
Seat No.

Set

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 **ENGINEERING MATHEMATICS - III**

Day and Date: Thursday, 4-5-2017

Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions:

- 1) Use of calculator is allowed.
- 2) Figures to the **right** indicate **full** marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct alternative:

14

1) The general solution of $(D^2 + 2D + 1)y = 2e^{3x}$ is

a)
$$C_1 e^{-x} + C_2 e^{-x} + \frac{e^{3x}}{8}$$

b)
$$(C_1 + C_2 x) e^{-x} + \frac{e^{3x}}{8}$$

c)
$$(C_1 \cos x + C_2 \sin x) + \frac{e^{3x}}{16}$$

d)
$$(C_1 + C_2 x) e^{-x} + \frac{e^{3x}}{18}$$

2)
$$\frac{1}{D^2 + 9} \sin 3x =$$

a)
$$-\frac{x}{2}\cos 3x$$

b)
$$\frac{x}{2}$$
 cos 3x

c)
$$-\frac{x}{6}\cos 3x$$

d)
$$\frac{x}{6}$$
 sin 3x

- 3) The particular integral of the differential equation $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = x$ is
 - a) $\frac{x}{2}$
- b) x
- c) e^x
- d) $\frac{e^x}{2}$

4) The solution of $\sqrt{p} + \sqrt{q} = 1$ is

a)
$$z = ax + (1 - a)y + c$$

b)
$$z = (1 - a)x + a^2y + c$$

c)
$$z = ax + \left(\frac{1}{1-a}\right)y + c$$

d)
$$z = ax + (1 - \sqrt{a})^2 y + c$$



- 5) Which of the following is Lagrange's equation?
 - a) $p^2x + q^2y = z$ c) $px + q^2y = z$

- b) qy = px + zd) $p^2x qy = z^2$
- 6) If $z\{f(k)\} = F(z)$ then $z\{a^k f(k)\} =$

 - a) $F\left(\frac{a}{z}\right)$ b) $\frac{1}{a}F\left(\frac{z}{a}\right)$ c) $\frac{1}{a}F\left(\frac{a}{z}\right)$
- d) $F\left(\frac{z}{a}\right)$

- 7) $z^{-1}\left\{\frac{z}{z-3}\right\} = ... \text{ for } k \ge 0, |z| > 3$
 - a) 3^k
- b) 3^{-k}
- c) $(-3)^{k}$
- 8) The speed of a particle moving along the curve $x = 2 \sin 3t$, $y = 2 \cos 3t$, z = 8t at time
 - a) 8

- b) 10
- c) 14
- d) 20

- 9) If $\overline{r} = ae^{3t} i + b e^{2t} j$, then at t = 0, $\frac{d\overline{r}}{dt} 2\overline{r} =$

- c) ai + bj
- 10) _____ is the constant term in the Fourier expansion of $f(x) = \frac{a}{2} x$, 0 < x < a.
 - a) 0

- b) $\frac{a^2}{2\pi}$
- c) $\frac{a^2}{4\pi}$
- 11) Fourier expansion of $f(x) = \begin{cases} -x, & -2 \le x \le 0 \\ x, & 0 \le x \le 2 \end{cases}$ in the interval [-2, 2] has
 - a) No cosine terms

- b) No sine terms
- c) Both cosine and sine terms
- d) None of these

- 12) $L\left\{\int_{0}^{\tau} \sin 2u \, du\right\} =$

- a) $\frac{2}{s^2+4}$ b) $\frac{2}{s^2}$ c) $\frac{2}{(s^2+4)^2}$ d) $\frac{2}{s(s^2+4)}$
- 13) $L\{e^{-t} sinht\} =$

- a) $\frac{1}{(s+1)^2-1}$ b) $\frac{1}{(s-1)^2-1}$ c) $\frac{s+1}{(s+1)^2-1}$ d) $\frac{s-1}{(s-1)^2-1}$
- 14) $L^{-1} \{ \varphi(s+a) \} =$

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



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S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 ENGINEERING MATHEMATICS – III

Day and Date: Thursday, 4-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Attempt any three questions from each Section.

- 2) Use of calculator is allowed.
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SECTION - I

2. a) Solve
$$\frac{d^3y}{dx^3} - 2\frac{dy}{dx} + 4y = 3x^2 - 5x + 2$$

b) Solve
$$z(p^2 - q^2) = x - y$$

c) Find
$$z \{(k + 1) a^k\}, k \ge 0$$

3. a) Solve
$$(D^2 + 6D + 9)y = \frac{e^{-3x}}{x^3} + 2x$$

b) Solve
$$px - qy = y^2 - x^2$$

c) Find
$$z^{-1} \left\{ \frac{1}{(z-5)^3} \right\}$$
, $|z| > 5$

4. a) Solve
$$\frac{d^2y}{dx^2} + \frac{1}{x} \frac{dy}{dx} = \frac{12 \log x}{x^2}$$

b) Solve the following partial differential equation by the method of separation of variables

$$3\frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0 \text{ given } u(x, 0) = 4e^{-x}.$$

c) Find
$$z\{2^k \sin (3k + 2)\}, k \ge 0.$$

OH

c) An electric circuit consists of an inductance L, a condenser of capacity C and emf. $E = E_0$ $\cos \omega t$, so that the charge Q satisfies the differential equation $\frac{d^2Q}{dt^2} + \frac{Q}{LC} = \frac{Eo}{L} \cos \omega t$. If

$$\omega^2 = \frac{1}{LC}$$
, find the charge Q at time t.

Set P



5. a) Solve $(D^2 + 4)y = x^2 + \cos 2x$.

3

b) Solve $p - q = \log(x + y)$

3

c) Find $z^{-1}\left\{\frac{z+2}{z^2-2z+1}\right\}$, |z|>1.

3

SECTION - II

6. a) Prove that $\nabla \left(\frac{\overline{a} \times \overline{r}}{r}\right) = 0$ where $\overline{a} = 5i - 6j - 8k$ and $\overline{r} = xi + yj + zk$.

3

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3

b) Find the tangential and normal components of acceleration of particle moving on the curve $x = t^3 + 1$, $y = t^2$, z = t at t = 1.

- c) Find the directional derivative of $\,\phi\,=2x^3y-3y^2z$ at P(1, 2, -1) in the direction towards Q(3, -1, 5). In what direction from P is the directional derivative maximum? Find the magnitude of maximum directional derivative.
- 7. a) Is $\overline{F} = \frac{\overline{a} \times \overline{r}}{r^n}$ a solenoidal vector? [\overline{a} is a constant vector]. 3
 - 3

c) Show that $\int_{0}^{\infty} \frac{\sin at}{t} dt = \frac{\pi}{2}$.

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8. a) Find the Fourier series of $f(x) = \begin{cases} -\pi, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$.

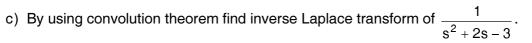
b) Obtain the Fourier expansions of f(x) = $2 - \frac{x^2}{2}$ in $0 \le x \le 2$.

b) Expand f(x) = x, 0 < x < 2 as a half-range sine series.

9

9. Attempt any three:

- a) Find the Laplace transform of f(t) where f(t) = t, 0 < t < 3 and f(t) = 6, t > 3.
- b) Find L⁻¹ $\left\{ \frac{1}{e^2(e+2)} \right\}$.



d) Use Laplace transform to solve $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 8y = 1$ where y(0) = 0, y'(0) = 1.

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MCQ/Objective Type Questions

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- 1) The speed of a particle moving along the curve $x = 2 \sin 3t$, $y = 2 \cos 3t$, z = 8t at time t = 0 is
 - a) 8

- b) 10
- c) 14
- d) 20

- 2) If $\overline{r} = ae^{3t} i + b e^{2t} j$, then at t = 0, $\frac{d\overline{r}}{dt} 2\overline{r} =$
 - a) ai

- c) ai + bi
- d) ae^{3t}i
- 3) _____ is the constant term in the Fourier expansion of $f(x) = \frac{a}{2} x$, 0 < x < a.
 - a) 0
- b) $\frac{a^2}{2\pi}$ c) $\frac{a^2}{4\pi}$ d) $\frac{2\pi}{a^2}$
- 4) Fourier expansion of $f(x) = \begin{cases} -x, & -2 \le x \le 0 \\ x, & 0 \le x \le 2 \end{cases}$ in the interval [-2, 2] has
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- 5) $L\left\{\int_{0}^{t} \sin 2u \, du\right\} =$
 - a) $\frac{2}{s^2 + 4}$ b) $\frac{2}{s^2}$
- c) $\frac{2}{(s^2+4)^2}$ d) $\frac{2}{s(s^2+4)}$



- 6) $L\{e^{-t} sinht\} =$
 - a) $\frac{1}{(s+1)^2-1}$ b) $\frac{1}{(s-1)^2-1}$ c) $\frac{s+1}{(s+1)^2-1}$ d) $\frac{s-1}{(s-1)^2-1}$

- 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 general solution of $(D^2 + 2D + 1)y = 2e^{3x}$ is
 - a) $C_1e^{-x} + C_2e^{-x} + \frac{e^{3x}}{9}$

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- 10) The particular integral of the differential equation $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = x$ is
- b) x
- c) e^x
- d) $\frac{e^{-}}{2}$

- 11) The solution of $\sqrt{p} + \sqrt{q} = 1$ is
 - a) z = ax + (1 a)y + c

b) $z = (1 - a)x + a^2y + c$

c) $z = ax + \left(\frac{1}{1-a}\right)y + c$

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- 13) If $z\{f(k)\} = F(z)$ then $z\{a^k f(k)\} =$

 - a) $F\left(\frac{a}{z}\right)$ b) $\frac{1}{a}F\left(\frac{z}{a}\right)$ c) $\frac{1}{a}F\left(\frac{a}{z}\right)$ d) $F\left(\frac{z}{a}\right)$

- 14) $z^{-1}\left\{\frac{z}{z-3}\right\} = ... \text{ for } k \ge 0, |z| > 3$
 - a) 3^k
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5. a) Solve $(D^2 + 4)y = x^2 + \cos 2x$.

3 3

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c) Find $z^{-1} \left\{ \frac{z+2}{z^2-2z+1} \right\}$, |z|>1.

SECTION - II

- 6. a) Prove that $\nabla \left(\frac{\overline{a} \times \overline{r}}{r}\right) = 0$ where $\overline{a} = 5i 6j 8k$ and $\overline{r} = xi + yj + zk$.
 - b) Find the tangential and normal components of acceleration of particle moving on the curve $x = t^3 + 1$, $y = t^2$, z = t at t = 1.
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- 7. a) Is $\overline{F} = \frac{\overline{a} \times \overline{r}}{r^n}$ a solenoidal vector ? [\overline{a} is a constant vector].
 - b) Expand f(x) = x, 0 < x < 2 as a half-range sine series.
 - c) Show that $\int_{0}^{\infty} \frac{\sin at}{t} dt = \frac{\pi}{2}.$
- 8. a) Find the Fourier series of $f(x) = \begin{cases} -\pi, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$.
 - b) Obtain the Fourier expansions of $f(x) = 2 \frac{x^2}{2}$ in $0 \le x \le 2$.
- 9. Attempt any three:
 - a) Find the Laplace transform of f(t) where f(t) = t, 0 < t < 3 and f(t) = 6, t > 3.
 - b) Find $L^{-1} \left\{ \frac{1}{s^2(s+2)} \right\}$.
 - c) By using convolution theorem find inverse Laplace transform of $\frac{1}{s^2 + 2s 3}$.
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- 1) Which of the following is Lagrange's equation?
 - a) $p^2x + q^2y = z$

c) $px + q^2y = z$

- b) qy = px + zd) $p^2x qy = z^2$
- 2) If $z\{f(k)\} = F(z)$ then $z\{a^k f(k)\} =$
 - a) $F\left(\frac{a}{z}\right)$

b) $\frac{1}{a} F\left(\frac{z}{a}\right)$

c) $\frac{1}{a} F\left(\frac{a}{z}\right)$

d) $F\left(\frac{z}{a}\right)$

3)
$$z^{-1}\left\{\frac{z}{z-3}\right\} = ... \text{ for } k \ge 0, |z| > 3$$

- c) $(-3)^{k}$
- d) 3
- 4) The speed of a particle moving along the curve $x = 2 \sin 3t$, $y = 2 \cos 3t$, z = 8t at time t = 0 is
 - a) 8

- b) 10
- c) 14
- d) 20

- 5) If $\overline{r} = ae^{3t} i + b e^{2t} j$, then at t = 0, $\frac{d\overline{r}}{dt} 2\overline{r} =$
 - a) ai
- b) ai
- c) ai + bi
- d) ae^{3t} i
- 6) _____ is the constant term in the Fourier expansion of $f(x) = \frac{a}{2} x$, 0 < x < a.
 - a) 0
- b) $\frac{a^2}{2\pi}$ c) $\frac{a^2}{4\pi}$
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- d) $(C_1 + C_2 x) e^{-x} + \frac{e^{3x}}{10}$

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- c) $z = ax + \left(\frac{1}{1 a}\right)y + c$
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Set R



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3 3

b) Solve $p - q = \log(x + y)$

3

3

4

3

c) Find $z^{-1} \left\{ \frac{z+2}{z^2-2z+1} \right\}$, |z|>1.

