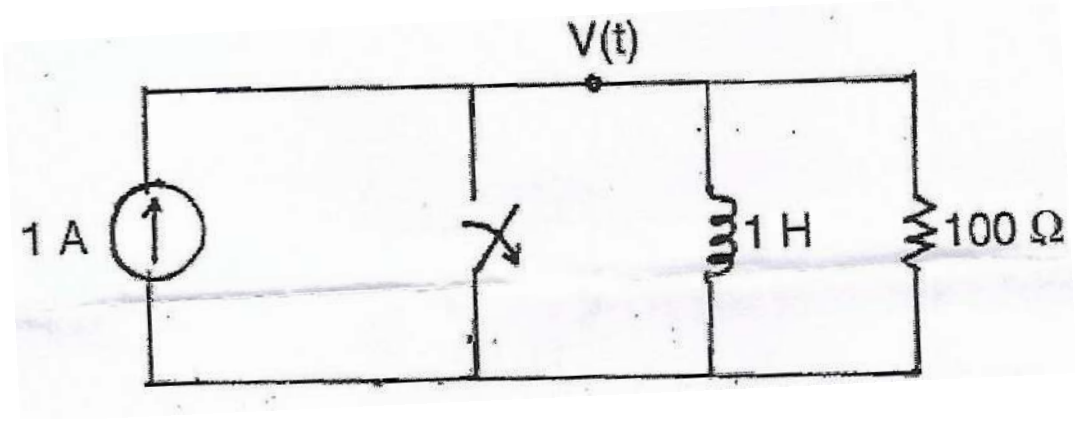


Section – II

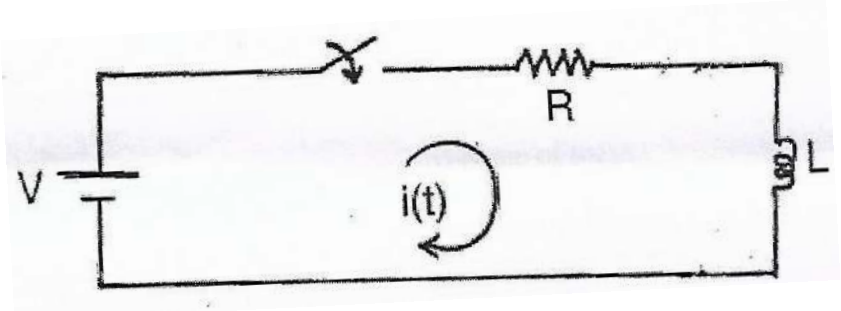
Q.4 Solve any three. **12**

a) Derive h parameter in terms of Z-parameter.

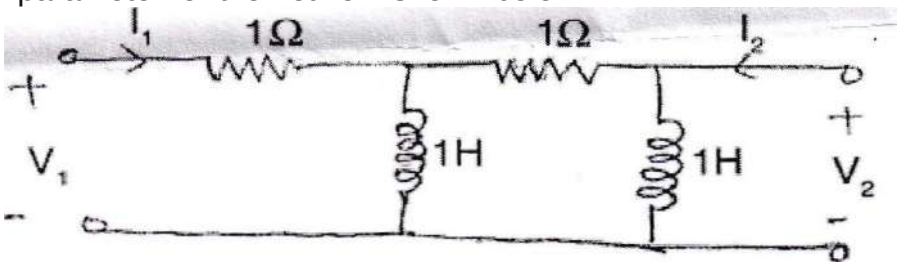
b) In the given network at t=0 switch is opened. Calculate v & dv/dt at $t = 0^+$



c) Derive an expression for i(t) for following circuit.



d) Find Z parameter for the network shown below.



Q.5 Solve any two. **16**

a) Derive H-parameter in terms of Z and transmission parameters.

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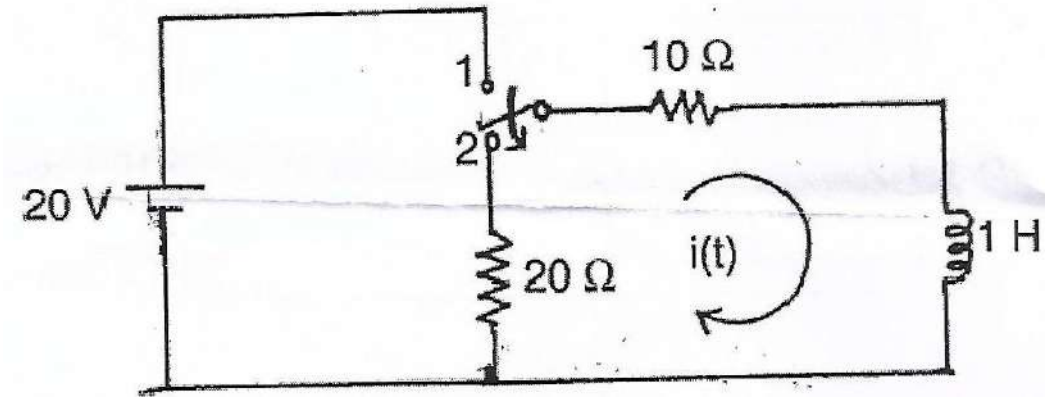

c) Give the Laplace transform of following function.

1) unit step function
2) unit ramp function
3) unit impluse function
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Seat No.	

Set **R**

S.E. (Part – II) (Old) (CGPA) 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

Instructions: 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

Duration: 30 Minutes Marks: 14

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

1) At t = 0+ with zero initial condition, which of the following acts as short circuit?
   a) Inductor b) Capacitor
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2) For a two port network to be reciprocal.
   a) $Z_{11} = Z_{22}$ b) $Y_{12} = Y_{21}$
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Seat No.	

Set **R**

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

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

Q.2 Solve any three. **12**

a) State and explain maximum power transfer theorem.

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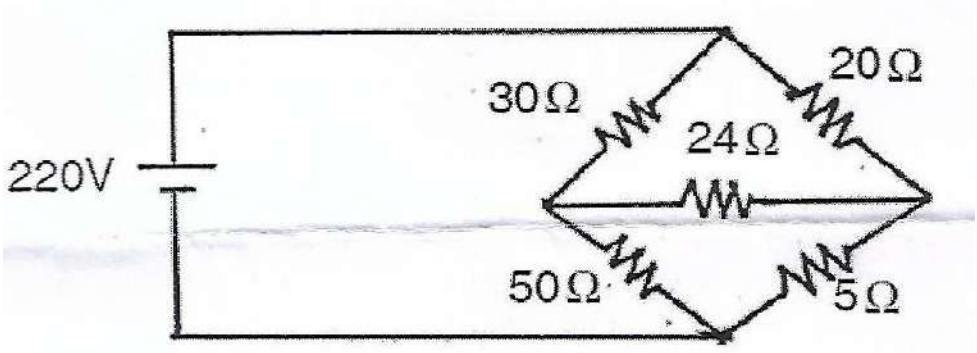
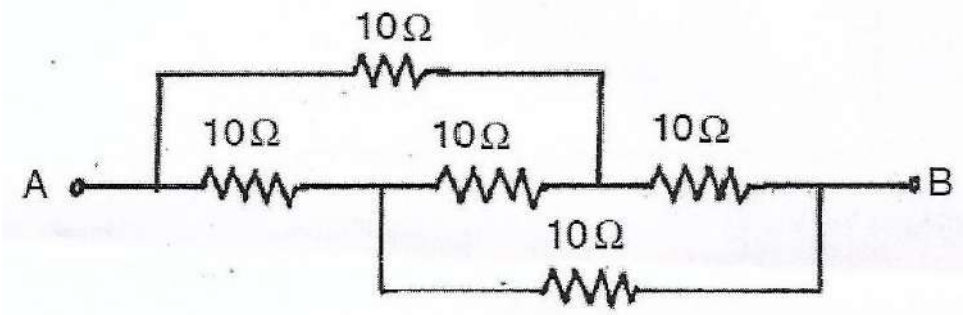
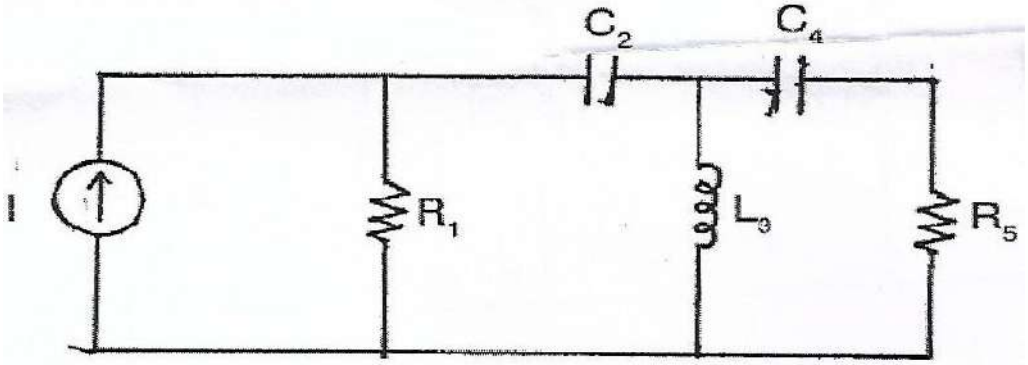


c) Find an equivalent resistance between A and B.



d) Draw the dual of the given network.



Q.3 Solve any two. **16**

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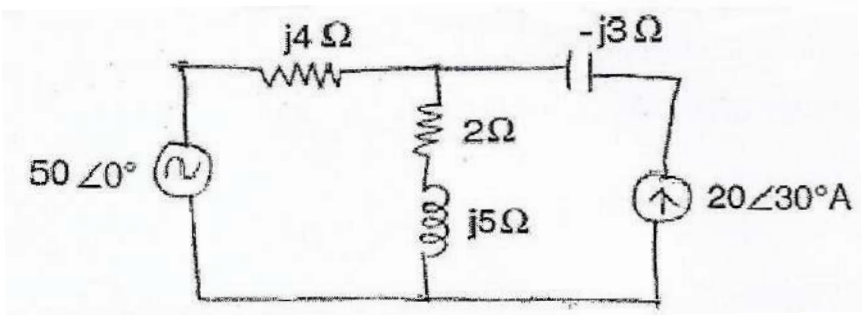

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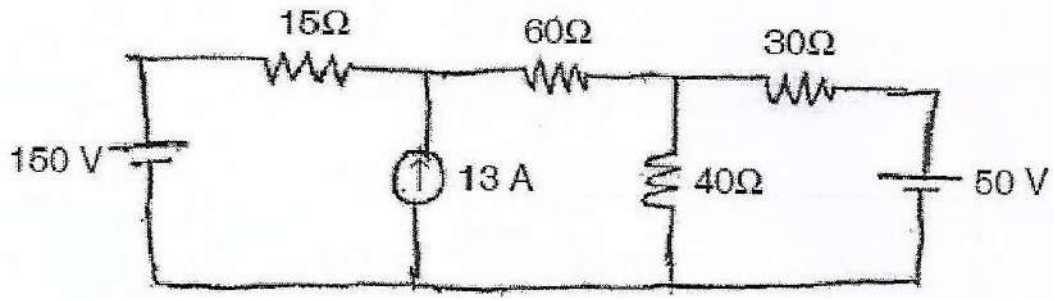

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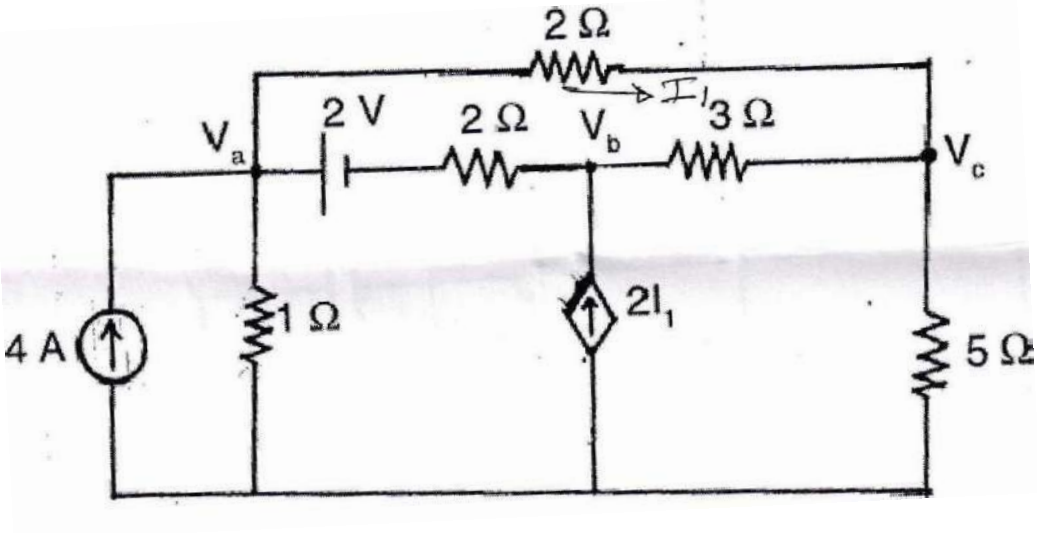

Section – II

Q.4 Solve any three. **12**

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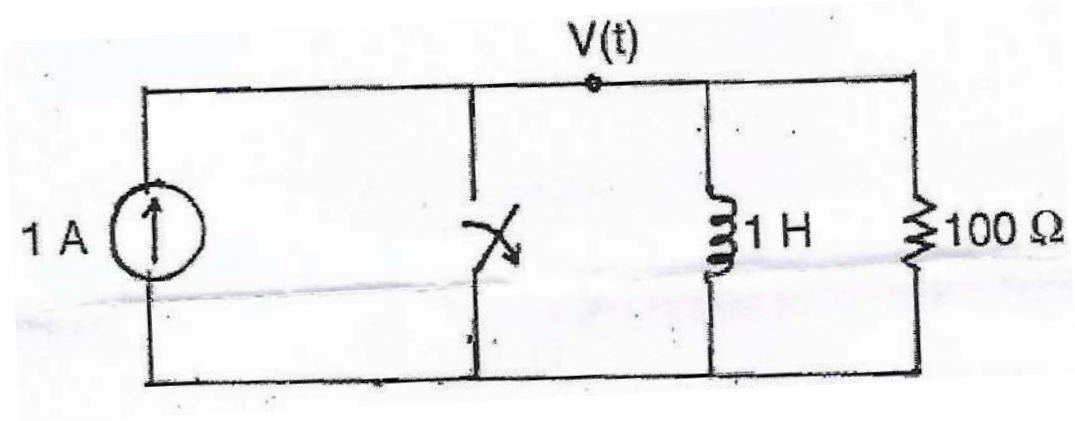

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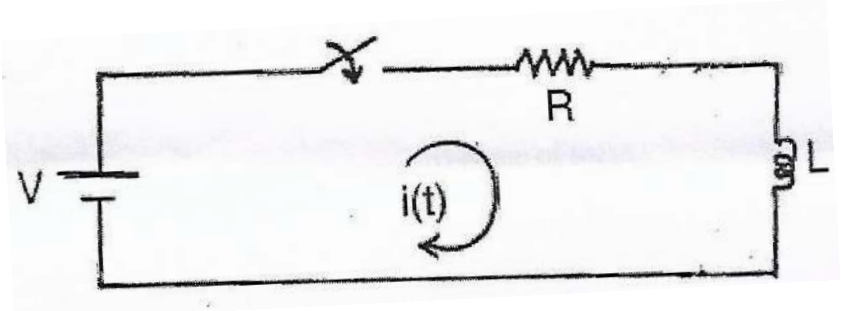
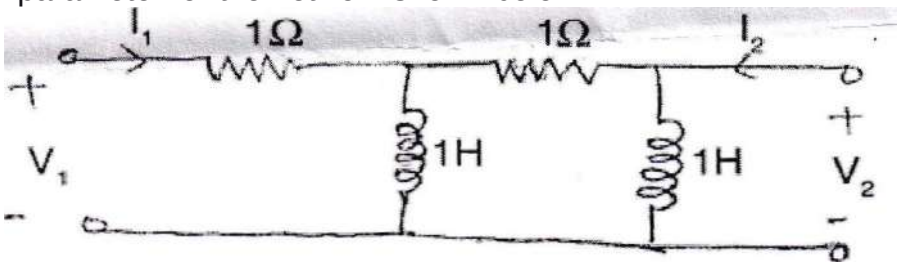


d) Find Z parameter for the network shown below.



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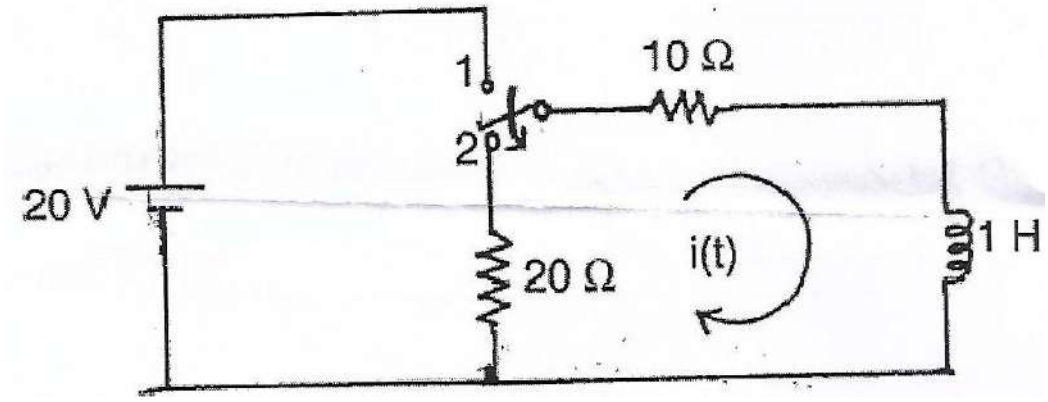

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Seat No.	

Set | S

S.E. (Part – II) (Old) (CGPA) 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

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Duration: 30 Minutes Marks: 14

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7) In an electric circuit dual of inductance is _____.
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8) Current between two open terminals is _____.
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Seat No.	

Set **S**

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

Day & Date: Wednesday, 27-11-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

Q.2 Solve any three. **12**

a) State and explain maximum power transfer theorem.

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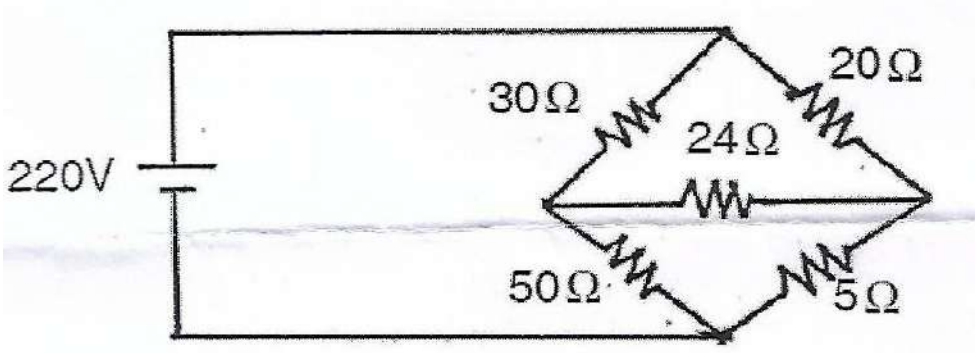
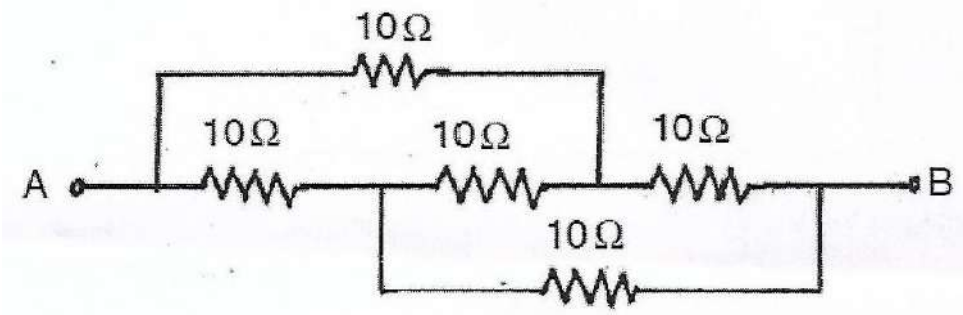
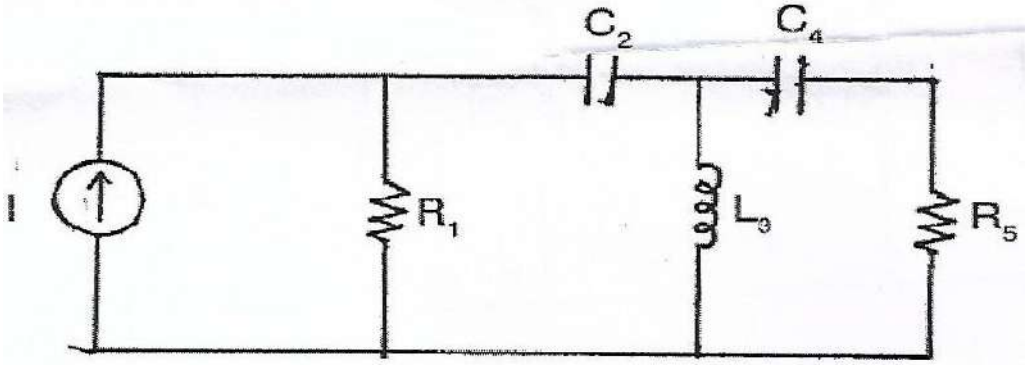


c) Find an equivalent resistance between A and B.



d) Draw the dual of the given network.



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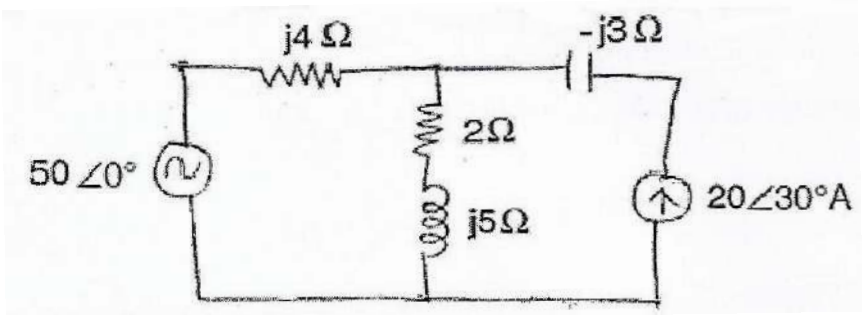
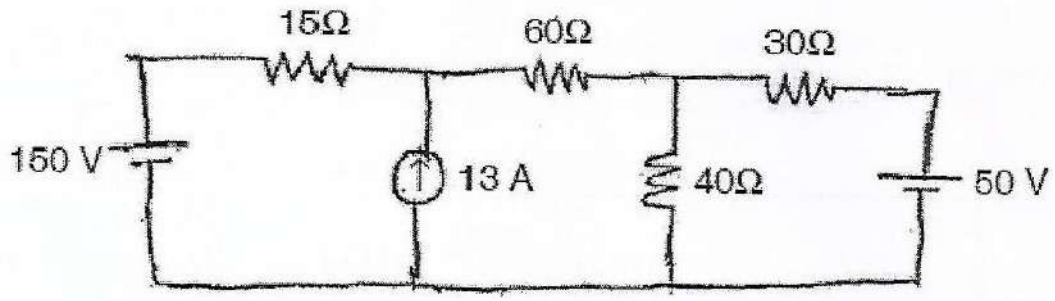


b) State and Explain Thevenin's Theorem. Find the current through the 30 Ω resistor using Thevenin's Theorem.