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SECTION - II

- 6. a) Prove that $\nabla \left(\frac{\overline{a} \times \overline{r}}{r}\right) = 0$ where $\overline{a} = 5i 6j 8k$ and $\overline{r} = xi + yj + zk$.
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- 2) Figures to the **right** indicate **full** marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct alternative:

- 1) _____ is the constant term in the Fourier expansion of $f(x) = \frac{a}{2} x$, 0 < x < a.
 - a) 0

- b) $\frac{a^2}{2\pi}$ c) $\frac{a^2}{4\pi}$ d) $\frac{2\pi}{a^2}$

- 2) Fourier expansion of $f(x) = \begin{cases} -x, & -2 \le x \le 0 \\ x, & 0 \le x \le 2 \end{cases}$ in the interval [-2, 2] has
 - a) No cosine terms

- b) No sine terms
- c) Both cosine and sine terms
- d) None of these

3)
$$L\left\{\int_{0}^{t} \sin 2u \, du\right\} =$$

a)
$$\frac{2}{s^2 + 4}$$

b)
$$\frac{2}{s^2}$$

c)
$$\frac{2}{(s^2+4)^2}$$

a)
$$\frac{2}{s^2+4}$$
 b) $\frac{2}{s^2}$ c) $\frac{2}{\left(s^2+4\right)^2}$ d) $\frac{2}{s\left(s^2+4\right)}$

4)
$$L\{e^{-t} sinht\} =$$

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

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

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

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

5)
$$L^{-1} \{ \phi(s+a) \} =$$

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

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

c) -t L⁻¹
$$\{\varphi(s)\}$$

d)
$$t L^{-1} \{ \phi(s) \}$$



- 6) The general solution of $(D^2 + 2D + 1)y = 2e^{3x}$ is
 - a) $C_1 e^{-x} + C_2 e^{-x} + \frac{e^{3x}}{\alpha}$

- b) $(C_1 + C_2 x) e^{-x} + \frac{e^{3x}}{8}$
- c) $(C_1 \cos x + C_2 \sin x) + \frac{e^{3x}}{16}$
- d) $(C_1 + C_2 x) e^{-x} + \frac{e^{3x}}{18}$

- 7) $\frac{1}{D^2 + 9} \sin 3x =$
 - a) $-\frac{x}{2}\cos 3x$ b) $\frac{x}{2}\cos 3x$ c) $-\frac{x}{6}\cos 3x$ d) $\frac{x}{6}\sin 3x$

- 8) The particular integral of the differential equation $x^2 \frac{d^2y}{dx^2} + x \frac{dy}{dx} + y = x$ is
 - a) $\frac{x}{2}$
- b) x
- c) e^x

- 9) The solution of $\sqrt{p} + \sqrt{q} = 1$ is
 - a) z = ax + (1 a)y + c

b) $z = (1 - a)x + a^2y + c$

c) $z = ax + \left(\frac{1}{1-a}\right)y + c$

- d) $z = ax + (1 \sqrt{a})^2 y + c$
- 10) Which of the following is Lagrange's equation?
 - a) $p^2x + q^2y = z$ c) $px + q^2y = z$

- b) qy = px + zd) $p^2x qy = z^2$
- 11) If $z\{f(k)\} = F(z)$ then $z\{a^k f(k)\} =$
- a) $F\left(\frac{a}{z}\right)$ b) $\frac{1}{a}F\left(\frac{z}{a}\right)$ c) $\frac{1}{a}F\left(\frac{a}{z}\right)$ d) $F\left(\frac{z}{a}\right)$

- 12) $z^{-1}\left\{\frac{z}{z-3}\right\} = ... \text{ for } k \ge 0, |z| > 3$
 - a) 3^k
- b) 3^{-k}
- c) $(-3)^k$
- 13) The speed of a particle moving along the curve $x = 2 \sin 3t$, $y = 2 \cos 3t$, z = 8t at time t = 0 is
 - a) 8

- b) 10
- c) 14
- d) 20

- 14) If $\overline{r} = ae^{3t} i + b e^{2t} j$, then at t = 0, $\frac{d\overline{r}}{dt} 2\overline{r} =$
 - a) ai
- b) aj
- c) ai + bj
- d) ae^{3t} i



Seat	
No.	

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 ENGINEERING MATHEMATICS – III

Day and Date: Thursday, 4-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Attempt any three questions from each Section.

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

SECTION - I

2. a) Solve
$$\frac{d^3y}{dx^3} - 2\frac{dy}{dx} + 4y = 3x^2 - 5x + 2$$

b) Solve
$$z(p^2 - q^2) = x - y$$

c) Find
$$z \{(k + 1) a^k\}, k \ge 0$$

3. a) Solve
$$(D^2 + 6D + 9)y = \frac{e^{-3x}}{x^3} + 2x$$

b) Solve
$$px - qy = y^2 - x^2$$

c) Find
$$z^{-1} \left\{ \frac{1}{(z-5)^3} \right\}$$
, $|z| > 5$

4. a) Solve
$$\frac{d^2y}{dx^2} + \frac{1}{x} \frac{dy}{dx} = \frac{12 \log x}{x^2}$$

b) Solve the following partial differential equation by the method of separation of variables

$$3\frac{\partial u}{\partial x} + 2\frac{\partial u}{\partial y} = 0 \text{ given } u(x, 0) = 4e^{-x}.$$

c) Find
$$z\{2^k \sin (3k + 2)\}, k \ge 0.$$

OF

c) An electric circuit consists of an inductance L, a condenser of capacity C and emf. $E = E_0$ $\cos \omega t$, so that the charge Q satisfies the differential equation $\frac{d^2Q}{dt^2} + \frac{Q}{LC} = \frac{Eo}{L} \cos \omega t$. If

$$\omega^2 = \frac{1}{LC}$$
, find the charge Q at time t.

Set S



5. a) Solve $(D^2 + 4)y = x^2 + \cos 2x$.

3

b) Solve $p - q = \log(x + y)$

3

c) Find $z^{-1}\left\{\frac{z+2}{z^2-2z+1}\right\}$, |z|>1.

3

SECTION - II

6. a) Prove that $\nabla \left(\frac{\overline{a} \times \overline{r}}{r}\right) = 0$ where $\overline{a} = 5i - 6j - 8k$ and $\overline{r} = xi + yj + zk$.

3

- b) Find the tangential and normal components of acceleration of particle moving on the curve $x = t^3 + 1$, $y = t^2$, z = t at t = 1.
- c) Find the directional derivative of $\,\phi\,=2x^3y-3y^2z$ at P(1, 2, -1) in the direction towards Q(3, -1, 5). In what direction from P is the directional derivative maximum? Find the magnitude of maximum directional derivative.

3

4

7. a) Is $\overline{F} = \frac{\overline{a} \times \overline{r}}{r^n}$ a solenoidal vector? [\overline{a} is a constant vector].

3

b) Expand f(x) = x, 0 < x < 2 as a half-range sine series.

3

c) Show that $\int_{0}^{\infty} \frac{\sin at}{t} dt = \frac{\pi}{2}$.

3

5

4

8. a) Find the Fourier series of $f(x) = \begin{cases} -\pi, & -\pi < x < 0 \\ x, & 0 < x < \pi \end{cases}$.

b) Obtain the Fourier expansions of f(x) = $2 - \frac{x^2}{2}$ in $0 \le x \le 2$.

9

9. Attempt any three:

- a) Find the Laplace transform of f(t) where f(t) = t, 0 < t < 3 and f(t) = 6, t > 3.
- b) Find L⁻¹ $\left\{ \frac{1}{e^2(e+2)} \right\}$.

- c) By using convolution theorem find inverse Laplace transform of $\frac{1}{s^2 + 2s 3}$.

- d) Use Laplace transform to solve $\frac{d^2y}{dt^2} + 4\frac{dy}{dt} + 8y = 1$ where y(0) = 0, y'(0) = 1.

Seat		
No.	Set	P

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 ELECTRICAL MACHINE – I

Day and Date: Friday, 5-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

			MCQ/Objective	ve Type Questio	ns	
Dura	atio	n : 30 Minutes			Mark	ks : 14
1.	Ch	oose the correct a	answers :			14
 The armature of a DC machine is made up of a) Silicon steel b) Wrought iron c) Cast Steel d) Soft Iron 						
	2)	A 4 pole DC mad a) 2			cuits. d) none of these	
	3)	a) field pole	dy current loss oc poles	b) yoke	of DC machine.	
	4)		les in the machin		equal to the	
	5)	A DC motor runs The speed regula a) 4.7%	ation is		75 r.p.m. at no load.	
 a) 4.7% b) 2.9% c) 7.6% d) 1.5% 6) A 240 V series motor takes 40 A when giving its rated output at 1500 r.p.m Its resistance is 0.3 Ω. What value of resistance must be added to obtain rated torque at starting? 						
		a) 2.4 Ω	b) 1.5 Ω	c) 3.2 Ω	d) 5.7 Ω	P.T.O.

-2-



7)	The value of diverter resistance is of the order of						
	a) 25 Ω	b) 100 Ω	c)	0.1 Ω	d) none of these		
8)	The main purpose its	of performing op	en	circuit test of a	transformer is to measure		
	a) copper loss			core loss			
	c) both a) and b)		d)	none of these	Э		
9)	The efficiencies of determined by	of two identical tr	ans	sformers unde	er load conditions can be		
	a) back to back t	test	b)	open circuit t	test		
	c) short circuit to	est	d)	any of these			
10)	Transformer will	operate at maxin	nun	n efficiency wh	nen		
·	•			b) eddy current loss = copper loss			
	c) iron loss = eddy current loss			d) none of these			
11)	The size of transf	ormer core depe	end	s on			
11)	a) frequency	·	b) flux density				
	c) area of core		d) both a) and b)				
12)	A 230/2300 V tra The core loss is	ınsformer takes	no	load current o	of 5A at 0.25 p.f. lagging.		
	a) 300.2 W	b) 192.5 W	c)	287.5 W	d) 212.6 W		
13)	A transformer ha will be	s 200 W as iron	los	s at full load.	The iron loss at half full load		
	a) 50 W	b) 100 W	c)	400 W	d) 200 W		
14)	A transformer will have zero efficiency at						
,	a) full load			b) no load			
	c) half the full load			none of these	е		

-3-

Seat No.

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 ELECTRICAL MACHINE – I

Day and Date: Friday, 5-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Solve any four:

16

- a) A 30 kW, 300 V DC shunt generator has armature and field resistance of 0.05 Ω and 100 Ω respectively. Calculate the total power developed by the armature when it delivers full load output.
- b) Derive the torque equation of a DC motor.
- c) With neat sketch explain three point starter for DC motor.
- d) A 250 V 4 pole wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 $\,\Omega$. The motor takes a current of 40A. Find its speed and the gross torque developed if it has a flux per pole of 25 mWb.
- e) Explain dynamic braking and plugging operation for DC motor.
- f) A shunt generator supplies 96A at a terminal voltage of 200 V. The armature and shunt field resistances are 0.1 $\,\Omega$ and 50 $\,\Omega$ respectively. The iron and frictional losses are 2500 W. Find :
 - i) e.m.f. generated
 - ii) copper losses.

3. Solve the following:

12

- a) A 100 kW, 500 V shunt generator was run as motor on no load at its rated speed and voltage. The total current taken was 9.5A including a shunt field current of 2.5A. The resistance of the armature circuit is 0.1 $\,\Omega$. Calculate the efficiency of the generator at :
 - i) full load
 - ii) half the full load.
- b) A DC shunt motor gave the following results of Swinburne's test.

Voltage = 600 V; current = 8A; armature resistance = 0.1 Ω ; field resistance = 300 Ω .

Find the efficiency of the machine:

- i) as a generator delivering 100 A at 600 V.
- ii) as a motor having a line current of 100 A at 600 V.

Assume stray load losses as 1% of output.



b) The Hopkinson's test on two similar DC shunt machines gave following full load data:

Line voltage = 110 V

Line current = 48A

Motor armature current = 230A

Field currents are 3A and 3.5A.

The armature resistance of each machine is 0.035 Ω . Calculate the efficiency of each machine assuming brush contact drop of 1 V per brush.

SECTION - II

4. Solve any four:

16

- a) Derive an emf equation of transformer.
- b) A transformer takes a current of 0.6A and absorbs 64 W when primary is connected to its normal supply of 200 V, 50 Hz; the secondary being open circuit. Find the magnetizing and iron loss currents.
- c) A single phase transformer with a ratio of 440/110 V takes no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120A at a p.f. 0.8 lagging, find the current taken by primary.
- d) A 100 kVA transformer has 400 turns on the primary and 80 turns on the secondary. The primary and secondary resistance are 0.3 Ω and 0.01 Ω respectively and corresponding leakage reactances are 1.1 Ω and 0.035 Ω respectively. Calculate the equivalent impedance referred to primary circuit.
- e) With neat sketch explain Sumpner test.
- f) In autotransformer prove that saving in copper = $K \times$ weight of copper in ordinary transformer. Where K is the transformation ratio.

5. Solve any two:

- a) Two single phase transformers with equal voltage ratios have impedance of $(0.5 + j3)\Omega$ and $(0.6 + j10)\Omega$ with respect to the secondary. If they operate in parallel, determine how they share a total load of 100 kW at 0.8 p.f. lagging.
- b) A 5kVA 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 fourth 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) Explain in detail the difference between ideal transformer and practical transformer with the help of phasor diagrams.

Seat		
No.	Set	Q

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 **ELECTRICAL MACHINE - I**

Day and Date: Friday, 5-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

	MCQ/Objective	ve Type Questions	
Duratio	on : 30 Minutes	Marks:	14
1. Ch	oose the correct answers :		14
1)	The main purpose of performing or its	oen circuit test of a transformer is to measure	
	a) copper loss c) both a) and b)	b) core loss d) none of these	
2)	The efficiencies of two identical tr determined by	ransformers under load conditions can be	
	a) back to back testc) short circuit test	b) open circuit testd) any of these	
3)	Transformer will operate at maxir a) copper loss = iron loss c) iron loss = eddy current loss	b) eddy current loss = copper loss	
4)	The size of transformer core deperation of of transformer core depe	ends on b) flux density d) both a) and b)	
5)	The core loss is a) 300.2 W	no load current of 5A at 0.25 p.f. lagging. b) 192.5 W	
	c) 287.5 W	d) 212.6 W	



6)	A transformer ha will be	s 200 W as iron	loss at full load.	The iron loss at half full load
	a) 50 W	b) 100 W	c) 400 W	d) 200 W
7)	A transformer wil	ll have zero efficie	-	
	a) full loadc) half the full loa	ad	b) no loadd) none of these	Δ
٥/			,	
0)	The armature of a) Silicon steel		· · · · · · · · · · · · · · · · · · ·	d) Soft Iron
9)	A 4 pole DC mac			
	a) 2	b) 8	c) 4	d) none of these
10)	The greatest edo	ly current loss oc	curs in the	of DC machine.
	a) field pole		b) yoke	
	c) commutating	poles	d) armature	
11)	The commutator a) number of polb) pole pairsc) 1d) none of these	les in the machine		equal to the
12)			t full load and 17	75 r.p.m. at no load.
	The speed regula a) 4.7%		c) 7.6%	d) 1.5%
13)		0.3 Ω . What val		ated output at 1500 r.p.m. must be added to obtain
	a) 2.4 Ω	b) 1.5 Ω	c) 3.2 Ω	d) 5.7 Ω
14)	The value of dive	erter resistance is	s of the order of	
	a) 25 Ω	b) 100 Ω	c) 0.1 Ω	d) none of these

Seat No.