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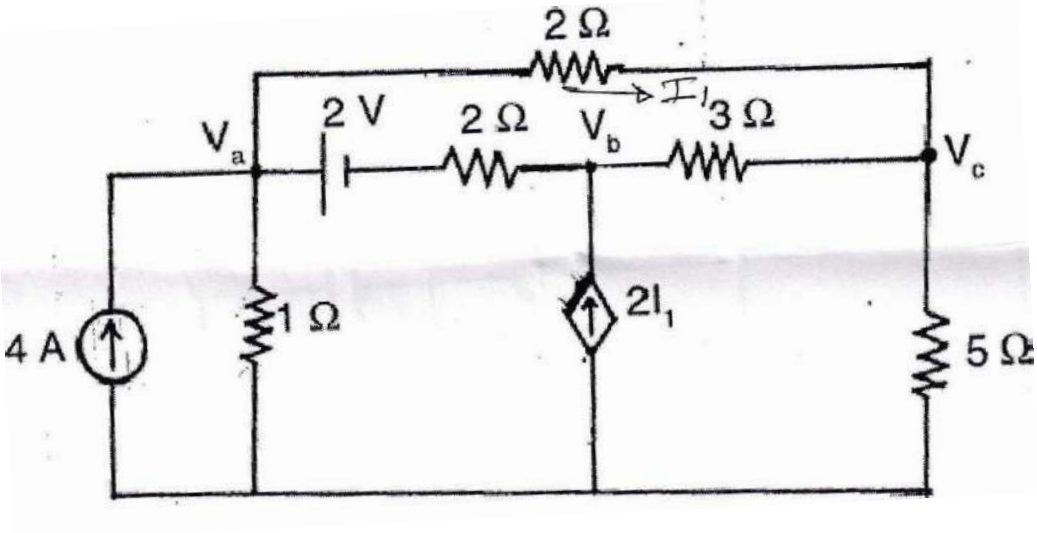
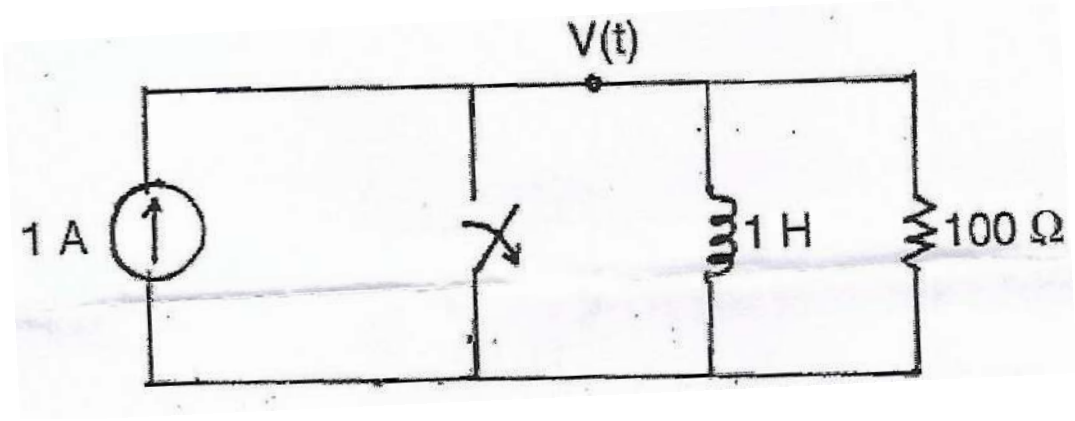


Section – II

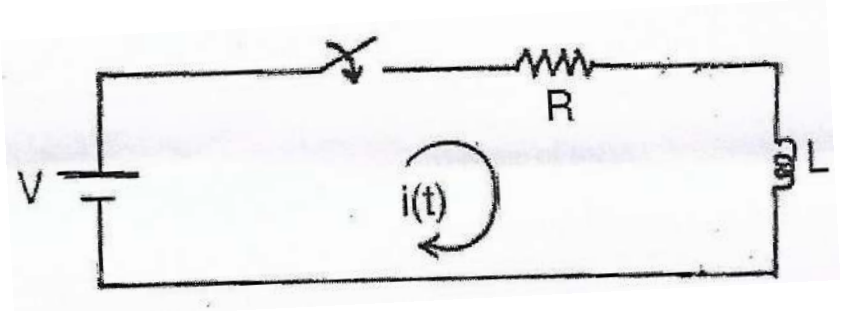
Q.4 Solve any three. **12**

a) Derive h parameter in terms of Z-parameter.

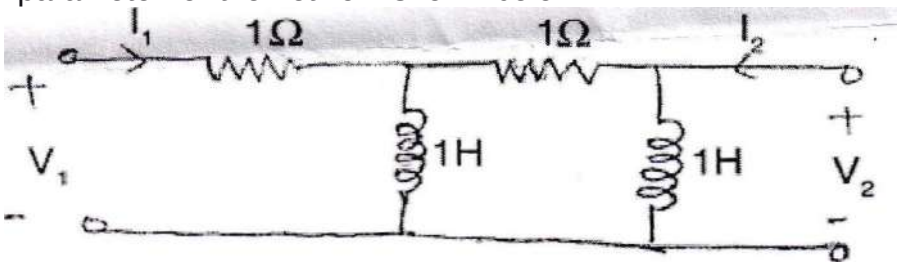
b) In the given network at t=0 switch is opened. Calculate v & dv/dt at $t = 0^+$



c) Derive an expression for i(t) for following circuit.



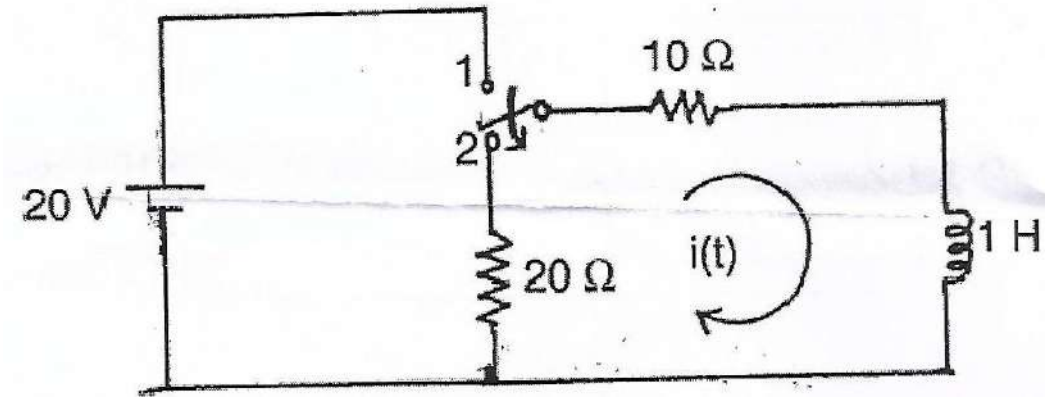
d) Find Z parameter for the network shown below.



Q.5 Solve any two. **16**

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, d^2i/dt^2.



c) Give the Laplace transform of following function.

1) unit step function
2) unit ramp function
3) unit impluse function
4) Exponential function

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 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 Marks: 14

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

1) A synchronous machine is _____.
   a) single excited machine b) doubly excited machine
   c) made to run below Ns d) lagging power factor machine

2) The per unit value of a 2 ohm resistor at 100 MVA base and 10 KV base voltage is _____.
   a) 4 pu b) 2 pu
   c) 0.5 pu d) 0.2 pu

3) 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

4) 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

5) 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

6) 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

7) EMF source is present _____ sequence N/W.
   a) positive b) zero
   c) negative d) all of the above

8) 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

9) 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
   c) Z0<Z1<Z2 d) None of the above

10) 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

11) When a line-to-ground fault occurs, the current in a faulted phase is 100 A. The zero sequence current in this case will be _____.
   a) zero b) 33.3 A
   c) 66.6 A d) 100 A

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 _____.
   a) double line to ground fault b) double line fault
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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
   b) M2
   c) It does not matter whether to add to M1 or M2
   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 _____.
   a) 4.0 b) 2.0
   c) 1.0 d) 0.5

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Max. Marks: 56
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. **16**

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.

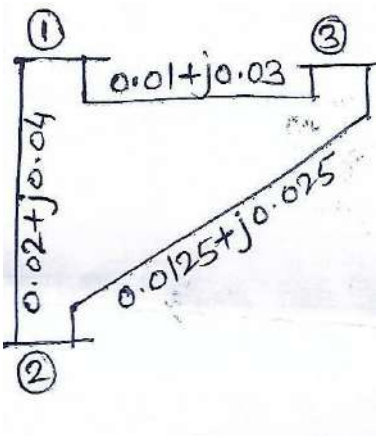
d) Derive an expression for the load flow analysis by gauss siedal method when.
1) PQ buses are present in the system
2) PV buses are present in system

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.

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.

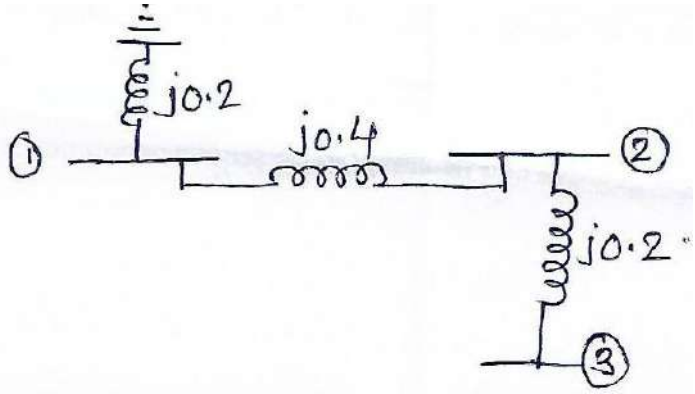


Bus	Voltage	Generation		Load	
		MW	MVAr	MW	MVAr
1 slack	1.05	-	-	0	0
2	1+j0	50	30	305.6	140.2
3	1+j0	0	0	138.6	45.2

Base MVA=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. **16**

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.
$ER = 1 \angle 0° \, V; EB = 1 \angle -120° \, V; EY = 0 \, V$
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. **12**

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.

$\mathrm{IR1} = (7 \cdot 89 + \mathrm{j}\ 0 \cdot 732)\ \mathrm{A}; \mathrm{IR2} = (2 \cdot 11 - \mathrm{j}\ 2 \cdot 732)\ \mathrm{A}$

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.

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 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 Marks: 14

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

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
   c) Z0<Z1<Z2 d) None of the above

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 be _____.
   a) zero b) 33.3 A
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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
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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 value corresponding to 400 MVA will be _____.
   a) 4.0 b) 2.0
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8) A synchronous machine is _____.
   a) single excited machine
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9) The per unit value of a 2 ohm resistor at 100 MVA base and 10 KV base voltage is _____.
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   b) Y22, Y23, Y32, Y33
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13) 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

14) EMF source is present _____ sequence N/W.
   a) positive
   b) zero
   c) negative
   d) all of the above

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Max. Marks: 56
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 of the following questions. **16**

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)
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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.

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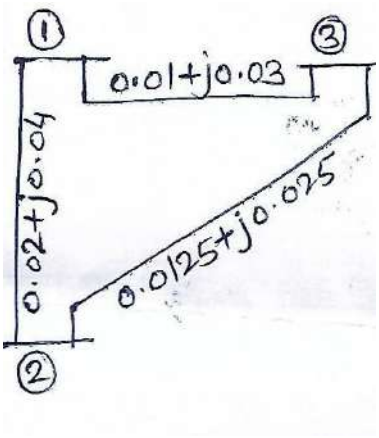
a) The following is the system data for load flow solution along with schedule of real and reactive powers, determine the voltages at the end of first iteration using gauss seidel method.



Bus	Voltage	Generation		Load	
		MW	MVAr	MW	MVAr
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2	1+j0	50	30	305.6	140.2
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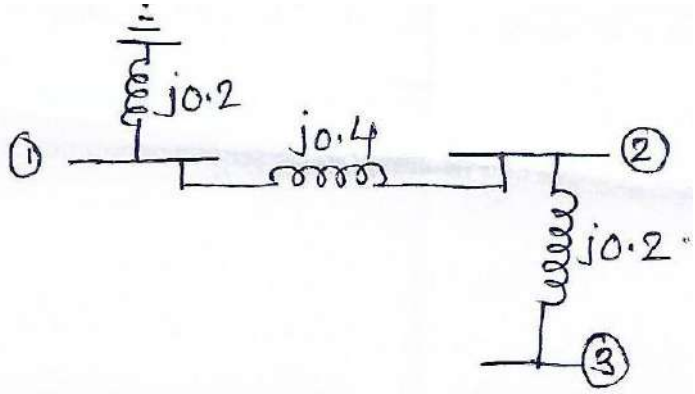
Base MVA=100

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. **16**

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.
$ER = 1\angle 0°\ V; EB = 1\angle -120°\ V; EY = 0\ V$
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.

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Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 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.
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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) 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 _____.
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2) For a 15-bus power system with 3 voltage controlled bus, the size of Jacobian matrix is _____.
   a) 11×11 b) 12×12
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3) EMF source is present _____ sequence N/W.
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4) 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 _____.
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Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

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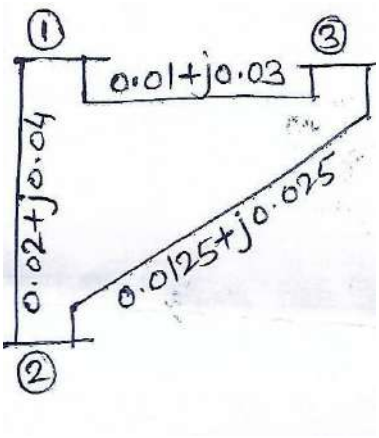

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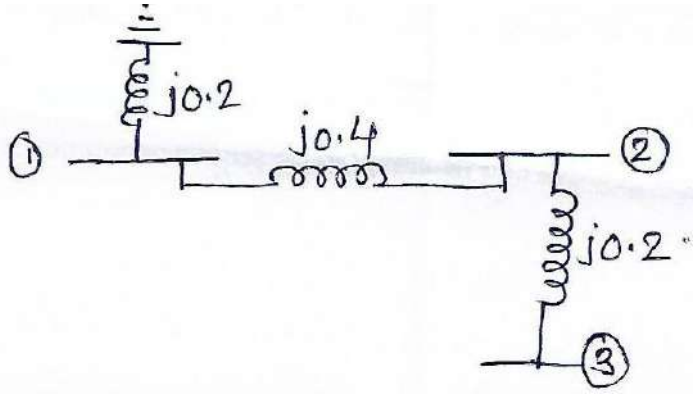

Section – II

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1) line to line fault occurs on generator
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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.

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 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 Marks: 14

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

1) 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

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 be _____.
   a) zero b) 33.3 A
   c) 66.6 A d) 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 value corresponding to 400 MVA will be _____.
   a) 4.0 b) 2.0
   c) 1.0 d) 0.5

6) A synchronous machine is _____.
   a) single excited machine b) doubly excited machine
   c) made to run below Ns d) lagging power factor machine

7) The per unit value of a 2 ohm resistor at 100 MVA base and 10 KV base voltage is _____.
   a) 4 pu b) 2 pu
   c) 0.5 pu d) 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

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
   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 b) Z1<Z2<Z0
   c) Z0<Z1<Z2 d) None of the above

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
POWER SYSTEM ANALYSIS

Day & Date: Friday, 06-12-2019 Max. Marks: 56
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. **16**

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.

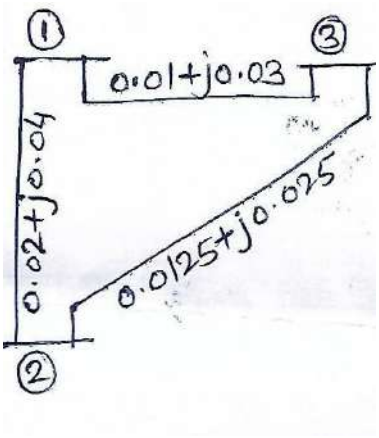
d) Derive an expression for the load flow analysis by gauss siedal method when.
1) PQ buses are present in the system
2) PV buses are present in system

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.

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.

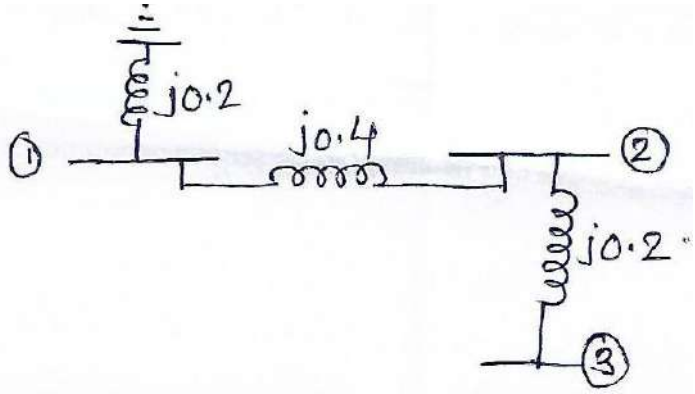


Bus	Voltage	Generation		Load	
		MW	MVAr	MW	MVAr
1 slack	1.05	-	-	0	0
2	1+j0	50	30	305.6	140.2
3	1+j0	0	0	138.6	45.2

Base MVA=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. **16**

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.
$ER = 1 \angle 0° \, V; EB = 1 \angle -120° \, V; EY = 0 \, V$
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. **12**

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.

$\mathrm{IR1} = (7 \cdot 89 + \mathrm{j}\ 0 \cdot 732)\ \mathrm{A}; \mathrm{IR2} = (2 \cdot 11 - \mathrm{j}\ 2 \cdot 732)\ \mathrm{A}$

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.

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 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) 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 Marks: 14

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

1) 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

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) Overall gain
   c) Distortion d) Instability

4) A transfer function of a system is a Laplace transform of its _____.
   a) Square wave response b) Step response
   c) Ramp response d) Impulse response

5) In a control system, the controller output is given to _____.
   a) Sensor b) Comparator
   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) $1 + G_1(s)\, G_2(s)$

7) A node having only outgoing branches _____.
   a) Incoming node b) Output node
   c) Input node d) Outgoing node

8) The damping ratio and peak overshoot are measures of _____.
   a) Relative stability b) Speed of response
   c) Steady state error d) Absolute stability

9) Steady state accuracy is determined by suitable choice of _____.
   a) Steady error
   b) Error constants
   c) Damping
   d) 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 point _____.
   a) Open loop zeros
   b) Closed loop zeros
   c) Open loop poles
   d) Closed loop poles

12) Root locus is used to calculate _____.
   a) Marginal stability
   b) Absolute stability
   c) Conditional stability
   d) 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

14) What should be the nature of bandwidth for a good control system?
   a) Large
   b) Small
   c) Medium
   d) All of the above

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
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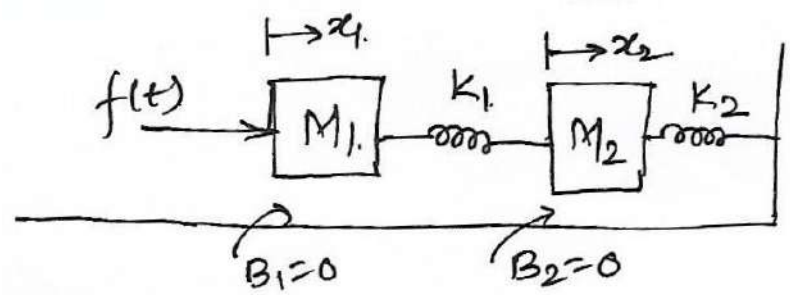
4) Use of only non-programmable calculator is allowed.

Section – I

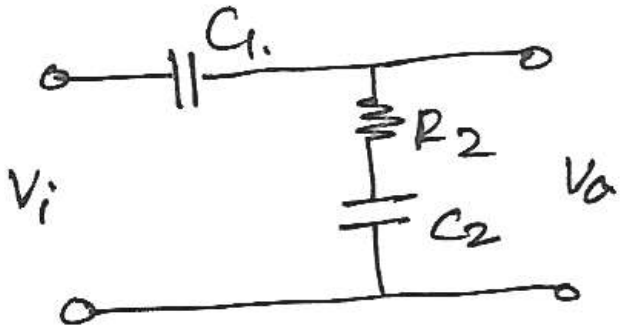
Q.2 Solve any Four. **16**

a) Distinguish the open loop and closed loop control systems.

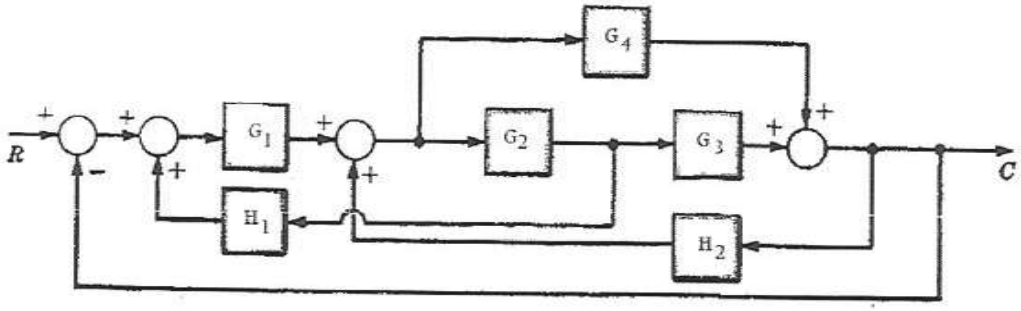
b) For the mechanical system shown
1) Draw the mechanical equivalent network
2) Write the system differential equations
3) Determine the transfer function $\frac{x_2(s)}{F(s)}$.