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 ELECTRICAL MACHINE – I

Day and Date: Friday, 5-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Solve any four:

16

- a) A 30 kW, 300 V DC shunt generator has armature and field resistance of 0.05 Ω and 100 Ω respectively. Calculate the total power developed by the armature when it delivers full load output.
- b) Derive the torque equation of a DC motor.
- c) With neat sketch explain three point starter for DC motor.
- d) A 250 V 4 pole wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 $\,\Omega$. The motor takes a current of 40A. Find its speed and the gross torque developed if it has a flux per pole of 25 mWb.
- e) Explain dynamic braking and plugging operation for DC motor.
- f) A shunt generator supplies 96A at a terminal voltage of 200 V. The armature and shunt field resistances are 0.1 $\,\Omega$ and 50 $\,\Omega$ respectively. The iron and frictional losses are 2500 W. Find :
 - i) e.m.f. generated
 - ii) copper losses.

3. Solve the following:

12

- a) A 100 kW, 500 V shunt generator was run as motor on no load at its rated speed and voltage. The total current taken was 9.5A including a shunt field current of 2.5A. The resistance of the armature circuit is 0.1 $\,\Omega$. Calculate the efficiency of the generator at :
 - i) full load
 - ii) half the full load.
- b) A DC shunt motor gave the following results of Swinburne's test.

Voltage = 600 V; current = 8A; armature resistance = 0.1 Ω ; field resistance = 300 Ω .

Find the efficiency of the machine:

- i) as a generator delivering 100 A at 600 V.
- ii) as a motor having a line current of 100 A at 600 V.

Assume stray load losses as 1% of output.



b) The Hopkinson's test on two similar DC shunt machines gave following full load data:

Line voltage = 110 V

Line current = 48A

Motor armature current = 230A

Field currents are 3A and 3.5A.

The armature resistance of each machine is 0.035 Ω . Calculate the efficiency of each machine assuming brush contact drop of 1 V per brush.

SECTION - II

4. Solve any four:

16

- a) Derive an emf equation of transformer.
- b) A transformer takes a current of 0.6A and absorbs 64 W when primary is connected to its normal supply of 200 V, 50 Hz; the secondary being open circuit. Find the magnetizing and iron loss currents.
- c) A single phase transformer with a ratio of 440/110 V takes no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120A at a p.f. 0.8 lagging, find the current taken by primary.
- d) A 100 kVA transformer has 400 turns on the primary and 80 turns on the secondary. The primary and secondary resistance are 0.3 Ω and 0.01 Ω respectively and corresponding leakage reactances are 1.1 Ω and 0.035 Ω respectively. Calculate the equivalent impedance referred to primary circuit.
- e) With neat sketch explain Sumpner test.
- f) In autotransformer prove that saving in copper = $K \times$ weight of copper in ordinary transformer. Where K is the transformation ratio.

5. Solve any two:

- a) Two single phase transformers with equal voltage ratios have impedance of $(0.5 + j3)\Omega$ and $(0.6 + j10)\Omega$ with respect to the secondary. If they operate in parallel, determine how they share a total load of 100 kW at 0.8 p.f. lagging.
- b) A 5kVA 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 fourth 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) Explain in detail the difference between ideal transformer and practical transformer with the help of phasor diagrams.

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Seat		
No.	Set	\mid R \mid

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 **ELECTRICAL MACHINE - I**

Day and Date: Friday, 5-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

c) short circuit test

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

> 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14 1. Choose the correct answers: 1) A DC motor runs at 1725 r.p.m. at full load and 1775 r.p.m. at no load. The speed regulation is a) 4.7% b) 2.9% c) 7.6% d) 1.5% 2) A 240 V series motor takes 40 A when giving its rated output at 1500 r.p.m. Its resistance is 0.3 Ω . What value of resistance must be added to obtain rated torque at starting? a) $2.4~\Omega$ b) 1.5Ω c) 3.2 Ω d) 5.7 Ω 3) The value of diverter resistance is of the order of a) 25 Ω b) 100 Ω c) $0.1~\Omega$ d) none of these 4) The main purpose of performing open circuit test of a transformer is to measure its a) copper loss b) core loss c) both a) and b) d) none of these 5) The efficiencies of two identical transformers under load conditions can be determined by a) back to back test b) open circuit test

d) any of these

-2-



6)	a) copper loss =	iron loss	mum efficiency when b) eddy current loss = copper loss d) none of these		
7)	The size of transf a) frequency c) area of core	former core depe	ends on b) flux density d) both a) and b)		
8)	A 230/2300 V tra The core loss is a) 300.2 W			of 5A at 0.25 p.f. lagging.	
9)	A transformer ha	s 200 W as iron	loss at full load.	The iron loss at half full load	
10)	a) 50 WA transformer wila) full loadc) half the full load	l have zero efficie	,		
11)	The armature of a a) Silicon steel		•	d) Soft Iron	
12)	A 4 pole DC mac	hine has b) 8	-	cuits. d) none of these	
13)	The greatest edd a) field pole c) commutating		b) yoke	of DC machine.	
14)	The commutator a) number of polb) pole pairsc) 1d) none of these	es in the machine		equal to the	

Seat No.

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 ELECTRICAL MACHINE – I

Day and Date: Friday, 5-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Solve any four:

16

- a) A 30 kW, 300 V DC shunt generator has armature and field resistance of 0.05 Ω and 100 Ω respectively. Calculate the total power developed by the armature when it delivers full load output.
- b) Derive the torque equation of a DC motor.
- c) With neat sketch explain three point starter for DC motor.
- d) A 250 V 4 pole wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 $\,\Omega$. The motor takes a current of 40A. Find its speed and the gross torque developed if it has a flux per pole of 25 mWb.
- e) Explain dynamic braking and plugging operation for DC motor.
- f) A shunt generator supplies 96A at a terminal voltage of 200 V. The armature and shunt field resistances are 0.1 $\,\Omega$ and 50 $\,\Omega$ respectively. The iron and frictional losses are 2500 W. Find :
 - i) e.m.f. generated
 - ii) copper losses.

3. Solve the following:

12

- a) A 100 kW, 500 V shunt generator was run as motor on no load at its rated speed and voltage. The total current taken was 9.5A including a shunt field current of 2.5A. The resistance of the armature circuit is 0.1 $\,\Omega$. Calculate the efficiency of the generator at :
 - i) full load
 - ii) half the full load.
- b) A DC shunt motor gave the following results of Swinburne's test.

Voltage = 600 V; current = 8A; armature resistance = 0.1 Ω ; field resistance = 300 Ω .

Find the efficiency of the machine:

- i) as a generator delivering 100 A at 600 V.
- ii) as a motor having a line current of 100 A at 600 V.

Assume stray load losses as 1% of output.



b) The Hopkinson's test on two similar DC shunt machines gave following full load data:

Line voltage = 110 V

Line current = 48A

Motor armature current = 230A

Field currents are 3A and 3.5A.

The armature resistance of each machine is 0.035 Ω . Calculate the efficiency of each machine assuming brush contact drop of 1 V per brush.

SECTION - II

4. Solve any four:

16

- a) Derive an emf equation of transformer.
- b) A transformer takes a current of 0.6A and absorbs 64 W when primary is connected to its normal supply of 200 V, 50 Hz; the secondary being open circuit. Find the magnetizing and iron loss currents.
- c) A single phase transformer with a ratio of 440/110 V takes no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120A at a p.f. 0.8 lagging, find the current taken by primary.
- d) A 100 kVA transformer has 400 turns on the primary and 80 turns on the secondary. The primary and secondary resistance are 0.3 Ω and 0.01 Ω respectively and corresponding leakage reactances are 1.1 Ω and 0.035 Ω respectively. Calculate the equivalent impedance referred to primary circuit.
- e) With neat sketch explain Sumpner test.
- f) In autotransformer prove that saving in copper = $K \times$ weight of copper in ordinary transformer. Where K is the transformation ratio.

5. Solve any two:

12

- a) Two single phase transformers with equal voltage ratios have impedance of $(0.5 + j3)\Omega$ and $(0.6 + j10)\Omega$ with respect to the secondary. If they operate in parallel, determine how they share a total load of 100 kW at 0.8 p.f. lagging.
- b) A 5kVA 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 fourth 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) Explain in detail the difference between ideal transformer and practical transformer with the help of phasor diagrams.

Seat No.	Set	S
140.		

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 **ELECTRICAL MACHINE - I**

Day and Date: Friday, 5-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3

	,	only. Don't forg of Page.	get to mention, G	Q.P. Set (P/Q/R/S) on To	p
		MCQ/Objectiv	ve Type Questio	ns	
Duratio	on : 30 Minutes			Mari	ks : 14
1. Ch	oose the correct	answers :			14
1)	Transformer will a) copper loss = c) iron loss = ec	•	b) eddy current	t loss = copper loss	
2)	The size of trans a) frequency c) area of core	former core depe	ends on b) flux density d) both a) and b	o)	
3)	The core loss is	ansformer takes b) 192.5 W		of 5A at 0.25 p.f. laggin d) 212.6 W	g.
4)	A transformer hawill be a) 50 W		loss at full load.	The iron loss at half full d) 200 W	load
5)	A transformer wi a) full load c) half the full lo		ency at b) no load d) none of thes	e	
6)	The armature of a) Silicon steel	a DC machine is b) Wrought iror	•	d) Soft Iron	
7)	A 4 pole DC mad a) 2	chine has b) 8	•	cuits. d) none of these	P.T.O



8)	The greatest edd a) field pole c) commutating p		curs in the b) yoke d) armature	of DC machine.
9)	The commutator a) number of polb) pole pairsc) 1d) none of these	•		equal to the
10)	A DC motor runs The speed regula	•	t full load and 17	75 r.p.m. at no load.
	a) 4.7%	b) 2.9%	c) 7.6%	d) 1.5%
11)		0.3 Ω . What valenting ?	• •	ated output at 1500 r.p.m. must be added to obtain
12)	The value of dive	•	,	u) 0.7 ==
12)	a) 25 Ω			d) none of these
13)	The main purpose its	of performing op	en circuit test of a	transformer is to measure
	a) copper loss		b) core loss	
	c) both a) and b)		d) none of these	е
14)	The efficiencies of determined by	of two identical tra	ansformers unde	er load conditions can be
	a) back to back to	test	b) open circuit	test
	c) short circuit to	est	d) any of these	

Seat No.

S.E. (Part – I) (Electrical) (CGPA) Examination, 2017 ELECTRICAL MACHINE – I

Day and Date: Friday, 5-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Solve any four:

16

- a) A 30 kW, 300 V DC shunt generator has armature and field resistance of 0.05 Ω and 100 Ω respectively. Calculate the total power developed by the armature when it delivers full load output.
- b) Derive the torque equation of a DC motor.
- c) With neat sketch explain three point starter for DC motor.
- d) A 250 V 4 pole wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 $\,\Omega$. The motor takes a current of 40A. Find its speed and the gross torque developed if it has a flux per pole of 25 mWb.
- e) Explain dynamic braking and plugging operation for DC motor.
- f) A shunt generator supplies 96A at a terminal voltage of 200 V. The armature and shunt field resistances are 0.1 $\,\Omega$ and 50 $\,\Omega$ respectively. The iron and frictional losses are 2500 W. Find :
 - i) e.m.f. generated
 - ii) copper losses.

3. Solve the following:

12

- a) A 100 kW, 500 V shunt generator was run as motor on no load at its rated speed and voltage. The total current taken was 9.5A including a shunt field current of 2.5A. The resistance of the armature circuit is 0.1 $\,\Omega$. Calculate the efficiency of the generator at :
 - i) full load
 - ii) half the full load.
- b) A DC shunt motor gave the following results of Swinburne's test.

Voltage = 600 V; current = 8A; armature resistance = 0.1 Ω ; field resistance = 300 Ω .

Find the efficiency of the machine:

- i) as a generator delivering 100 A at 600 V.
- ii) as a motor having a line current of 100 A at 600 V.

Assume stray load losses as 1% of output.



b) The Hopkinson's test on two similar DC shunt machines gave following full load data:

Line voltage = 110 V

Line current = 48A

Motor armature current = 230A

Field currents are 3A and 3.5A.

The armature resistance of each machine is 0.035 Ω . Calculate the efficiency of each machine assuming brush contact drop of 1 V per brush.

SECTION - II

4. Solve any four:

16

- a) Derive an emf equation of transformer.
- b) A transformer takes a current of 0.6A and absorbs 64 W when primary is connected to its normal supply of 200 V, 50 Hz; the secondary being open circuit. Find the magnetizing and iron loss currents.
- c) A single phase transformer with a ratio of 440/110 V takes no load current of 5A at 0.2 p.f. lagging. If the secondary supplies a current of 120A at a p.f. 0.8 lagging, find the current taken by primary.
- d) A 100 kVA transformer has 400 turns on the primary and 80 turns on the secondary. The primary and secondary resistance are 0.3 Ω and 0.01 Ω respectively and corresponding leakage reactances are 1.1 Ω and 0.035 Ω respectively. Calculate the equivalent impedance referred to primary circuit.
- e) With neat sketch explain Sumpner test.
- f) In autotransformer prove that saving in copper = $K \times$ weight of copper in ordinary transformer. Where K is the transformation ratio.