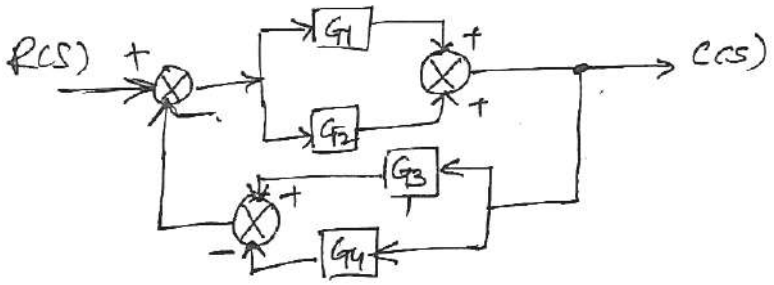
c) Determine the T.F. for the electric network shown



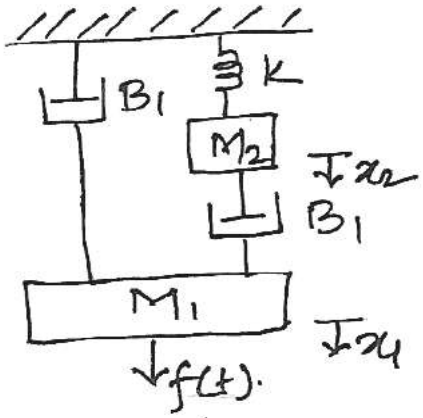
d) For the block diagram shown, find C(s)/R(s) using block diagram reduction technique.



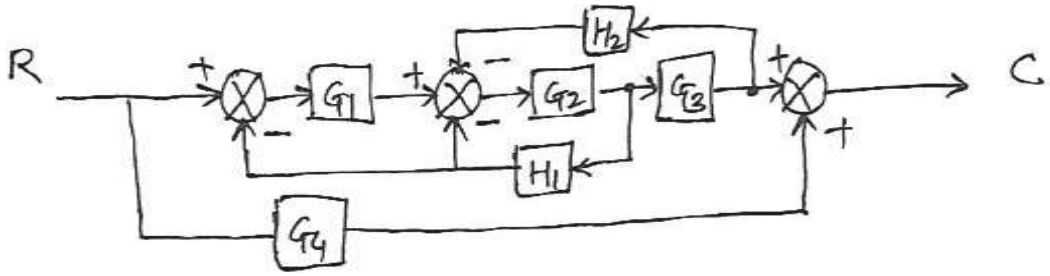
e) Obtain the Transfer Function C(s)/R(s).



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. **06**



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.** **16**

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.

Q.5 Solve any Two. **12**

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.

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 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.
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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 damping ratio and peak overshoot are measures of _____.
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   c) Steady state error d) Absolute stability

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Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
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Section – I

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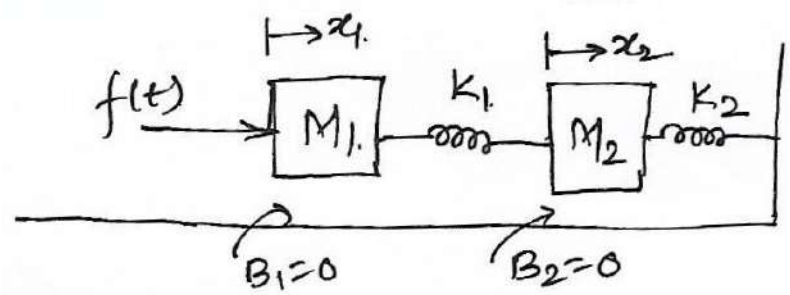

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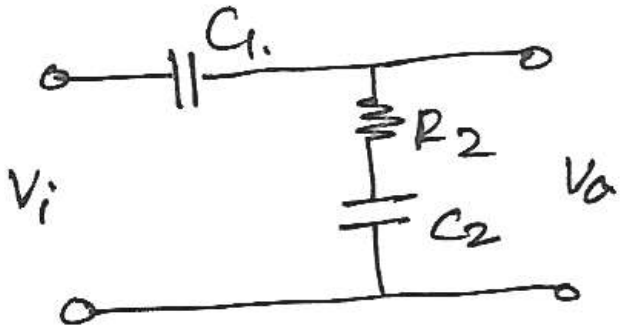

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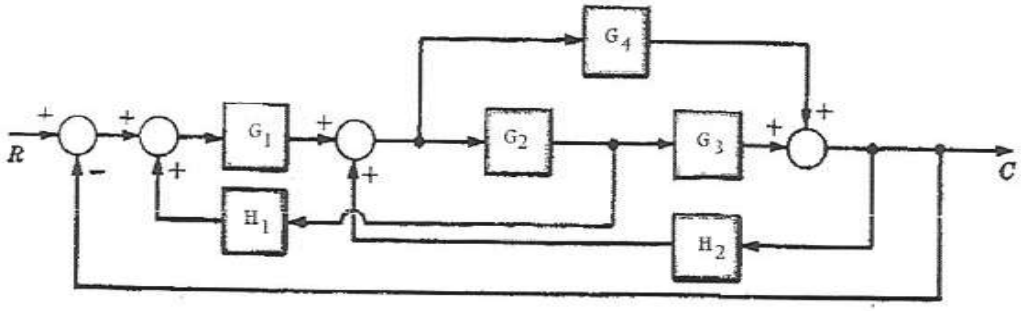

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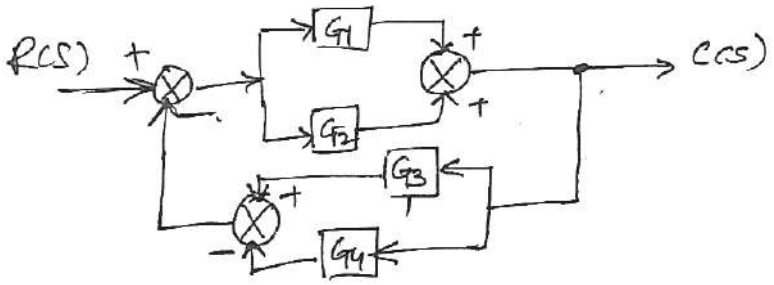

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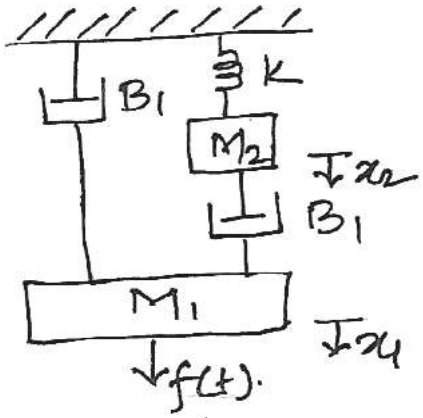

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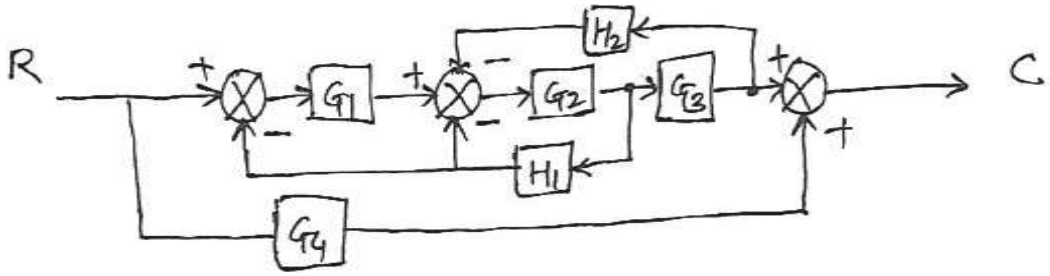

OR

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Section – II

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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.

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a) For the unity feedback system where $G(s) = \frac{5000}{s(s+75)}$

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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.

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 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.
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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) In a control system, the controller output is given to _____.
   a) Sensor b) Comparator
   c) Amplifier d) Final Control element

2) 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) $1 + G_1(s)\, G_2(s)$

3) A node having only outgoing branches _____.
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4) The damping ratio and peak overshoot are measures of _____.
   a) Relative stability b) Speed of response
   c) Steady state error d) Absolute stability

5) Steady state accuracy is determined by suitable choice of _____.
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   c) Damping d) Transient error

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   c) Conditional stability d) Relative stability

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
   b) It is calculated at gain cross over frequency
   c) It is calculated at phase cross over frequency
   d) Both a and c

10) What should be the nature of bandwidth for a good control system?
   a) Large
   b) Small
   c) Medium
   d) All of the above

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

12) A good control system has all the following features except _____.
   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
   b) Overall gain
   c) Distortion
   d) Instability

14) A transfer function of a system is a Laplace transform of its _____.
   a) Square wave response
   b) Step response
   c) Ramp response
   d) Impulse response

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

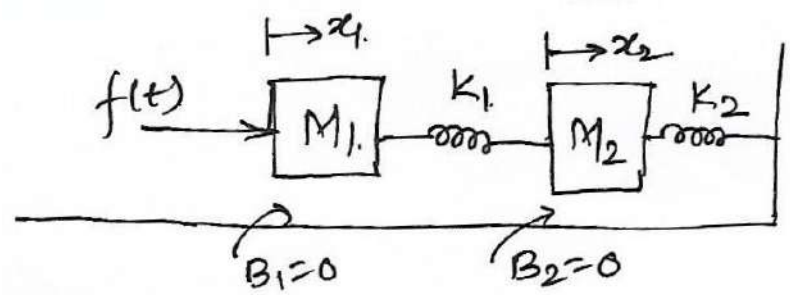
Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Assume suitable data if necessary.
4) Use of only non-programmable calculator is allowed.

Section – I

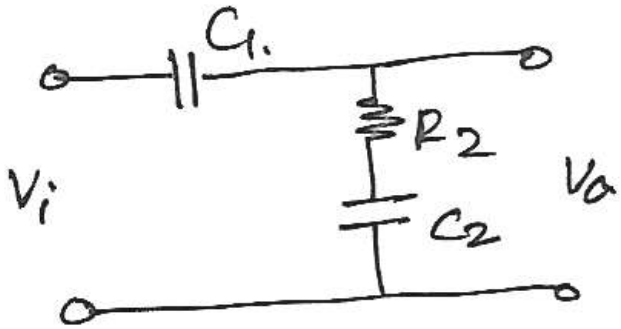
Q.2 Solve any Four. **16**

a) Distinguish the open loop and closed loop control systems.

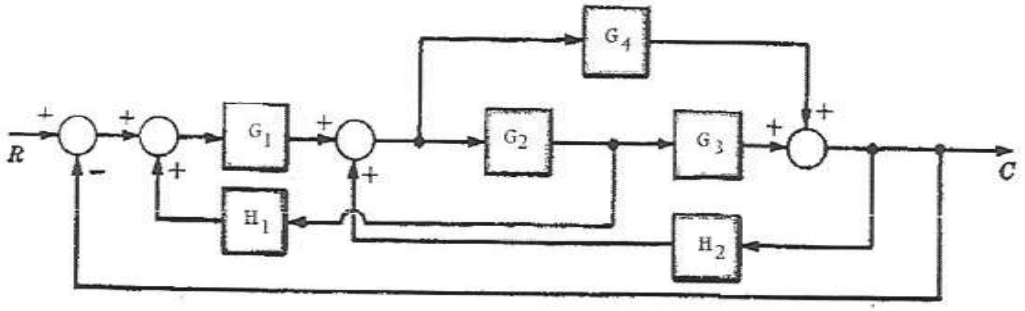
b) For the mechanical system shown
1) Draw the mechanical equivalent network
2) Write the system differential equations
3) Determine the transfer function $\frac{x_2(s)}{F(s)}$.



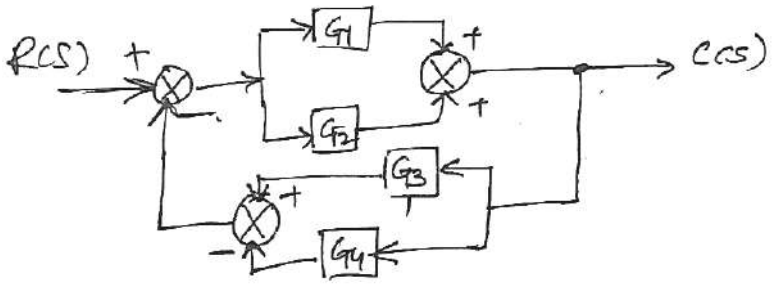
c) Determine the T.F. for the electric network shown



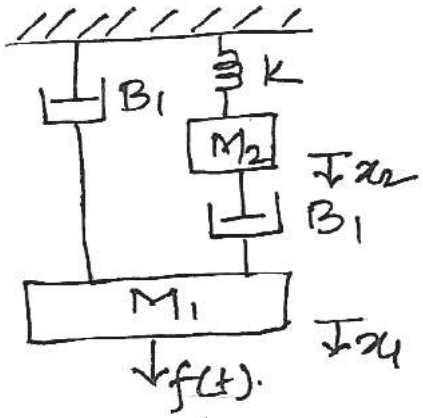
d) For the block diagram shown, find C(s)/R(s) using block diagram reduction technique.



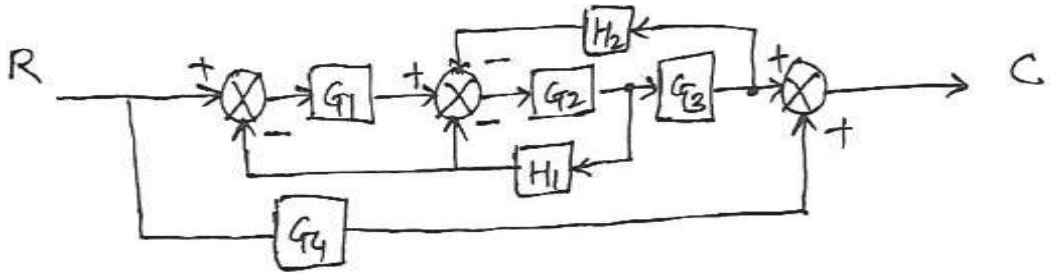
e) Obtain the Transfer Function C(s)/R(s).



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. **06**



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.** **16**

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.

Q.5 Solve any Two. **12**

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.

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 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) 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 Marks: 14

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

1) 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

2) For root loci which of the following are the starting point _____.
   a) Open loop zeros b) Closed loop zeros
   c) Open loop poles d) Closed loop poles

3) Root locus is used to calculate _____.
   a) Marginal stability b) Absolute stability
   c) Conditional stability d) Relative stability

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
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5) What should be the nature of bandwidth for a good control system?
   a) Large b) Small
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6) In an open loop control system _____.
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7) A good control system has all the following features except _____.
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8) As a result of introduction of negative feedback which of the following will not decrease?
   a) Band width
   b) Overall gain
   c) Distortion
   d) Instability

9) A transfer function of a system is a Laplace transform of its _____.
   a) Square wave response
   b) Step response
   c) Ramp response
   d) Impulse response

10) In a control system, the controller output is given to _____.
   a) Sensor
   b) Comparator
   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 _____.
   a) Incoming node
   b) Output node
   c) Input node
   d) Outgoing node

13) The damping ratio and peak overshoot are measures of _____.
   a) Relative stability
   b) Speed of response
   c) Steady state error
   d) Absolute stability

14) Steady state accuracy is determined by suitable choice of _____.
   a) Steady error
   b) Error constants
   c) Damping
   d) Transient error

Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
CONTROL SYSTEM – I

Day & Date: Monday, 09-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
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4) Use of only non-programmable calculator is allowed.

Section – I

Q.2 Solve any Four. **16**

a) Distinguish the open loop and closed loop control systems.

b) For the mechanical system shown
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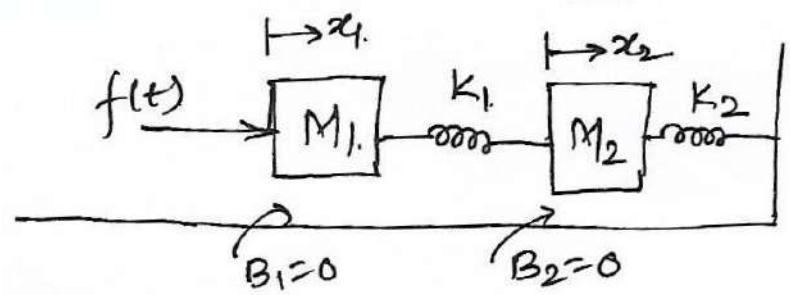
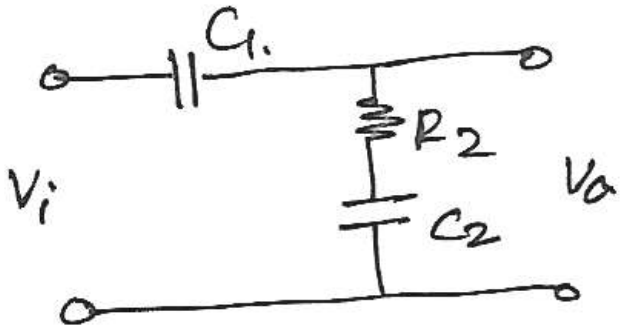
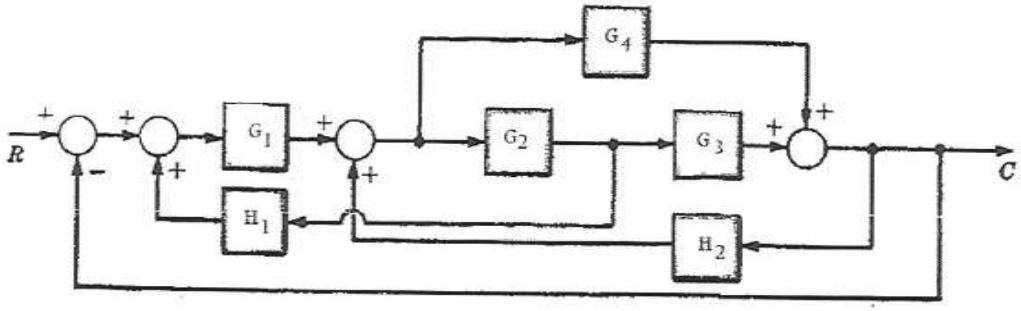


c) Determine the T.F. for the electric network shown



d) For the block diagram shown, find C(s)/R(s) using block diagram reduction technique.



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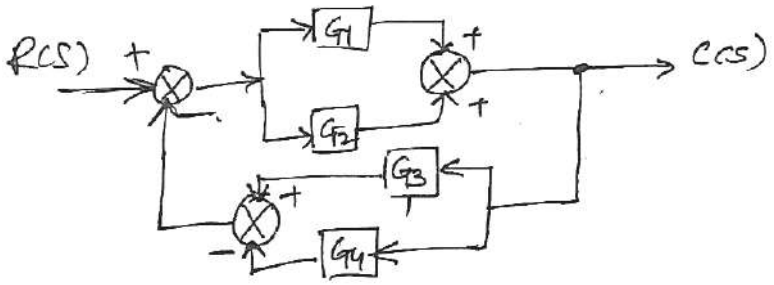

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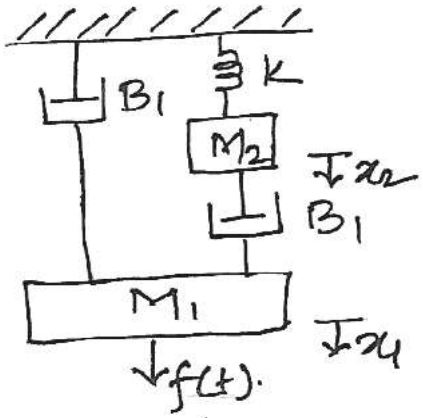

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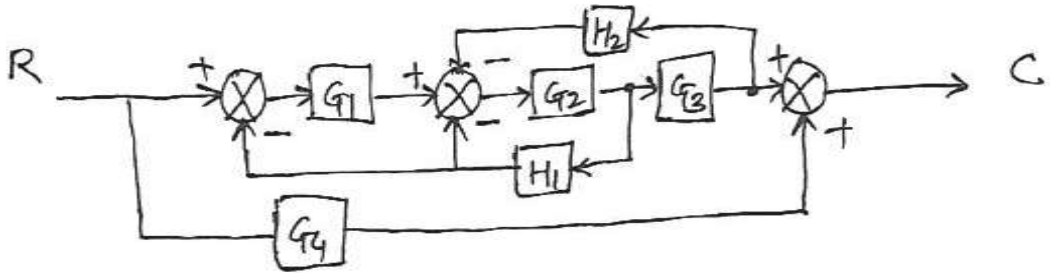

OR

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Section – II

Q.4 **Solve any Four.** **16**

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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.

SLR-FM-732

Seat No.	

Set P

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND INDUSTRIAL 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 Marks: 14

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

1) Economics is the science which studies _____.
   a) Moral things
   b) Human behavior with reference to human needs and its means
   c) Only profits & loss in the business
   d) Human psychology

2) PERT includes following _____.
   a) Most likely time b) Pessimistic time
   c) Optimistic time d) all of above

3) _____ is utilization of organized information for managerial decision making.
   a) EOQ b) ABC
   c) MIS d) CPM

4) 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

5) 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

6) Function of Entrepreneur is _____.
   a) To bear risk & uncertainty b) To control and manage efficiently
   c) To increase co-ordination d) all of above

7) _____ is the father of principles of management.
   a) Peter Drucker b) Henry Fayol
   c) William Hawtray d) Joseph Schumpeter

8) Objective of Value Analysis _____.
   a) To increase profit b) To increase efficiency
   c) To reduce cost of product d) Both a) & c)

9) For growing needs of power sector in the country; which of the following source would be cheaper and suitable _____?
   a) Tidal power
   b) Solar power
   c) Wind Power
   d) none of the above

10) Improved technology shall bring about _____.
   a) Increase in cost of Production
   b) Increase in Demand
   c) Increase in scale of production
   d) None of the above

11) _____ technology is suitable for SSI.
   a) Labour intensive
   b) Complex technology
   c) Capital intensive
   d) No Technology

12) Entrepreneurship development means and includes _____.
   a) Creation of jobs for unemployed
   b) Starting new ventures
   c) Giving opportunities and facilities to entrepreneurs
   d) Imposing many new taxes on entrepreneurs

13) GST means _____.
   a) Growth Sales Tax
   b) Gross Sale Tax
   c) Goods & Service Tax
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14) Demonetization announced by Government of India on _____.
   a) 31st December 2016
   b) 8th November 2016
   c) 8th December 2016
   d) 1st April 2016

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

Q.2 **Write short notes. (any four)** **16**
- **a)** Micro & Macro Economics
- **b)** Types of Energy Sources
- **c)** Private and Public limited company Characteristics
- **d)** Economic Order Quantity
- **e)** Payback Period

Q.3 **a)** Explain in detail Features of Indian Economy. **06**

b) Distinguish between Macro Economy and Micro Economy. Explain in detail the indicators of Macro Economy and Micro Economy. **06**

OR

Discuss the different forms of Business organization.

Q.4 **Write short notes. (any four)** **16**
- **a)** Key factors regarding location of Factory
- **b)** Functions of Management
- **c)** Characteristics of Good Management Information System
- **d)** Provisions in Factory Act
- **e)** Advantages of Small Scale Industry

Q.5 List the stages of setting of SSI. **06**

Q.6 Explain PERT and CPM methods with suitable example. **06**

OR

Discuss Functions of Entrepreneur. Explain the contents of Detailed project report.