5. Solve any two:

- a) Two single phase transformers with equal voltage ratios have impedance of $(0.5 + j3)\Omega$ and $(0.6 + j10)\Omega$ with respect to the secondary. If they operate in parallel, determine how they share a total load of 100 kW at 0.8 p.f. lagging.
- b) A 5kVA 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 fourth 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) Explain in detail the difference between ideal transformer and practical transformer with the help of phasor diagrams.

No. Set P	Seat No.		Set	Р
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S.E. (Electrical Engg.) (Part - ELECTRONIC DEV	I) (CGPA) Examination, 20ICES AND CIRCUITS	17
Day and Date : Saturday, 6-5-2017 Time : 3.00 p.m. to 6.00 p.m.	Max	. Marks : 70
in Answer Book P 4) Answer MCQ/Ob		one mark. Io. 3 only.
	e Type Questions	
Duration: 30 Minutes		Marks: 14
1. Choose the correct answer:		(1×14=14)
 Transistor Biasing is done to keep a) Proper direct current The base current small 	in the circuit. b) Proper alternating current d) Collector current small	
2) The point of intersection of d.c. anda) Operating pointc) Voltage gain	d a.c. load lines represents b) Current gain d) None of the above	
3) The disadvantages of voltage dividesa) High stability factorc) Many resistors	der bias that it has b) Low base current d) None of the above	
 4) A transistor amplifier has high outp a) Emitter is heavily doped b) Collector has reverse biased c) Collector is wider than emitter of d) None of the above 	·	
5) The input capacitor in an amplifier ia) Couplingc) Leakage	is the capacitor. b) Bypass d) None of the above	
6) A JFET is called as tra a) Unipolar c) Unijunction	•	



		driven d	· · · ·	· · · · · · · · · · · · · · · · · · ·		
	a) Current		b)	Voltage		
	a) Currentc) Both current and	d voltage	d)	None of the abo	ove	
8)	Which of the follow	ing filter circuit is h	navi	ng ripple indepe	ende	ent of load?
	a) L	b) C	c)	LC	d)	CLC
9)	The effect of -ve fe	edback on stabili	ty is	that it		
	a) Increases	b) Decreases	c)	Remains same	d)	Achieves $S = 1$
10)	The procedure for covoltage V at the our	tput and the outpu	ıt cu	rrent I flows witl	h Vs	s set to
	a) 0	b) Vin	c)	V	d)	Vf
11)	The power amplifie	rs are basically the	e	amplifie	ers.	
				•		
	a) Voltage			Small signal	d)	High resistance
12)	a) VoltageThe feedback sign capacitive voltage	b) Current nal in a(n)	c)	oscillator		
12)	The feedback sign	b) Current hal in a(n) divider in the LC o	c) ircu	oscillator it.	' is	derived from a
ŕ	The feedback sign capacitive voltage	b) Current al in a(n) divider in the LC o b) Colpitts	c) circu c)	oscillator it. Armstrong	' is	derived from a
ŕ	The feedback sign capacitive voltage a) Hartley	b) Current nal in a(n) divider in the LC o b) Colpitts nower supply witho	c) circu c) out f	oscillatorit. Armstrong ilter the	d)	derived from a None of these
ŕ	The feedback sign capacitive voltage a) Hartley In an unregulated p	b) Current al in a(n) divider in the LC o b) Colpitts bower supply without ith input	c) circu c) out f b)	oscillator it. Armstrong ilter the The output is ri	d)	derived from a None of these e free

Set P



Seat	
No.	

S.E. (Electrical Engg.) (Part – I) (CGPA) Examination, 2017 ELECTRONIC DEVICES AND CIRCUITS

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

2. Attempt any four:

 $(4 \times 4 = 16)$

- a) Draw and explain collector base bias method of biasing of a BJT.
- b) Explain direct coupling and its advantages for BJT amplifier.
- c) Explain BJT as an amplifier in CE arrangement.
- d) Explain V-I characteristics of JFET.
- e) Explain DC biasing of JFET.
- f) State how transistor affects the characteristics of an amplifier at high frequency response?
- 3. a) What are h-parameters? Draw hybrid model for CE configuration.

6

6

b) Explain different biasing techniques and derive expression for stability factor for any one technique.

OR

 Explain construction and operation with transfer function characteristics of enhancement type MOSFET.

 $(4 \times 4 = 16)$

4. Attempt any four:

- a) Explain the concept of critical inductance in LC filter.
- b) What is feedback circuit? Explain how it provides feedback in amplifiers?
- c) What is cross-over distortion? Explain it with the help of suitable diagram.
- d) Explain UJT relaxation oscillator with the help of waveforms.
- e) Differentiate between positive and negative Feedback.
- f) Derive the expression of ripple factor for capacitor filter.



5. Attempt any two:

 $(6 \times 2 = 12)$

- a) Explain the effect of –ve feedback on input impedance, output impedance, voltage gain and bandwidth for voltage shunt feedback.
- b) Draw class AB amplifier and explain it with the help of waveform. Also derive the expression for efficiency of class AB amplifier.
- c) Define Oscillator. Explain Hartley Oscillator.

Seat No.	Set	Q
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	I						
	•	ical Engg.) (Part - LECTRONIC DEV	, ,	•		•	
-	d Date : Saturd	•				Max. Marks: 7	70
Time : 3	3.00 p.m. to 6.0	00 p.m.					
ı		4) Answer MCQ/Ob	ndicat I sory age N jectiv	e full marks . It should be lo. 3 . Each q e type ques i	solved uestior t ions o	n carries one mark.	
		MCQ/Objective	Туре	Questions			
Duration	n : 30 Minutes					Marks : 1	14
1. Cho	oose the corre	ct answer :				(1×14=1	4)
1)	Which of the fo	ollowing filter circuit is b) C		ng ripple ind LC	•	ent of load ? CLC	
2)	The effect of - a) Increases	ve feedback on stab b) Decreases	•		ame d)	Achieves S = 1	
•	•	e for obtaining the out ne output and the out b) Vin	-	ırrent I flows	with V	• • •	
4)	•	,	,		,		
4)	a) Voltage	plifiers are basically b) Current		-		High resistance	
5)	,	signal in a(n)	•	_	•	_	
		tage divider in the LC					
	a) Hartley	b) Colpitts	c)	Armstrong	d)	None of these	
6)	In an unregula a) Output var	ted power supply wit es with input		ilter the The output	is rippl	e free	
	c) The output	is $\sqrt{2}$ of input	d)	The output	is indep	pendent of input	
7)	a) Oscillatorsb) Oscillatorsc) Oscillators	ollowing statement is use +ve feedback circuit should satisfy circuit only generate s circuit output frequen	Barkh sinuso	ausen's crite oidal oscillati			



8)	Transistor Biasing is done to keep a) Proper direct current c) The base current small	b) Proper alternating current
9)	The point of intersection of d.c. and a) Operating point c) Voltage gain	
10)	The disadvantages of voltage divides a) High stability factor c) Many resistors	ler bias that it has b) Low base current d) None of the above
11)	A transistor amplifier has high outp a) Emitter is heavily doped b) Collector has reverse biased c) Collector is wider than emitter of d) None of the above	·
12)	The input capacitor in an amplifier ia) Coupling c) Leakage	s the capacitor. b) Bypass d) None of the above
13)	A JFET is called as tr a) Unipolar c) Unijunction	ansistor. b) Bipolar d) None of the above
14)	The JFET is a driver a) Current c) Both current and voltage	device. b) Voltage d) None of the above



Seat	
No.	

S.E. (Electrical Engg.) (Part – I) (CGPA) Examination, 2017 ELECTRONIC DEVICES AND CIRCUITS

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

2. Attempt any four:

 $(4 \times 4 = 16)$

- a) Draw and explain collector base bias method of biasing of a BJT.
- b) Explain direct coupling and its advantages for BJT amplifier.
- c) Explain BJT as an amplifier in CE arrangement.
- d) Explain V-I characteristics of JFET.
- e) Explain DC biasing of JFET.
- f) State how transistor affects the characteristics of an amplifier at high frequency response?
- 3. a) What are h-parameters? Draw hybrid model for CE configuration.

6

6

b) Explain different biasing techniques and derive expression for stability factor for any one technique.

OR

 Explain construction and operation with transfer function characteristics of enhancement type MOSFET.

 $(4 \times 4 = 16)$

4. Attempt any four:

- a) Explain the concept of critical inductance in LC filter.
- b) What is feedback circuit? Explain how it provides feedback in amplifiers?
- c) What is cross-over distortion? Explain it with the help of suitable diagram.
- d) Explain UJT relaxation oscillator with the help of waveforms.
- e) Differentiate between positive and negative Feedback.
- f) Derive the expression of ripple factor for capacitor filter.



5. Attempt any two:

 $(6 \times 2 = 12)$

- a) Explain the effect of –ve feedback on input impedance, output impedance, voltage gain and bandwidth for voltage shunt feedback.
- b) Draw class AB amplifier and explain it with the help of waveform. Also derive the expression for efficiency of class AB amplifier.
- c) Define Oscillator. Explain Hartley Oscillator.

Seat		
No.	Set	R

S.E. (Electrical Engg.) (Part – I) (CGPA) Examination, 2017 ELECTRONIC DEVICES AND CIRCUITS

	ELECTRONIC DE	EVICES AND CIRCUITS	
•	d Date : Saturday, 6-5-2017 3.00 p.m. to 6.00 p.m.		Max. Marks : 70
,	3) Q. No. 1 is com in Answer Book 4) Answer MCQ /	re compulsory. It indicate full marks. Ipulsory. It should be solved it It Page No. 3. Each question Objective type questions or In mention, Q.P. Set (P/Q/R/S	carries one mark. I Page No. 3 only.
	MCQ/Object	ive Type Questions	
Duratio	n : 30 Minutes		Marks : 14
1. Ch	oose the correct answer:		(1×14=14)
·	The input capacitor in an amplifical Coupling c) Leakage A JFET is called as a) Unipolar	b) Bypassd) None of the abovetransistor.b) Bipolar	tor.
3)	c) Unijunction The JFET is a driv	d) None of the above	
0)	a) Currentc) Both current and voltage	b) Voltage	
4)	Which of the following filter circua) L b) C		ent of load ? CLC
5)	The effect of –ve feedback on so a) Increases c) Remains same	tability is that it b) Decreases d) Achieves S = 1	
6)	The procedure for obtaining the voltage V at the output and the ca) 0 b) Vin	-	set to
7)	The power amplifiers are basica a) Voltage c) Small signal	,	



8)	The feedback signal in a(n)			· is	derived from a
	capacitive voltage divider in the LC c a) Hartley b) Colpitts			d)	None of these
9)	In an unregulated power supply without a) Output varies with input		lter the The output is rip	pple	e free
	c) The output is $\sqrt{2}$ of input	d)	The output is in	dep	pendent of input
10)	Which of the following statement is fa a) Oscillators use +ve feedback b) Oscillator circuit should satisfy Ba c) Oscillator circuit only generate sin	arkha nuso	ausen's criteria idal oscillation		
44\	d) Oscillator circuit output frequency				
11)	Transistor Biasing is done to keepa) Proper direct currentc) The base current small	b)	in the circl Proper alternati Collector curre	ing	
12)	The point of intersection of d.c. and a a) Operating point c) Voltage gain	b)	oad lines repres Current gain None of the abo		ts
13)	The disadvantages of voltage divider a) High stability factor c) Many resistors	b)	s that it has Low base curre None of the abo		
14)	A transistor amplifier has high output a) Emitter is heavily doped b) Collector has reverse biased c) Collector is wider than emitter or b d) None of the above			Э	



Seat	
No.	

S.E. (Electrical Engg.) (Part – I) (CGPA) Examination, 2017 ELECTRONIC DEVICES AND CIRCUITS

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

2. Attempt any four:

 $(4 \times 4 = 16)$

- a) Draw and explain collector base bias method of biasing of a BJT.
- b) Explain direct coupling and its advantages for BJT amplifier.
- c) Explain BJT as an amplifier in CE arrangement.
- d) Explain V-I characteristics of JFET.
- e) Explain DC biasing of JFET.
- f) State how transistor affects the characteristics of an amplifier at high frequency response?
- 3. a) What are h-parameters? Draw hybrid model for CE configuration.

6

6

b) Explain different biasing techniques and derive expression for stability factor for any one technique.

OR

 Explain construction and operation with transfer function characteristics of enhancement type MOSFET.

 $(4 \times 4 = 16)$

4. Attempt any four:

- a) Explain the concept of critical inductance in LC filter.
- b) What is feedback circuit? Explain how it provides feedback in amplifiers?
- c) What is cross-over distortion? Explain it with the help of suitable diagram.
- d) Explain UJT relaxation oscillator with the help of waveforms.
- e) Differentiate between positive and negative Feedback.
- f) Derive the expression of ripple factor for capacitor filter.



5. Attempt any two:

 $(6 \times 2 = 12)$

a) Explain the effect of –ve feedback on input impedance, output impedance, voltage gain and bandwidth for voltage shunt feedback.

-4-

- b) Draw class AB amplifier and explain it with the help of waveform. Also derive the expression for efficiency of class AB amplifier.
- c) Define Oscillator. Explain Hartley Oscillator.