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day & Date: Friday, 13-12-2019 Max. Marks: 70
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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Seat No.	

Set **Q**

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Electrical Engineering
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

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Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

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Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

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Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND INDUSTRIAL 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 Marks: 14

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

1) Improved technology shall bring about _____.
   a) Increase in cost of Production
   b) Increase in Demand
   c) Increase in scale of production
   d) None of the above

2) _____ technology is suitable for SSI.
   a) Labour intensive b) Complex technology
   c) Capital intensive d) No Technology

3) Entrepreneurship development means and includes _____.
   a) Creation of jobs for unemployed
   b) Starting new ventures
   c) Giving opportunities and facilities to entrepreneurs
   d) Imposing many new taxes on entrepreneurs

4) GST means _____.
   a) Growth Sales Tax b) Gross Sale Tax
   c) Goods & Service Tax d) Good Sale Tax

5) Demonetization announced by Government of India on _____.
   a) 31st December 2016 b) 8th November 2016
   c) 8th December 2016 d) 1st April 2016

6) Economics is the science which studies _____.
   a) Moral things
   b) Human behavior with reference to human needs and its means
   c) Only profits & loss in the business
   d) Human psychology

7) PERT includes following _____.
   a) Most likely time b) Pessimistic time
   c) Optimistic time d) all of above

8) _____ is utilization of organized information for managerial decision making.
   a) EOQ b) ABC
   c) MIS d) CPM

9) 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

10) 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

11) Function of Entrepreneur is _____.
   a) To bear risk & uncertainty
   b) To control and manage efficiently
   c) To increase co-ordination
   d) all of above

12) _____ is the father of principles of management.
   a) Peter Drucker
   b) Henry Fayol
   c) William Hawtray
   d) Joseph Schumpeter

14) Objective of Value Analysis _____.
   a) To increase profit
   b) To increase efficiency
   c) To reduce cost of product
   d) Both a) & c)

9) For growing needs of power sector in the country; which of the following source would be cheaper and suitable _____?
   a) Tidal power
   b) Solar power
   c) Wind Power
   d) none of the above

SLR-FM-732

Seat No.		Set	S

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day & Date: Friday, 13-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

Q.2 **Write short notes. (any four)** **16**
- **a)** Micro & Macro Economics
- **b)** Types of Energy Sources
- **c)** Private and Public limited company Characteristics
- **d)** Economic Order Quantity
- **e)** Payback Period

Q.3 **a)** Explain in detail Features of Indian Economy. **06**

b) Distinguish between Macro Economy and Micro Economy. Explain in detail the indicators of Macro Economy and Micro Economy. **06**

OR

Discuss the different forms of Business organization.

Q.4 **Write short notes. (any four)** **16**
- **a)** Key factors regarding location of Factory
- **b)** Functions of Management
- **c)** Characteristics of Good Management Information System
- **d)** Provisions in Factory Act
- **e)** Advantages of Small Scale Industry

Q.5 List the stages of setting of SSI. **06**

Q.6 Explain PERT and CPM methods with suitable example. **06**

OR

Discuss Functions of Entrepreneur. Explain the contents of Detailed project report.

SLR-FM-733

Seat No.	

Set P

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 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.
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. 14

1) $\nabla \times H = (\sigma + j\omega\varepsilon)E$ is for _____.
   a) Time varying field b) Static field
   c) Harmonically varying field d) None-time varying field

2) For static magnetic field _____.
   a) $\nabla \times \mathrm{B} = \rho$ b) $\nabla \times \mathrm{B} = \mu \mathrm{J}$
   c) $\nabla \cdot \mathrm{B} = \mu \mathrm{oJ}$ d) $\nabla \times \mathrm{B} = 0$

3) Displacement current density is _____.
   a) D b) J
   c) $\partial D / \partial t$ d) $\partial J / \partial t$

4) Energy shared in a magneto static field is _____.
   a) $\frac{1}{4}\mu \mathrm{H}^2$ b) $\frac{1}{4}\mu \mathrm{H}$
   c) $\frac{1}{2}\mu \mathrm{H}^2$ d) None of these

5) The unit of magnetic susceptibility is _____.
   a) Nil b) Amp
   c) H/M d) Wb

6) Mutual inductance between two coils is _____.
   a) $\mathrm{M} = \frac{\mathrm{N2}\Phi 1}{\mathrm{I1}}$ b) $\mathrm{M} = \frac{\mathrm{N1}\Phi 2}{\mathrm{I2}}$
   c) $\mathrm{M} = \frac{\mathrm{N1I1}}{\Phi 1}$ d) $\mathrm{M} = \frac{\mathrm{N1I1}}{\Phi 2}$

7) Ampere's circuital law in differential form is _____.
   a) $\nabla \times \mathrm{H} = \mathrm{J}$ b) $\nabla \cdot \mathrm{H} = \mathrm{J}$
   c) $\nabla \times \mathrm{H} = \mathrm{I}$ d) $\nabla \cdot \mathrm{H} = \mathrm{I}$

8) 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

9) Find the nature of the given vector field defined by $A = 30a_x - 2xy\ a_y + 5xz^2 a_z$
   a) Neither Solenoidal nor irrotational
   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.
   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.
   iv) The normal component of the flux density is continuous across the charge free boundary between two dielectrics. Of these statements
   a) i), ii) & iii) are correct
   b) ii), iii) & iv) are correct
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11) Capacitance C of parallel plate capacitor is _____.
   a) $\varepsilon A / d$
   b) $\varepsilon A / d^2$
   c) $\varepsilon A^2 / d$
   d) $\varepsilon A / s^2$

12) The Electric charges are _____.
   i) Conserved
   ii) Quantised
   iii) Exist in pair
   iv) Have circular field
   a) i) only
   b) i), ii)
   c) i), iv)
   d) i), ii), iii)

13) The Work in Moving charge between two points depending on _____.
   a) The Path Only
   b) Q,E, and the path
   c) Q and E Only
   d) Q,E, and the end point

14) The surface over which Gauss's law is applied must be _____.
   a) Open
   b) Closed
   c) Ps
   d) none of these

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Max. Marks: 56
Time: 02:30 PM To 05:30 PM

Instructions: 1) All questions are compulsory.
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Section – I

Q.2 Solve any three **12**

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 $\bar{E}$ on the side of the plane containing the Origin.

Q.3 Solve any two. **16**

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 $\bar{E} = 5\ e^{-r/4}\bar{a}_r + \frac{10}{r \sin\theta}\bar{a}_\Phi v/m.$
c) Derive expression on electric field due to infinite sheet charge.

Section – II

Q.4 Solve any three. **12**

a) A current filament of 5.0 A in a_y direction is parallel to y axis at x= 2,z= - 2. Find $\bar{H}$ 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. **16**

a) Evaluate both sides of Stroke's theorem for the field
$$\bar{H} = (y^2 z/x)\bar{a}_x + (0.5y^2 z^2/x^2)\bar{a}_z$$
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.

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Max. Marks: 70
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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

Q.1 Choose the correct alternatives from the options. **14**

1) 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

2) Find the nature of the given vector field defined by
   $A = 30a_x - 2xy\ a_y + 5xz^2 a_z$
   a) Neither Solenoidal nor irrotational
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3) Consider the following statements regarding field boundary conditions _____.
   i) The tangential component of electric field is continuous across the boundary between two dielectrics.
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4) Capacitance C of parallel plate capacitor is _____.
   a) $\varepsilon A / d$ b) $\varepsilon A / d^2$
   c) $\varepsilon A^2/d$ d) $\varepsilon A / s^2$

5) The Electric charges are _____.
   i) Conserved
   ii) Quantised
   iii) Exist in pair
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   a) i) only b) i), ii)
   c) i), iv) d) i), ii), iii)

6) The Work in Moving charge between two points depending on _____.
   a) The Path Only
   b) Q,E, and the path
   c) Q and E Only
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7) The surface over which Gauss's law is applied must be _____.
   a) Open
   b) Closed
   c) Ps
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8) $\nabla \times H = (\sigma + j\omega\varepsilon)E$ is for _____.
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10) Displacement current density is _____.
   a) D
   b) J
   c) $\partial D \,/\, \partial t$
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12) The unit of magnetic susceptibility is _____.
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13) Mutual inductance between two coils is _____.
   a) $\mathrm{M} = \frac{\mathrm{N2\Phi1}}{\mathrm{I1}}$
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Seat No.	

Set **Q**

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ELECTROMAGNETIC ENGINEERING

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Section – I

Q.2 Solve any three **12**

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Q.3 Solve any two. **16**

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 $\bar{E} = 5\ e^{-r/4}\bar{a}_r + \frac{10}{r \sin\theta}\bar{a}_\Phi v/m.$
c) Derive expression on electric field due to infinite sheet charge.

Section – II

Q.4 Solve any three. **12**

a) A current filament of 5.0 A in a_y direction is parallel to y axis at x= 2,z= - 2. Find $\bar{H}$ at origin.
b) State and prove Ampere's work law.
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d) State the Maxwell's equation in point form for static electric fields.
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Seat No.	

Set **R**

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ELECTROMAGNETIC ENGINEERING

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MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

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12) For static magnetic field _____.
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14) Energy shared in a magneto static field is _____.
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Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Max. Marks: 56
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Section – I

Q.2 Solve any three **12**

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Q.3 Solve any two. **16**

a) Explain Boundary Condition for Electrostatic Field? Conductor free space Boundary.
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Section – II

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Seat No.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

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MCQ/Objective Type Questions

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12) Ampere's circuital law in differential form is _____.
   a) $\nabla \times H = J$ b) $\nabla . H = J$
   c) $\nabla \times H = I$ d) $\nabla . H = I$

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 field defined by $A = 30a_x - 2xy\ a_y + 5xz^2 a_z$
   a) Neither Solenoidal nor irrotational
   b) Solenoidal & irrotational
   c) Only Solenoidal
   d) Only irrotational

SLR-FM-733

Seat No.	

Set S

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTROMAGNETIC ENGINEERING

Day & Date: Monday, 16-12-2019 Max. Marks: 56
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 **12**

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 $\bar{E}$ on the side of the plane containing the Origin.

Q.3 Solve any two. **16**

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 $\bar{E} = 5\ e^{-r/4}\bar{a}_r + \frac{10}{r \sin\theta}\bar{a}_\Phi v/m.$
c) Derive expression on electric field due to infinite sheet charge.

Section – II

Q.4 Solve any three. **12**

a) A current filament of 5.0 A in a_y direction is parallel to y axis at x= 2,z= - 2. Find $\bar{H}$ 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. **16**

a) Evaluate both sides of Stroke's theorem for the field
$$\bar{H} = (y^2 z/x)\bar{a}_x + (0.5y^2 z^2/x^2)\bar{a}_z$$
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.

SLR-FM-734

Seat No.	

Set P

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 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 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) 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

2) 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

3) At lagging loads, armature reaction in an alternator is _____.
   a) Cross - magnetizing b) Demagnetizing
   c) Non - effective d) Magnetizing

4) The Potier's triangle separates the _____.
   a) iron losses and copper losses
   b) field mmf and armature mmf
   c) stator voltage and rotor voltage
   d) armature leakage reactance and armature reaction mmf

5) For proper parallel operation, a.c. polyphase alternators must have the same _____.
   a) speed b) voltage rating
   c) kVA rating d) excitation

6) Of the following conditions, the one which does not have to be met by alternators working in parallel is _____.
   a) terminal voltage each machine must be same
   b) the machines must have same phase rotation
   c) the machines must operate at the same frequency
   d) the machines must have equal ratings

7) 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

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 the ____.
   a) shaft load
   b) step pulse frequency
   c) polarity of stator current
   d) magnitude of stator current

12) 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

13) The rotor of a stepper motor has no _____.
   a) windings
   b) commutator
   c) brushes
   d) all of the above

14) Wave excitation of a stepper motor results in _____.
   a) microstepping
   b) half-stepping
   c) increased step angle
   d) reduced resolution

Seat No.	