Seat No.	Set	S

, , , , , , , , , , , , , , , , , , , ,	I) (CGPA) Examination, 2017ICES AND CIRCUITS										
Day and Date: Saturday, 6-5-2017 Time: 3.00 p.m. to 6.00 p.m.	Max. Marks : 70										
Instructions: 1) All questions are compulsory. 2) Figures to right indicate full marks. 3) Q. No. 1 is compulsory. It should be solved in first 30 m in Answer Book Page No. 3. Each question carries one 4) Answer MCQ/Objective type questions on Page No. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of											
	e Type Questions										
Duration: 30 Minutes	Marks: 14										
1. Choose the correct answer:	(1×14=14)										
 The procedure for obtaining the out voltage V at the output and the outp a) 0 b) Vin 	tput resistance with feedback is to apply a put current I flows with Vs set to c) V d) Vf										
2) The power amplifiers are basically ta) Voltage b) Current	the amplifiers. c) Small signal d) High resistance										
capacitive voltage divider in the LC	oscillator is derived from a circuit. c) Armstrong d) None of these										
4) In an unregulated power supply with a) Output varies with input	thout filter the										
c) The output is $\sqrt{2}$ of input	d) The output is independent of input										
 5) Which of the following statement is a) Oscillators use +ve feedback b) Oscillator circuit should satisfy I c) Oscillator circuit only generate s d) Oscillator circuit output frequence 	Barkhausen's criteria sinusoidal oscillation										
6) Transistor Biasing is done to keep _a) Proper direct currentc) The base current small	in the circuit. b) Proper alternating current d) Collector current small										



7)	The point of intersection of a) Operating point c) Voltage gain	.c. and a.c. load lines represents b) Current gain d) None of the above
8)	The disadvantages of voltage) High stability factor c) Many resistors	e divider bias that it has b) Low base current d) None of the above
9)	A transistor amplifier has hig a) Emitter is heavily doped b) Collector has reverse bia c) Collector is wider than e d) None of the above	
10)	The input capacitor in an an an a) Coupling c) Leakage	olifier is the capacitor. b) Bypass d) None of the above
11)	A JFET is called asa) Unipolarc) Unijunction	transistor. b) Bipolar d) None of the above
12)	The JFET is aa) Current c) Both current and voltage	driven device. b) Voltage d) None of the above
13)	Which of the following filter a) L b) C	ircuit is having ripple independent of load? c) LC d) CLC
14)	The effect of -ve feedback a) Increases b) Deci	on stability is that it eases c) Remains same d) Achieves $S = 1$



Seat	
No.	

S.E. (Electrical Engg.) (Part – I) (CGPA) Examination, 2017 ELECTRONIC DEVICES AND CIRCUITS

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to right indicate full marks.

2. Attempt any four:

 $(4 \times 4 = 16)$

- a) Draw and explain collector base bias method of biasing of a BJT.
- b) Explain direct coupling and its advantages for BJT amplifier.
- c) Explain BJT as an amplifier in CE arrangement.
- d) Explain V-I characteristics of JFET.
- e) Explain DC biasing of JFET.
- f) State how transistor affects the characteristics of an amplifier at high frequency response?
- 3. a) What are h-parameters? Draw hybrid model for CE configuration.

6

6

b) Explain different biasing techniques and derive expression for stability factor for any one technique.

OR

b) Explain construction and operation with transfer function characteristics of enhancement type MOSFET.

4. Attempt any four:

 $(4 \times 4 = 16)$

- a) Explain the concept of critical inductance in LC filter.
- b) What is feedback circuit? Explain how it provides feedback in amplifiers?
- c) What is cross-over distortion? Explain it with the help of suitable diagram.
- d) Explain UJT relaxation oscillator with the help of waveforms.
- e) Differentiate between positive and negative Feedback.
- f) Derive the expression of ripple factor for capacitor filter.



5. Attempt any two:

 $(6 \times 2 = 12)$

- a) Explain the effect of –ve feedback on input impedance, output impedance, voltage gain and bandwidth for voltage shunt feedback.
- b) Draw class AB amplifier and explain it with the help of waveform. Also derive the expression for efficiency of class AB amplifier.
- c) Define Oscillator. Explain Hartley Oscillator.

II				ı	ı					ı		ı								I		I				I				ı	
П	Ш	ı	II	ı	ı	II	ı	ı	Ш	ı	II	ı	Ш	ı	Ш	II	I	ı	Ш	ı	Ш	П	II	Ш	II	ı	Ш	Ш	Ш	II	

	8 8 8 8 8				SLR	R-VB-304
Seat No.						Set P
	•	trical) (Part – I) (. MEASUREMEN	-	•	-	
-	nd Date : Monday, : 3.00 p.m. to 6.00				ľ	Max. Marks : 70
	2) 3)	Solve all questions Figures to right ind Q. No. 1 is compuls in Answer Book Pag Answer MCQ/Obje Don't forget to me	dicate ory . It ge No. ective	should be so . 3. Each que t ype questi	stion carrie ons on Pa ç	s one mark. ge No. 3 only.
Durati	ion : 30 Minutes	MCQ/Objective	Туре	Questions		Marks : 14
1. C	hoose the correct a	answer:				(14×1=14
1) A null type instru a) A higher accu c) A faster respo	•	b) /	leflection typ A lower sens All of the abo	sitivity	nt has
2	a) High friction le	eight ratio in analog oss gards friction loss	b) l	Low friction I	oss	es
3	B) Which instrumer a) PMMC c) Electrodynam	it is cheapest disreg	b) I	g accuracy ? Moving iron Rectifier	?	
4	H) The units whoseun a) Derived	se sizes cannot b its.	b) I	Fundamental	l	are called
	c) Absolute		d) <i>i</i>	Auxiliary fund	damental	
5	i) Frequency can ba) Maxwell	e measured by using b) Schering	-	br De-sauty's	ridge. d) Wie	en's

6) Four arm ac bridge balance is obtained when

a) $I_1 = I_3 \& I_2 = I_4$

b) $Z_1Z_4 = Z_2Z_3$

c) $L\theta_1 + L\theta_4 = L\theta_2 + L\theta_3$

d) All of above

-2-



- 7) A potentiometer is a basically
 - a) Deflection type instrument
- b) Null type instrument

c) Digital instrument

- d) Both (a) and (b)
- 8) The burden in current transformer is expressed in terms of
 - a) Secondary winding current
 - b) VA rating of transformer
 - c) Voltage, current and power factor of secondary winding circuit
 - d) None of these
- 9) Ratio and Phase angle errors in PT may be reduced by
 - a) Increasing the exciting current
 - b) Increasing resistance and leakage reactance in transformer
 - c) Not employing turns compensation
 - d) None of these
- 10) The nominal ratio of 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 these
- 11) Strip chart recorders records
 - a) One quantity with respect to time
 - b) One quantity with respect to another quantity
 - c) Both (a) and (b)
 - d) None of these
- 12) Time division multiplexing is used
 - a) When the data to be transferred is slow changing
 - b) When the data to be transmitted has a small bandwidth
 - c) When the data to be transmitted is slow changing and has a low bandwidth
 - d) When the data to be transmitted is fast changing and has a high bandwidth
- 13) Q meter works on principle of
 - a) Mutual inductance

b) Series resonance

c) Self inductance

d) Parallel resonance

- 14) Multimeter measures
 - a) Both AC/DC current and voltage

b) Only AC current

c) Only DC voltage

d) None of the above



Seat	
No.	

S.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date: Monday, 8-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Solve all questions.

2) Figures to right indicate full marks.

SECTION - I

2. Solve any four:

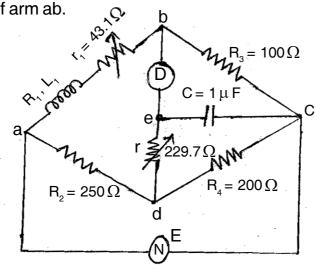
 $(4 \times 4 = 16)$

- 1) Define the following terms:
 - a) Accuracy
- b) Sensitivity
- c) Dead zone
- d) Linearity
- 2) A milliammeter of 2.5 resistance reads upto 100 mA. Calculate the resistance which is necessary to enable it to be used as
 - i) A voltmeter reading upto 10 V
- ii) An ammeter reading upto 10 A
- 3) Draw a neat sketch of a Weston synchroscope and explain its working.
- 4) How the standards of measurements are classified?
- 5) Explain simple DC potentiometer for measurement of unknown emf.

3. Solve any two:

 $(2 \times 6 = 12)$

- 1) A 3 phase 440 V motor has a power factor of 0.6. Two watt meters connected to measure the power show the input to be 25 kW. Find the reading on each instrument.
- 2) An AC bridge is connected as shown. Determine the resistance and inductance of arm ab.



3) Explain with neat diagram the working of Weston frequency meter.

Set P

SECTION - II

4. Solve any four: (4×4=16)

- a) Write a note on Q-meter.
- b) Draw and explain strip chart recorder.
- c) Explain with block diagram dual slope integration type analog to digital converter.
- d) Explain data acquisition system.
- e) Explain with neat block diagram working of digital multimeter.

5. Solve any two: (2×6=12)

- a) Explain the use of multiplexing in data acquisition system.
- b) Draw typical phasor diagram of a current transformer. Derive expression for actual transformation ratio.
- c) Describe different parts of CRT. Also describe how the following measurements can be made with the help of CRO: (i) frequency (ii) phase angle.

Seat	
No.	

Set

Q

S.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date: Monday, 8-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Solve all questions.

- 2) Figures to right indicate full marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 1) The burden in current transformer is expressed in terms of
 - a) Secondary winding current
 - b) VA rating of transformer
 - c) Voltage, current and power factor of secondary winding circuit
 - d) None of these
- 2) Ratio and Phase angle errors in PT may be reduced by
 - a) Increasing the exciting current
 - b) Increasing resistance and leakage reactance in transformer
 - c) Not employing turns compensation
 - d) None of these
- 3) The nominal ratio of 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 these
- 4) Strip chart recorders records
 - a) One quantity with respect to time
 - b) One quantity with respect to another quantity
 - c) Both (a) and (b)
 - d) None of these

-VE	3 – 304		
5)	Time division multiplexing is used a) When the data to be transferred is b) When the data to be transmitted h c) When the data to be transmitted is d) When the data to be transmitted is	as a slov	a small bandwidth v changing and has a low bandwidth
6)	Q meter works on principle of a) Mutual inductance c) Self inductance	,	Series resonance Parallel resonance
7)	Multimeter measures a) Both AC/DC current and voltage c) Only DC voltage	,	Only AC current None of the above
8)	A null type instrument as compared t a) A higher accuracy c) A faster response	b)	deflection type instrument has A lower sensitivity All of the above
9)	High torque to weight ratio in analog i a) High friction loss c) Nothing as regards friction loss	b)	cating instrument indicates Low friction loss None of the above
10)	Which instrument is cheapest disregation at the property of th	b)	ng accuracy ? Moving iron Rectifier
11)	The units whose sizes cannot be units.	e cl	nosen independently are called
	a) Derived c) Absolute	,	Fundamental Auxiliary fundamental
12)	Frequency can be measured by using a) Maxwell b) Schering		bridge. De-sauty's d) Wien's

13) Four arm ac bridge balance is obtained when

a)
$$I_1 = I_3 \& I_2 = I_4$$

b)
$$Z_1Z_4 = Z_2Z_3$$

c)
$$L\theta_1 + L\theta_4 = L\theta_2 + L\theta_3$$

14) A potentiometer is a basically



Seat	
No.	

S.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date: Monday, 8-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Solve all questions.

2) Figures to right indicate full marks.

SECTION - I

2. Solve any four:

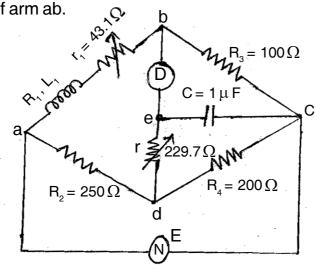
 $(4 \times 4 = 16)$

- 1) Define the following terms:
 - a) Accuracy
- b) Sensitivity
- c) Dead zone
 - d) Linearity
- 2) A milliammeter of 2.5 resistance reads upto 100 mA. Calculate the resistance which is necessary to enable it to be used as
 - i) A voltmeter reading upto 10 V
- ii) An ammeter reading upto 10 A
- 3) Draw a neat sketch of a Weston synchroscope and explain its working.
- 4) How the standards of measurements are classified?
- 5) Explain simple DC potentiometer for measurement of unknown emf.

3. Solve any two:

 $(2 \times 6 = 12)$

- 1) A 3 phase 440 V motor has a power factor of 0.6. Two watt meters connected to measure the power show the input to be 25 kW. Find the reading on each instrument.
- 2) An AC bridge is connected as shown. Determine the resistance and inductance of arm ab.



3) Explain with neat diagram the working of Weston frequency meter.

SECTION - II

4. Solve any four: (4×4=16)

- a) Write a note on Q-meter.
- b) Draw and explain strip chart recorder.
- c) Explain with block diagram dual slope integration type analog to digital converter.
- d) Explain data acquisition system.
- e) Explain with neat block diagram working of digital multimeter.

5. Solve any two: (2×6=12)

- a) Explain the use of multiplexing in data acquisition system.
- b) Draw typical phasor diagram of a current transformer. Derive expression for actual transformation ratio.
- c) Describe different parts of CRT. Also describe how the following measurements can be made with the help of CRO: (i) frequency (ii) phase angle.

II				ı	ı					ı		ı								I		I				I				ı	
П	Ш	ı	II	ı	ı	II	ı	ı	Ш	ı	II	ı	Ш	ı	Ш	II	I	ı	Ш	ı	Ш	П	II	Ш	II	ı	Ш	Ш	Ш	II	

Set

S.E. (Electrical) (Part - I) (CGPA) Examination, 2017 **ELECTRICAL MEASUREMENT AND INSTRUMENTATION**

Day and Date : Monday, 8-5-2017	Max. Marks: 70
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Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Solve all questions.

- 2) Figures to right indicate full marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 3 only. f Page.