Set **P**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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.

Q.5 Solve any two **12**

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.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 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 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) An unexcited single phase synchronous motor is _____.
   a) reluctance motor b) repulsion motor
   c) universal motor d) AC series motor

2) Zero power factor method of an alternator is used to find its _____.
   a) efficiency b) voltage regulation
   c) armature resistance d) synchronous impedance

3) 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

4) 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

5) 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

6) The rotor of a stepper motor has no _____.
   a) windings b) commutator
   c) brushes d) all of the above

7) Wave excitation of a stepper motor results in _____.
   a) microstepping b) half-stepping
   c) increased step angle d) reduced resolution

8) 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

9) 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

10) At lagging loads, armature reaction in an alternator is _____.
   a) Cross - magnetizing
   b) Demagnetizing
   c) Non - effective
   d) Magnetizing

11) The Potier's triangle separates the _____.
   a) iron losses and copper losses
   b) field mmf and armature mmf
   c) stator voltage and rotor voltage
   d) armature leakage reactance and armature reaction mmf

12) For proper parallel operation, a.c. polyphase alternators must have the same _____.
   a) speed
   b) voltage rating
   c) kVA rating
   d) excitation

13) Of the following conditions, the one which does not have to be met by alternators working in parallel is _____.
   a) terminal voltage each machine must be same
   b) the machines must have same phase rotation
   c) the machines must operate at the same frequency
   d) the machines must have equal ratings

14) 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

Seat No.	

Set **Q**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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.

Q.5 Solve any two **12**

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.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 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 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) For proper parallel operation, a.c. polyphase alternators must have the same _____.
   a) speed b) voltage rating
   c) kVA rating d) excitation

2) Of the following conditions, the one which does not have to be met by alternators working in parallel is _____.
   a) terminal voltage each machine must be same
   b) the machines must have same phase rotation
   c) the machines must operate at the same frequency
   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
   c) universal motor d) AC series motor

5) Zero power factor method of an alternator is used to find its _____.
   a) efficiency b) voltage regulation
   c) armature resistance d) synchronous impedance

6) 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
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7) 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

8) A stepper motor may be considered as a _____ converter.
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   c) dc to ac
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9) The rotor of a stepper motor has no _____.
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   b) commutator
   c) brushes
   d) all of the above

10) Wave excitation of a stepper motor results in _____.
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11) The disadvantage of short pitched coil is that _____.
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   b) field mmf and armature mmf
   c) stator voltage and rotor voltage
   d) armature leakage reactance and armature reaction mmf

Seat No.	

Set **R**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
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. **16**

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.
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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. **12**

a) A 25 kVA, single phase 500V alternator gave following O.C. & S.C. values.

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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 **16**

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.

Q.5 Solve any two **12**

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.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 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 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) The regulation of an alternator is _____.
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   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

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   d) excitation

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   b) repulsion motor
   c) universal motor
   d) AC series 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.	

Set **S**

T.E. (Part – I) (Old) (CGPA) Examination Nov/Dec-2019
Electrical Engineering
ELECTRICAL MACHINE – III

Day & Date: Wednesday, 11-12-2019 Max. Marks: 56
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. **16**

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. **12**

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 **16**

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.

Q.5 Solve any two **12**

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.	

Set **P**

T.E. (Part – I) (Old) Examination Nov/Dec-2019
Electrical Engineering
LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Max. Marks: 100
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 Marks: 20

Q.1 Choose the correct alternatives from the options. 20

1) 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

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 _____.
   a) very law b) above 100
   c) depend on I/P Voltage d) very high

6) For a op-amp differential gain (Av) and common mode gain (Ac) then CMRR is _____.
   a) $AV + AC$ b) $\frac{AV}{AC}$
   c) $I + \left(\frac{AV}{AC}\right)$ d) $\frac{AC}{AV}$

7) A voltage follower _____.
   a) has a voltage gain of I b) is non- inverting
   c) has no feedback register d) has all of these

8) For IC 714C SVRR is _____.
   a) 100 dB b) 104 dB
   c) infinite d) zero

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 a _____.
   a) Phase selective circuit b) Filter selective circuit
   c) Frequence selective circuit d) None of above

12) Filters are classified as audio or radio _____.
   a) Analog or digital b) Passive or active
   c) All of the above d) 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 voltage b) Free running voltage
   c) Error Voltage d) 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.	

Set **P**

T.E. (Part – I) (Old) Examination Nov/Dec-2019
Electrical Engineering
LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Max. Marks: 80
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. **20**

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. **20**

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. **20**

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 = 1KHz, Q = 3, and A_f = 10. (Assume suitable data)

Q.5 Attempt any two. **20**

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.

Seat No.	

Set **Q**

T.E. (Part – I) (Old) Examination Nov/Dec-2019
Electrical Engineering
LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Max. Marks: 100
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 Marks: 20

Q.1 Choose the correct alternatives from the options. 20

1) For a op-amp differential gain (Av) and common mode gain (Ac) then CMRR is _____.
   a) $\mathrm{AV} + \mathrm{AC}$ b) $\frac{\mathrm{AV}}{\mathrm{AC}}$
   c) $\mathrm{I} + \left(\frac{\mathrm{AV}}{\mathrm{AC}}\right)$ d) $\frac{\mathrm{AC}}{\mathrm{AV}}$

2) A voltage follower _____.
   a) has a voltage gain of I b) is non- inverting
   c) has no feedback register d) has all of these

3) For IC 714C SVRR is _____.
   a) 100 dB b) 104 dB
   c) infinite d) zero

4) 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) $V_0 = A(V_1)$

5) 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

6) An electrical filter is a _____.
   a) Phase selective circuit b) Filter selective circuit
   c) Frequence selective circuit d) None of above

7) Filters are classified as audio or radio _____.
   a) Analog or digital b) Passive or active
   c) All of the above d) None of the above

8) 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

9) The output voltage of phase defector is _____.
   a) Phase voltage b) Free running voltage
   c) Error Voltage d) None of above

10) 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

11) 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

12) 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

13) 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

14) IC 7808 is fixed regulator of _____.
   a) 7 Volt
   b) 8 Volt
   c) 9 Volt
   d) 10 Volt

15) 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

16) 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

17) 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) $R_i = 0, A = \infty, R_o = \infty$

18) 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

19) 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

20) The differential gain is _____.
   a) very law
   b) above 100
   c) depend on I/P Voltage
   d) very high

Seat No.	

Set **Q**

T.E. (Part – I) (Old) Examination Nov/Dec-2019
Electrical Engineering
LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Max. Marks: 80
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. **20**

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. **20**

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. **20**

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 = 1KHz, Q = 3, and A_f = 10. (Assume suitable data)

Q.5 Attempt any two. **20**

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.

Seat No.	

Set **R**

T.E. (Part – I) (Old) Examination Nov/Dec-2019
Electrical Engineering
LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Max. Marks: 100
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 Marks: 20

Q.1 Choose the correct alternatives from the options. 20

1) An electrical filter is a _____.
   a) Phase selective circuit b) Filter selective circuit
   c) Frequence selective circuit d) None of above

2) Filters are classified as audio or radio _____.
   a) Analog or digital b) Passive or active
   c) All of the above d) None of the above

3) 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

4) The output voltage of phase defector is _____.
   a) Phase voltage b) Free running voltage
   c) Error Voltage d) None of above

5) 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

6) 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

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

8) 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

9) IC 7808 is fixed regulator of _____.
   a) 7 Volt b) 8 Volt
   c) 9 Volt d) 10 Volt

10) 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

11) 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

12) The ideal op-amp has following characteristics _____.
   a) $\mathrm{R_i} = \infty, \mathrm{A} = \infty, \mathrm{R_o} = 0$ b) $\mathrm{R_i} = 0, \mathrm{A} = \infty, \mathrm{R_o} = 0$
   c) $\mathrm{R_i} = \infty, \mathrm{A} = \infty, \mathrm{R_o} = \infty$ d) $\mathrm{R_i} = 0, \mathrm{A} = \infty, \mathrm{R_o} = \infty$

13) 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

14) 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

15) The differential gain is _____.
   a) very law b) above 100
   c) depend on I/P Voltage d) very high

16) For a op-amp differential gain (Av) and common mode gain (Ac) then CMRR is _____.
   a) $\mathrm{AV} + \mathrm{AC}$ b) $\frac{\mathrm{AV}}{\mathrm{AC}}$
   c) $\mathrm{I} + \left(\frac{\mathrm{AV}}{\mathrm{AC}}\right)$ d) $\frac{\mathrm{AC}}{\mathrm{AV}}$

17) A voltage follower _____.
   a) has a voltage gain of I b) is non- inverting
   c) has no feedback register d) has all of these

18) For IC 714C SVRR is _____.
   a) 100 dB b) 104 dB
   c) infinite d) zero

19) 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) $V_0 = A(V_1)$

20) 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

Seat No.	

Set **R**

T.E. (Part – I) (Old) Examination Nov/Dec-2019
Electrical Engineering
LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Max. Marks: 80
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. **20**

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. **20**

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. **20**

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 = 1KHz, Q = 3, and A_f = 10. (Assume suitable data)

Q.5 Attempt any two. **20**

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.

Seat No.	

Set **S**

T.E. (Part – I) (Old) Examination Nov/Dec-2019
Electrical Engineering
LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Max. Marks: 100
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 Marks: 20

Q.1 Choose the correct alternatives from the options. 20

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

4) IC 7808 is fixed regulator of _____.
   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

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
   b) above 100
   c) depend on I/P Voltage
   d) very high

11) For a op-amp differential gain (Av) and common mode gain (Ac) then CMRR is _____.
   a) $\mathrm{AV} + \mathrm{AC}$
   b) $\frac{\mathrm{AV}}{\mathrm{AC}}$
   c) $\mathrm{I} + \left(\frac{\mathrm{AV}}{\mathrm{AC}}\right)$
   d) $\frac{\mathrm{AC}}{\mathrm{AV}}$

12) A voltage follower _____.
   a) has a voltage gain of I
   b) is non- inverting
   c) has no feedback register
   d) has all of these

13) For IC 714C SVRR is _____.
   a) 100 dB
   b) 104 dB
   c) infinite
   d) zero

14) 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) $V_0 = A(V_1)$

15) 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

16) An electrical filter is a _____.
   a) Phase selective circuit
   b) Filter selective circuit
   c) Frequence selective circuit
   d) None of above

17) Filters are classified as audio or radio _____.
   a) Analog or digital
   b) Passive or active
   c) All of the above
   d) None of the above

18) 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

19) The output voltage of phase defector is _____.
   a) Phase voltage
   b) Free running voltage
   c) Error Voltage
   d) None of above

20) 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

Seat No.	

Set **S**

T.E. (Part – I) (Old) Examination Nov/Dec-2019
Electrical Engineering
LINEAR INTEGRATED CIRCUIT

Day & Date: Friday, 20-12-2019 Max. Marks: 80
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. **20**

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. **20**

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. **20**

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 = 1KHz, Q = 3, and A_f = 10. (Assume suitable data)

Q.5 Attempt any two. **20**

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.