4) Answer MCQ/Ob	bjective type questions on Page nention, Q.P. Set (P/Q/R/S) on T	e No. 3 only.
MCQ/Objective	e Type Questions	
Duration: 30 Minutes		Marks: 14
1. Choose the correct answer:		(14×1=14)
Frequency can be measured by us a) Maxwell b) Schering	sing bridge. c) De-sauty's d) Wien	's
 2) Four arm ac bridge balance is obta a) I₁ = I₃ & I₂ = I₄ c) Lθ₁ + Lθ₄ = Lθ₂ + Lθ₃ 	ained when b) $Z_1Z_4 = Z_2Z_3$ d) All of above	
3) A potentiometer is a basicallya) Deflection type instrumentc) Digital instrument	b) Null type instrument d) Both (a) and (b)	
4) The burden in current transformera) Secondary winding currentb) VA rating of transformer	·	

- c) Voltage, current and power factor of secondary winding circuit
- d) None of these
- 5) Ratio and Phase angle errors in PT may be reduced by
 - a) Increasing the exciting current
 - b) Increasing resistance and leakage reactance in transformer
 - c) Not employing turns compensation
 - d) None of these

6) The nominal ratio of current transformer is

	a) Primary winding current/Secondarb) Rated primary winding current/Ratc) Number of secondary winding turrd) All of these	ed secondary winding current
7)	Strip chart recorders records a) One quantity with respect to time b) One quantity with respect to anoth c) Both (a) and (b) d) None of these	er quantity
8)	•	
9)	Q meter works on principle of a) Mutual inductance c) Self inductance	b) Series resonanced) Parallel resonance
10)	Multimeter measures a) Both AC/DC current and voltage c) Only DC voltage	b) Only AC currentd) None of the above
11)	A null type instrument as compared to a) A higher accuracy c) A faster response	b a deflection type instrument has b) A lower sensitivity d) All of the above
12)	High torque to weight ratio in analog ina) High friction lossc) Nothing as regards friction loss	b) Low friction loss
13)	Which instrument is cheapest disregated a) PMMC c) Electrodynamometer	arding accuracy ? b) Moving iron d) Rectifier
14)	The units whose sizes cannot beunits.	e chosen independently are called
	a) Derived	b) Fundamental
	c) Absolute	d) Auxiliary fundamental Set R



Seat	
No.	

S.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date: Monday, 8-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Solve all questions.

2) Figures to right indicate full marks.

SECTION - I

2. Solve any four:

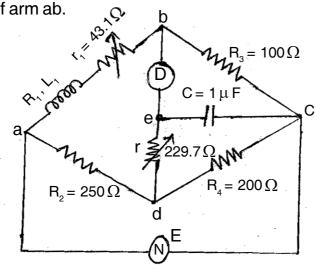
 $(4 \times 4 = 16)$

- 1) Define the following terms:
 - a) Accuracy
- b) Sensitivity
- c) Dead zone
- d) Linearity
- 2) A milliammeter of 2.5 resistance reads upto 100 mA. Calculate the resistance which is necessary to enable it to be used as
 - i) A voltmeter reading upto 10 V
- ii) An ammeter reading upto 10 A
- 3) Draw a neat sketch of a Weston synchroscope and explain its working.
- 4) How the standards of measurements are classified?
- 5) Explain simple DC potentiometer for measurement of unknown emf.

3. Solve any two:

 $(2 \times 6 = 12)$

- 1) A 3 phase 440 V motor has a power factor of 0.6. Two watt meters connected to measure the power show the input to be 25 kW. Find the reading on each instrument.
- 2) An AC bridge is connected as shown. Determine the resistance and inductance of arm ab.



3) Explain with neat diagram the working of Weston frequency meter.

Set R

SECTION - II

4. Solve any four: (4×4=16)

- a) Write a note on Q-meter.
- b) Draw and explain strip chart recorder.
- c) Explain with block diagram dual slope integration type analog to digital converter.
- d) Explain data acquisition system.
- e) Explain with neat block diagram working of digital multimeter.

5. Solve any two: (2×6=12)

- a) Explain the use of multiplexing in data acquisition system.
- b) Draw typical phasor diagram of a current transformer. Derive expression for actual transformation ratio.
- c) Describe different parts of CRT. Also describe how the following measurements can be made with the help of CRO: (i) frequency (ii) phase angle.

Seat	
No.	

Set

S

S.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date: Monday, 8-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Solve all questions.

- 2) Figures to **right** indicate **full** marks.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 1) The nominal ratio of 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 these
- 2) Strip chart recorders records
 - a) One quantity with respect to time
 - b) One quantity with respect to another quantity
 - c) Both (a) and (b)
 - d) None of these
- 3) Time division multiplexing is used
 - a) When the data to be transferred is slow changing
 - b) When the data to be transmitted has a small bandwidth
 - c) When the data to be transmitted is slow changing and has a low bandwidth
 - d) When the data to be transmitted is fast changing and has a high bandwidth
- 4) Q meter works on principle of
 - a) Mutual inductance

b) Series resonance

c) Self inductance

d) Parallel resonance



5)	Multimeter measures a) Both AC/DC current and voltage	•
6)	c) Only DC voltageA null type instrument as compared toa) A higher accuracyc) A faster response	d) None of the above a deflection type instrument has b) A lower sensitivity d) All of the above
7)	High torque to weight ratio in analog in	ndicating instrument indicates b) Low friction loss
8)	Which instrument is cheapest disregated a) PMMC c) Electrodynamometer	arding accuracy ? b) Moving iron d) Rectifier
9)	The units whose sizes cannot be units.	chosen independently are called
	a) Derived c) Absolute	b) Fundamentald) Auxiliary fundamental
10)	Frequency can be measured by using a) Maxwell b) Schering	bridge. c) De-sauty's d) Wien's
11)	Four arm ac bridge balance is obtaine a) $I_1 = I_3 \& I_2 = I_4$ c) $L\theta_1 + L\theta_4 = L\theta_2 + L\theta_3$	d when b) $Z_1Z_4 = Z_2Z_3$ d) All of above
12)	A potentiometer is a basically a) Deflection type instrument c) Digital instrument	b) Null type instrumentd) Both (a) and (b)
13)	The burden in current transformer is ea.) Secondary winding current b) VA rating of transformer c) Voltage, current and power factor d) None of these	
14)	Ratio and Phase angle errors in PT m a) Increasing the exciting current b) Increasing resistance and leakage c) Not employing turns compensation d) None of these	reactance in transformer



Seat	
No.	

S.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTRICAL MEASUREMENT AND INSTRUMENTATION

Day and Date: Monday, 8-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Solve all questions.

2) Figures to right indicate full marks.

SECTION - I

2. Solve any four:

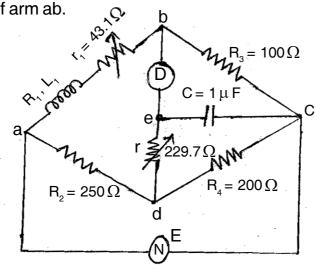
 $(4 \times 4 = 16)$

- 1) Define the following terms:
 - a) Accuracy
- b) Sensitivity
- c) Dead zone
- d) Linearity
- 2) A milliammeter of 2.5 resistance reads upto 100 mA. Calculate the resistance which is necessary to enable it to be used as
 - i) A voltmeter reading upto 10 V
- ii) An ammeter reading upto 10 A
- 3) Draw a neat sketch of a Weston synchroscope and explain its working.
- 4) How the standards of measurements are classified?
- 5) Explain simple DC potentiometer for measurement of unknown emf.

3. Solve any two:

 $(2 \times 6 = 12)$

- 1) A 3 phase 440 V motor has a power factor of 0.6. Two watt meters connected to measure the power show the input to be 25 kW. Find the reading on each instrument.
- 2) An AC bridge is connected as shown. Determine the resistance and inductance of arm ab.



3) Explain with neat diagram the working of Weston frequency meter.

SECTION - II

4. Solve any four: (4×4=16)

- a) Write a note on Q-meter.
- b) Draw and explain strip chart recorder.
- c) Explain with block diagram dual slope integration type analog to digital converter.
- d) Explain data acquisition system.
- e) Explain with neat block diagram working of digital multimeter.

5. Solve any two: (2×6=12)

- a) Explain the use of multiplexing in data acquisition system.
- b) Draw typical phasor diagram of a current transformer. Derive expression for actual transformation ratio.
- c) Describe different parts of CRT. Also describe how the following measurements can be made with the help of CRO: (i) frequency (ii) phase angle.

! .!! . !! . !! !!! !	

Seat	
No.	

Set P

S.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 1) Interconnected systems have the advantage of
 - a) Reduced reserve plant capacity, capital cost per kW and economy in operation
 - b) Improved load factor, diversity factor and operation efficiency and increased reliability of supply
 - c) All of the above
 - d) None of the above
- 2) The essential requirement(s) of the power plants to be operated as base-load plants is/are
 - a) Low-operating cost
 - b) The capability of operating continuously for long periods
 - c) Requirement of few operating personnel and economical repair
 - d) All of the above
- 3) A load curve is a plot of
 - a) Load vs generation capacity
- b) Load vs current

c) Load vs time

- d) Load vs power
- 4) Which of the following category of consumers can provide highest load factor?
 - a) A domestic consumer
 - b) A continuous process plant
 - c) A steel melting unit using arc furnace
 - d) A cold storage plant



5)	A system having conne of 20 kW and average lo	oad of 40 kW, w	vill	have a load fac	tor	of
	,		′	_	,	80 %
6)	Whenever the boiler pre			•	•	
	a) Super heater b) (Condenser c	c) ⁻	Turbine	d)	Economizer
7)	The temperatures inside	e the water tube	e bo	oiler is		
	a) 300°C b) 4	400°C c	2) 5	560°C	d)	720°C
8)	Which of the following is	s considered as	s su	perior quality o	f co	oal?
	a) Peat		•	Coke		
	c) Bituminous coal	d	l (b	Lignite		
9)	Ash content of Indian co	oal is approxima	atel	ly		
	a) 5 % b) 8	3 % c	c) ⁻	10%	d)	25 %
10)	Water is supplied to boi	ler				
	a) At 120 kg/m ²					
	b) At atmospheric press					
	c) At slightly more than					
	d) At more than the ste	•				
11)	The enriched uranium c		IIXC	mately		
	a) 10 % of U^{235} and 90					
	 b) 20 % of U²³⁵ and 80 c) 30 % of U²³⁵ and 70 					
	d) None of these	70 OI O				
12\	Nuclear power station is	e euitable ae				
12)	a) Base-load plant		a) [Peak-load plant		
	c) Base or peak load		,	None		
13)	One a.m.u. is approxima		-, .			
10)	a) 1.66×10^{-24} kg		o) .	1.66 × 10 ^{–27} kg		
	c) 1.6×10^{-16} kg			$1.6 \times 10^{-13} \text{ kg}$		
14)	The main daily solar rac		,	•	iho	ut
,	a) 100 kwh m ⁻²		•	20 kwh m ⁻²		. -
	c) 5 kwh m ⁻²			1 kwh m ⁻²		
	•		•			



Seat	
No.	

S.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) What is depreciation? Explain any one method of depreciation in detail.
- 2) What is a tariff? Explain different methods of tariffs.
- 3) Elaborate advantages and disadvantages of thermal power plant.
- 4) Give the general layout of ash handling system and dust collecting system.
- 5) Explain ash and dust collection system in thermal power plant.
- 6) Explain different types of turbines used in hydropower plant.

3. Attempt any two:

 $(2 \times 6 = 12)$

- 1) Explain the layout of thermal power plant in detail.
- 2) Explain the layout of hydro power plant in detail.

OR

2) Write a short note on fluidized bed combustion.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Explain with neat diagram the function of BWR and PWR. Mention advantages and disadvantages.
- 2) Explain the working of diesel engine power plant in detail.
- 3) Discuss the factors governing the choice of site for gas turbine power plant.
- 4) Explain fission and fusion with neat sketch.
- 5) Write a short note on tidal power generation.
- 6) What is geothermal energy? How it can be used for power generation?

Set P



5. Attempt any two:

 $(2 \times 6 = 12)$

- 1) With neat diagram, explain the working of nuclear power plant.
- 2) Explain with neat sketch open cycle and closed cycle gas turbine power plant.

OR

2) Explain different types of wind power plants.

Seat	
No.	

Set Q

 $(14 \times 1 = 14)$

S.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes	Marks: 14

1) Which of the following is considered as superior quality of coal?

a) Peat

b) Coke

c) Bituminous coal

1. Choose the correct answer:

d) Lignite

2) Ash content of Indian coal is approximately

a) 5%

b) 8 %

c) 10%

d) 25%

3) Water is supplied to boiler

a) At 120 kg/m²

b) At atmospheric pressure

c) At slightly more than atmospheric pressure

d) At more than the steam pressure in the boiler

4) The enriched uranium consists of approximately

a) 10 % of U^{235} and 90 % of U^{238}

b) 20 % of U^{235} and 80 % of U^{238}

c) 30 % of U^{235} and 70 % of U^{238}

d) None of these

5) Nuclear power station is suitable as

a) Base-load plant

b) Peak-load plant

c) Base or peak load

d) None

6) One a.m.u. is approximately equal to

a) 1.66×10^{-24} kg c) 1.6×10^{-16} kg

b) $1.66 \times 10^{-27} \text{ kg}$

d) 1.6×10^{-13} kg

P.T.O.

a) 100 kwh m^{-2}

b) 20 kwh m⁻²

7) The main daily solar radiation at many places in India is about



	c) 5 kwh m ⁻²		d) 1 kwh m ⁻²	
8)	Interconnected sys		•	N and economy in
	operation	ve plant capacity,	Capital Cost pel Ki	Wand economy in
	b) Improved load for reliability of sup	•	or and operation effic	iency and increased
	c) All of the above			
٥)	d) None of the abo			
9)	plants is/are	, , , ,	ower plants to be ope	erated as base-load
	a) Low-operating			-1-
	• •	. •	uously for long peric sonnel and econom	
	d) All of the above			icai repaii
10)	A load curve is a p			
,	a) Load vs genera		b) Load vs curren	t
	c) Load vs time		d) Load vs power	
11)			sumers can provide	highest load factor?
	a) A domestic con			
	b) A continuous p	rocess plant unit using arc furn	ace	
	d) A cold storage	<u> </u>	400	
12)	•		00 kW, peak load o , will have a load fac	
	a) 40 %	b) 50%	c) 60 %	d) 80 %
13)	,	,	ds 70 kg/cm ² invaria	,
,		b) Condenser	c) Turbine	d) Economizer
14)	The temperatures	inside the water tu	be boiler is	
	a) 300°C	b) 400°C	c) 560°C	d) 720°C



Seat	
No.	

S.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) What is depreciation? Explain any one method of depreciation in detail.
- 2) What is a tariff? Explain different methods of tariffs.
- 3) Elaborate advantages and disadvantages of thermal power plant.
- 4) Give the general layout of ash handling system and dust collecting system.
- 5) Explain ash and dust collection system in thermal power plant.
- 6) Explain different types of turbines used in hydropower plant.

3. Attempt any two:

 $(2 \times 6 = 12)$

- 1) Explain the layout of thermal power plant in detail.
- 2) Explain the layout of hydro power plant in detail.

OR

2) Write a short note on fluidized bed combustion.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- Explain with neat diagram the function of BWR and PWR. Mention advantages and disadvantages.
- 2) Explain the working of diesel engine power plant in detail.
- 3) Discuss the factors governing the choice of site for gas turbine power plant.
- 4) Explain fission and fusion with neat sketch.
- 5) Write a short note on tidal power generation.
- 6) What is geothermal energy? How it can be used for power generation?

Set Q



5. Attempt any two:

 $(2 \times 6 = 12)$

- 1) With neat diagram, explain the working of nuclear power plant.
- 2) Explain with neat sketch open cycle and closed cycle gas turbine power plant.

OR

2) Explain different types of wind power plants.

SLR-VB - 305

Set

S.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017 **POWER PLANT ENGINEERING**

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

> 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

		MCQ/Objective	Type Questions		
Durati	ion : 30 Minutes	-		Marks : 14	1
1. C	hoose the correct ar	iswer:		(14×1=14))
1	of 20 kW and aver	age load of 40 kV	I, will have a load		
	a) 40 %	b) 50 %	c) 60 %	d) 80 %	
2	2) Whenever the boil a) Super heater	er pressure excee b) Condenser	eds 70 kg/cm² inv c) Turbine	variably we use d) Economizer	
3	B) The temperatures a) 300°C	inside the water to b) 400°C	ube boiler is c) 560°C	d) 720°C	
4	Which of the follow	ving is considered	l as superior qua b) Coke	lity of coal?	
	a) Peatc) Bituminous coa	al	d) Lignite		
	c) Ditarrillous coe	(I	a) Ligitic		

c) 10%

d) 25 %

- 6) Water is supplied to boiler
 - a) At 120 kg/m²

a) 5%

- b) At atmospheric pressure
- c) At slightly more than atmospheric pressure

b) 8 %

5) Ash content of Indian coal is approximately

d) At more than the steam pressure in the boiler



- 7) The enriched uranium consists of approximately
 - a) 10 % of U^{235} and 90 % of U^{238}
 - b) 20 % of U^{235} and 80 % of U^{238}
 - c) 30 % of U^{235} and 70 % of U^{238}
 - d) None of these
- 8) Nuclear power station is suitable as
 - a) Base-load plant

b) Peak-load plant

c) Base or peak load

- d) None
- 9) One a.m.u. is approximately equal to
 - a) 1.66×10^{-24} kg

b) $1.66 \times 10^{-27} \text{ kg}$

c) 1.6×10^{-16} kg

- d) 1.6×10^{-13} kg
- 10) The main daily solar radiation at many places in India is about
 - a) 100 kwh m^{-2}

b) 20 kwh m⁻²

c) 5 kwh m^{-2}

- d) 1 kwh m^{-2}
- 11) Interconnected systems have the advantage of
 - a) Reduced reserve plant capacity, capital cost per kW and economy in operation
 - b) Improved load factor, diversity factor and operation efficiency and increased reliability of supply
 - c) All of the above
 - d) None of the above
- 12) The essential requirement(s) of the power plants to be operated as base-load plants is/are
 - a) Low-operating cost
 - b) The capability of operating continuously for long periods
 - c) Requirement of few operating personnel and economical repair
 - d) All of the above
- 13) A load curve is a plot of
 - a) Load vs generation capacity
- b) Load vs current

c) Load vs time

- d) Load vs power
- 14) Which of the following category of consumers can provide highest load factor?
 - a) A domestic consumer
 - b) A continuous process plant
 - c) A steel melting unit using arc furnace
 - d) A cold storage plant



Seat	
No.	

S.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) What is depreciation? Explain any one method of depreciation in detail.
- 2) What is a tariff? Explain different methods of tariffs.
- 3) Elaborate advantages and disadvantages of thermal power plant.
- 4) Give the general layout of ash handling system and dust collecting system.
- 5) Explain ash and dust collection system in thermal power plant.
- 6) Explain different types of turbines used in hydropower plant.

3. Attempt any two:

 $(2 \times 6 = 12)$

- 1) Explain the layout of thermal power plant in detail.
- 2) Explain the layout of hydro power plant in detail.

OR

2) Write a short note on fluidized bed combustion.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Explain with neat diagram the function of BWR and PWR. Mention advantages and disadvantages.
- 2) Explain the working of diesel engine power plant in detail.
- 3) Discuss the factors governing the choice of site for gas turbine power plant.
- 4) Explain fission and fusion with neat sketch.
- 5) Write a short note on tidal power generation.
- 6) What is geothermal energy? How it can be used for power generation?

Set R



5. Attempt any two:

 $(2 \times 6 = 12)$

- 1) With neat diagram, explain the working of nuclear power plant.
- 2) Explain with neat sketch open cycle and closed cycle gas turbine power plant.

OR

2) Explain different types of wind power plants.

SLR-VB - 305

Seat	
No.	

Set

S

S.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 1) Water is supplied to boiler
 - a) At 120 kg/m²
 - b) At atmospheric pressure
 - c) At slightly more than atmospheric pressure
 - d) At more than the steam pressure in the boiler
- 2) The enriched uranium consists of approximately
 - a) 10 % of U^{235} and 90 % of U^{238}
 - b) 20 % of U²³⁵ and 80 % of U²³⁸
 - c) 30 % of U^{235} and 70 % of U^{238}
 - d) None of these
- 3) Nuclear power station is suitable as
 - a) Base-load plant

b) Peak-load plant

c) Base or peak load

- d) None
- 4) One a.m.u. is approximately equal to
 - a) $1.66 \times 10^{-24} \text{ kg}$

b) $1.66 \times 10^{-27} \text{ kg}$

c) 1.6×10^{-16} kg

- d) 1.6×10^{-13} kg
- 5) The main daily solar radiation at many places in India is about
 - a) 100 kwh m⁻²

b) 20 kwh m⁻²

c) 5 kwh m⁻²

d) 1 kwh m^{-2}



6)	Interconnected systems have the a) Reduced reserve plant capa operation	•	kW and economy in
	b) Improved load factor, diversity factor, diversity for reliability of supplyc) All of the aboved) None of the above	factor and operation ef	ficiency and increased
7)	The essential requirement(s) of the plants is/are	ne power plants to be c	pperated as base-load
	a) Low-operating costb) The capability of operating costc) Requirement of few operatingd) All of the above	•	
8)	A load curve is a plot of	h)	
	a) Load vs generation capacityc) Load vs time	b) Load vs curred) Load vs power	
9)	 Which of the following category of a) A domestic consumer b) A continuous process plant c) A steel melting unit using arc d) A cold storage plant 	·	le highest load factor?
10)	A system having connected load of 20 kW and average load of 40	kW, will have a load	factor of
44\	a) 40 % b) 50 %	c) 60 %	d) 80 %
11)	Whenever the boiler pressure ex a) Super heater b) Condense		
12)	The temperatures inside the water a) 300°C b) 400°C	er tube boiler is c) 560°C	d) 720°C
13)	Which of the following is conside a) Peat c) Bituminous coal	red as superior qualit b) Coke d) Lignite	ty of coal?
14)	Ash content of Indian coal is appr		J) 05 0/
	a) 5 % b) 8 %	c) 10 %	d) 25 %



Seat	
No.	

S.E. (Electrical Engineering) (Part – I) (CGPA) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four:

 $(4 \times 4 = 16)$

- 1) What is depreciation? Explain any one method of depreciation in detail.
- 2) What is a tariff? Explain different methods of tariffs.
- 3) Elaborate advantages and disadvantages of thermal power plant.
- 4) Give the general layout of ash handling system and dust collecting system.
- 5) Explain ash and dust collection system in thermal power plant.
- 6) Explain different types of turbines used in hydropower plant.

3. Attempt any two:

 $(2 \times 6 = 12)$

- 1) Explain the layout of thermal power plant in detail.
- 2) Explain the layout of hydro power plant in detail.

OR

2) Write a short note on fluidized bed combustion.

SECTION - II

4. Attempt any four:

 $(4 \times 4 = 16)$

- 1) Explain with neat diagram the function of BWR and PWR. Mention advantages and disadvantages.
- 2) Explain the working of diesel engine power plant in detail.
- 3) Discuss the factors governing the choice of site for gas turbine power plant.
- 4) Explain fission and fusion with neat sketch.
- 5) Write a short note on tidal power generation.
- 6) What is geothermal energy? How it can be used for power generation?



5. Attempt any two:

 $(2 \times 6 = 12)$

- 1) With neat diagram, explain the working of nuclear power plant.
- 2) Explain with neat sketch open cycle and closed cycle gas turbine power plant.

OR

2) Explain different types of wind power plants.

SLR-VB - 306

No. Set P	Seat No.		Set	Р
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S.E. (Electrical) (Part – I) (Old) Examination, 2017 DATA STRUCTURE

DATA STRUCTURE						
-	d Date : Monday, 15 10.00 a.m. to 1.00 p					Max. Marks: 100
Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark. 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.						
		MCQ/Objective T	уре	Questions		
Duratio	n : 30 Minutes					Marks : 20
	oose the correct an Which is not dynar A) malloc			function?	D)	calloc
2)	Which one of the b A) Queue	,	line	ear data structur	e ?	All of the above
3)	The size of array in A) 4	nt a[5] = {1, 2} is B) 12	C)	10	D)	6
4)	The variable that a A) Local variable C) Auto variable	re declared outside	B)	I the functions a Global variable None of the abo		alled
5)	The function used mode is A) putc	to read a character B) getc				een opened in read putchar
6)	push() and pop() fu A) queues		in	stacks		trees
7)	Which of the follow first node? A) singly linked lis C) circular singly li	t	B)	ave last mode o linked list doubly linked li		e list pointing to the
8)	What value strcmp A) 0	o() function returns B) 2	wh C)	_		ne same ? error



•	What is the only ful A) start()			must contain ? main()	D)	program()
•	Which of the follow A) funct;	ring is a valid funct B) funct x, y;				· · · · · · · · · · · · · · · · · · ·
	What punctuation i A) { } C) BEGIN and END	_	B)	eginning and end -> and <- (and)	d of	code blocks?
	If the given input ar gives the best perform. A) Insertion sort	ormance?	_			e following algorithm Merge sort
	•	•	•		,	s given by means of
	A) linked list	B) node list	C)	primitive list	D)	none of these
•	Which of the follow A) Queue			ture ? Hash Table	D)	Binary search tree
•	Which of the follow A) compare(); C) cmp();	ing functions comp	B)	es two strings ? stringcompare(strcmp()	();	
•	The binary equivale A) 110010 C) 101	ent of 50 is	,	1010110 101.011.00.00		
ŕ	In linked list implem A) At the head of li B) At the tail of the C) At the centre po D) None	nk list link list		vhere does a ne	w el	lement be inserted ?
	Which of the follow A) int x;	ing is the proper de B) int &x	_			
	What is the index n A) 29 C) 0	umber of the last e	B)	nent of an array 28 Programmer-de		
20)	Which is the built in size?	n library function to	ad	just the allocate	ed d	ynamic memory
	A) malloc	B) calloc	C)	realloc	D)	resize

Set P



Seat	
No.	

S.E. (Electrical) (Part – I) (Old) Examination, 2017 DATA STRUCTURE

Day and Date: Monday, 15-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

- 2. Solve any four: (5×4=20)
 - 1) Define the data structure. What is ADT?
 - 2) Explain PUSH and POP operation of STACK.
 - 3) Explain with example Dynamic Memory Allocation Function in C.
 - 4) Difference between Structure and Union.
 - 5) Explain structure and pointer to structure with proper example.
- 3. Explain with e.g. conversation of infix to postfix.

10

OR

What is FILE? Explain any five file operation in C with examples.

4. Write a short note (any 2):

10

- A) Union Data Type in C.
- B) Function in C.
- C) Type_casting.

SECTION - II

5. Solve any four: (4×5=20)

- 1) What is Recursion? Explain with example.
- 2) Write a note on queue as a data structure.

- 3) What is linked list? Explain its types with diagrams.
- 4) Explain the procedure for inserting and deleting node in the doubly linked list?
- 5) What is Hashing? Explain.
- 6. Solve:

Explain Hashing functions along with example in detail.

OR

Explain collision resolution methods in detail.

7. Solve any one:

- 1) Write a C program to implement Circular Queue?
- 2) Write a note on any one:
 - a) Bubble sort.
 - b) Merge sort.

A) Queue

B) Stack

SLR-VB - 306

No.

	S.E. (Elec	trical) (Part – I) DATA STR	(Old) Examination	on, 2017
-	id Date : Monday, 1։ 10.00 a.m. to 1.00 բ			Max. Marks : 100
	ii 2) A	n Answer Book Pag Answer MCQ/Obje	ge No. 3. Each ques ctive type question	ved in first 30 minutes stion carries one mark. as on Page No. 3 only. /R/S) on Top of Page.
		MCQ/Objective T	ype Questions	
Duratio	on : 30 Minutes			Marks : 20
1. Ch	oose the correct ar	nswers :		
1)	The binary equiva A) 110010 C) 101	lent of 50 is	B) 1010110 D) 101.011.00.00	
2)	A) At the head of B) At the tail of the	link list		w element be inserted ?
3)	Which of the follow A) int x;	ving is the proper d B) int &x	eclaration of a poin C) ptr x;	ter ? D) int *x;
4)		number of the last	element of an array B) 28 D) Programmer-de	with 29 elements ?
5)	size?	-	-	ed dynamic memory
	A) malloc	B) calloc	C) realloc	D) resize
6)	Which is not dynai A) malloc	mic memory alloca B) free	tion function ? C) alloc	D) calloc
7)	Which one of the b	elow mentioned is	linear data structur	e?

C) Arrays D) All of the above

8)	The size of array in A) 4	nt a[5] = {1, 2} B) 12		10	D)	6
9)	The variable that an A) Local variable C) Auto variable	re declared ou	B)	the functions Global varial None of the	ole	alled
10)	The function used mode is	to read a char	acter fr	om a file that	has b	een opened in read
	A) putc	B) getc	C)	getchar	D)	putchar
11)	<pre>push() and pop() fu A) queues</pre>	nctions are fou B) lists		stacks	D)	trees
12)	Which of the follow first node?	_			e of th	e list pointing to the
	A) singly linked listC) circular singly li		,	linked list doubly linke	d list	
13)	What value strcmp A) 0	() function retu B) 2	rns wh	_		ne same ? error
14)	What is the only fur A) start()	nction all C pro B) system()	_	must contain main()		program()
15)	Which of the follow A) funct;	ing is a valid fu B) funct x, y;				function exists) ? int funct();
16)	What punctuation is A) { } C) BEGIN and END	_	B)	eginning and -> and <- (and)	end of	code blocks?
17)	If the given input ar gives the best performs. A) Insertion sort	ormance?				
18)	A linear collection of pointer is called	of data elemer	its whe	re the linear ı	node is	s given by means of
	•	,	•	•	D)	none of these
19)	Which of the follow A) Queue	ing is FIFO da B) Stack		ture ? Hash Table	D)	Binary search tree
20)	Which of the follow A) compare(); C) cmp();	ing functions c	B)	es two strings stringcompa strcmp()		



Seat	
No.	

S.E. (Electrical) (Part – I) (Old) Examination, 2017 DATA STRUCTURE

Day and Date: Monday, 15-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

- 2. Solve any four: (5×4=20)
 - 1) Define the data structure. What is ADT?
 - 2) Explain PUSH and POP operation of STACK.
 - 3) Explain with example Dynamic Memory Allocation Function in C.
 - 4) Difference between Structure and Union.
 - 5) Explain structure and pointer to structure with proper example.
- 3. Explain with e.g. conversation of infix to postfix.

10

OR

What is FILE? Explain any five file operation in C with examples.

4. Write a short note (any 2):

10

- A) Union Data Type in C.
- B) Function in C.
- C) Type_casting.

SECTION - II

5. Solve any four: (4×5=20)

- 1) What is Recursion? Explain with example.
- 2) Write a note on queue as a data structure.



- 3) What is linked list? Explain its types with diagrams.
- 4) Explain the procedure for inserting and deleting node in the doubly linked list?
- 5) What is Hashing? Explain.

6. Solve:

Explain Hashing functions along with example in detail.

OR

Explain collision resolution methods in detail.

7. Solve any one:

- 1) Write a C program to implement Circular Queue?
- 2) Write a note on any one:
 - a) Bubble sort.
 - b) Merge sort.

C) 101

SLR-VB - 306

Seat	_	
No.	Set	\mid R \mid

	S.E. (Elect	rical) (Part – I) (DATA STR	-	•	n, :	2017
•	d Date : Monday, 15 I 0.00 a.m. to 1.00 p					Max. Marks : 100
1	2) A	. No. 1 is compulse Answer Book Pag nswer MCQ/Objec on't forget to men	e N ctiv	lo. 3. Each quest e type question s	tion s or	carries one mark. I Page No. 3 only.
		MCQ/Objective T	уре	Questions		
Duratio	n : 30 Minutes					Marks : 20
1. Ch	oose the correct ans	swers :				
1)	What punctuation is A) { } C) BEGIN and END	J	B)	eginning and end -> and <- (and)	d of	code blocks ?
2)	If the given input ar gives the best perform. A) Insertion sort	ormance ?				following algorithm Merge sort
3)	•	of data elements w	vhe	re the linear noc	le is	given by means of
4)	Which of the follow A) Queue	,	truc	ture?	,	Binary search tree
5)	Which of the follow A) compare(); C) cmp();	ing functions comp	B)	es two strings ? stringcompare(strcmp());	
6)	The binary equivale A) 110010	ent of 50 is	B)	1010110		

D) 101.011.00.00

7)	In linked list implem A) At the head of li B) At the tail of the C) At the centre po D) None	nk list e link list		vhere does a ne	w el	ement be inserted ?
8)	Which of the follow A) int x;			aration of a poin ptr x;		? int*x;
9)	What is the index n A) 29 C) 0	number of the last e	B)	nent of an array 28 Programmer-de		
10)	Which is the built in size ?	n library function to	ad	just the allocate	d dy	ynamic memory
	A) malloc	B) calloc	C)	realloc	D)	resize
11)	Which is not dynan A) malloc	nic memory allocat B) free		function ? alloc	D)	calloc
12)	Which one of the back) Queue					All of the above
13)	The size of array in A) 4	nt a[5] = {1, 2} is B) 12	C)	10	D)	6
14)	The variable that a A) Local variable C) Auto variable	re declared outside	B)	the functions a Global variable None of the abo		alled
15)	The function used mode is	to read a characte	er fr	om a file that ha	as b	een opened in read
	A) putc	B) getc	C)	getchar	D)	putchar
16)	push() and pop() fu A) queues	nctions are found B) lists		stacks	D)	trees
17)	Which of the follow	ring linked list belo	w h	ave last mode o	f th	e list pointing to the
	first node? A) singly linked list C) circular singly li		,	linked list doubly linked li	st	
18)	What value strcmp A) 0	() function returns B) 2	who	_		ne same ? error
19)	What is the only ful A) start()	nction all C progra B) system()		must contain ? main()	D)	program()
20)	Which of the follow A) funct;	ring is a valid funct B) funct x, y;		call (assuming funct();		function exists) ? int funct();



Seat	
No.	

S.E. (Electrical) (Part – I) (Old) Examination, 2017 DATA STRUCTURE

Day and Date: Monday, 15-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

- 2. Solve any four: (5×4=20)
 - 1) Define the data structure. What is ADT?
 - 2) Explain PUSH and POP operation of STACK.
 - 3) Explain with example Dynamic Memory Allocation Function in C.
 - 4) Difference between Structure and Union.
 - 5) Explain structure and pointer to structure with proper example.
- 3. Explain with e.g. conversation of infix to postfix.

10

OR

What is FILE? Explain any five file operation in C with examples.

4. Write a short note (any 2):

10

- A) Union Data Type in C.
- B) Function in C.
- C) Type_casting.

SECTION - II

5. Solve any four: (4×5=20)

- 1) What is Recursion? Explain with example.
- 2) Write a note on queue as a data structure.



- 3) What is linked list? Explain its types with diagrams.
- 4) Explain the procedure for inserting and deleting node in the doubly linked list?
- 5) What is Hashing? Explain.

6. Solve:

Explain Hashing functions along with example in detail.

OR

Explain collision resolution methods in detail.

7. Solve any one:

- 1) Write a C program to implement Circular Queue?
- 2) Write a note on any one:
 - a) Bubble sort.
 - b) Merge sort.

SLR-VB - 306

Seat	Set	
No.	Set	7

S.E. (Electrical) (Part – I) (Old) Examination, 2017 DATA STRUCTURE

·	DATA STR	UCTURE	
Day and Date: Monday, 15-5 Time: 10.00 a.m. to 1.00 p.m			Max. Marks: 100
2) Ans	nswer Book Pag swer MCQ/Obje d	e No. 3. Each ques ctive type question	ved in first 30 minutes tion carries one mark. s on Page No. 3 only. /R/S) on Top of Page.
М	CQ/Objective T	ype Questions	
Duration: 30 Minutes			Marks : 20
 Choose the correct answ push() and pop() fund queues Which of the following first node? 	ctions are found i i) lists	C) stacks	D) trees If the list pointing to the
A) singly linked list C) circular singly link	ked list	B) linked listD) doubly linked li	st
3) What value strcmp()A) 0B	function returns 2) 2	when two strings a C) 1	re the same ? D) error
4) What is the only funcA) start()	• -	ms must contain ? C) main()	D) program()
5) Which of the followinA) funct;	_	ion call (assuming C) funct();	the function exists)? D) int funct();
6) What punctuation is tA) { }C) BEGIN and END	used to signal the	e beginning and end B) -> and <- D) (and)	d of code blocks?
7) If the given input arra gives the best performA) Insertion sortC) Quick sort	-	arly sorted, which o B) Selection sort D) Merge sort	f the following algorithm

8)	A linear collection of pointer is called	of data elements v	vhe	re the linear noo	de is	s given by means of
	A) linked list	B) node list	C)	primitive list	D)	none of these
9)	Which of the follow A) Queue	•			D)	Binary search tree
10)	Which of the follow A) compare(); C) cmp();	ing functions com	B)	es two strings ? stringcompare(strcmp());	
11)	The binary equivale A) 110010 C) 101	ent of 50 is	,	1010110 101.011.00.00		
12)	In linked list implem A) At the head of li B) At the tail of the C) At the centre po D) None	nk list link list		vhere does a ne	w el	ement be inserted ?
13)	Which of the follow A) int x;			aration of a poing ptr x;		? int*x;
14)	What is the index n A) 29 C) 0	umber of the last o	B)	nent of an array 28 Programmer-de		
15)	Which is the built in size?	•				•
4.0\	A) malloc	B) calloc	•	realloc	D)	resize
16)	Which is not dynan A) malloc				D)	calloc
17)	Which one of the boa. A) Queue	elow mentioned is B) Stack				All of the above
18)	The size of array in A) 4	nt a[5] = {1, 2} is B) 12	C)	10	D)	6
19)	The variable that a A) Local variable C) Auto variable	•	e all B)		re c	
20)	mode is					een opened in read
	A) putc	B) getc	C)	getchar	D)	putchar



Seat	
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S.E. (Electrical) (Part – I) (Old) Examination, 2017 DATA STRUCTURE

Day and Date: Monday, 15-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

- 2. Solve any four: (5×4=20)
 - 1) Define the data structure. What is ADT?
 - 2) Explain PUSH and POP operation of STACK.
 - 3) Explain with example Dynamic Memory Allocation Function in C.
 - 4) Difference between Structure and Union.
 - 5) Explain structure and pointer to structure with proper example.
- 3. Explain with e.g. conversation of infix to postfix.

10

OR

What is FILE? Explain any five file operation in C with examples.

4. Write a short note (any 2):

10

- A) Union Data Type in C.
- B) Function in C.
- C) Type_casting.

SECTION - II

5. Solve any four: (4×5=20)

- 1) What is Recursion? Explain with example.
- 2) Write a note on queue as a data structure.



- 3) What is linked list? Explain its types with diagrams.
- 4) Explain the procedure for inserting and deleting node in the doubly linked list?
- 5) What is Hashing? Explain.
- 6. Solve:

Explain Hashing functions along with example in detail.

OR

Explain collision resolution methods in detail.

7. Solve any one:

- 1) Write a C program to implement Circular Queue?
- 2) Write a note on any one:
 - a) Bubble sort.
 - b) Merge sort.

c) only invertible matrix

SLR-VB - 307

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No.	Set	$\mid \mathbf{P} \mid$
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	` , , ,	ectrical) (CGPA) Exami DS AND COMPUTER I	
-	Pate : Tuesday, 16-5-2017 00 a.m. to 1.00 p.m.		Max. Marks : 70
	Answer Boo 3) Answer MC	compulsory . It should book Page No. 3. Each ques	e solved in first 30 minutes in tion carries one mark. ons on Page No. 3 only. Don't
	MCQ/C	Objective Type Questions	S
Duration:	30 Minutes		Marks: 14
1. Choo	se the correct answers :		14
1) If	f(x) is continuous in the interval	al (a, b) such that f(a) and	If(b) are of opposite signs then
ē	a) $f(a) \cdot f(b) > 0$ b) $\frac{f(a)}{f(b)} >$	0 c) $f(a) \cdot f(b) < 0$	d) $f(a) \cdot f(b) = 0$
é	f a function f(x) contains same exponential then f(x) = 0 is called a) algebraic equation b) linear equation		l equation
•	n case of bisection method, the a) quadratic b) very sk	e convergence is ow c) very fast	d) linear
	Σ y = 3x + 4 is the best fit of 6 paragraphs Σ y = 78 then Σ x =		
5) If	$\dot{y} = x^2 + 1$, then the first divide a) 3 b) 1		
n a	as soon as a new value of varia lext step, this method is called a) Gauss – Jacobe c) Gauss – Jordan	ble is found in the iteration b) Gauss – Seide d) Gauss – elimir	el
•	.U-Decomposition of a matrix is	s possible for b) any ordered m	natrix

d) singular matrix



- 8) To apply Trapezoidal rule the number of sub intervals must be
 - a) multiple of 6
- b) multiple of 3
- c) any
- d) even

- 9) The Laplace equation $u_{xx} + u_{yy} = 0$ is
 - a) Parabolic
- b) Elliptic
- c) Hyperbolic
- d) Circular
- 10) Romberg's method improves accuracy of
 - a) Trapezoidal method
- b) Milne's method

c) Liebmann method

- d) None
- 11) For the following data:

the value of $\int_{0}^{2} y \, dx$ by Simpson's $\frac{1}{3}$ rd rule is

- a) 26.67
- c) 2.6667
- d) 25
- 12) In solving a ODE by Runge Kutta method if y(0) = 1, h = 0.1, $k_1 = 0.1$,

$$k_2 = 0.1150$$
, $k_3 = 0.1171$, $k_4 = 0.1359$ then the value of $y(0.1) =$

- a) 0.11668
- b) 0.16186
- c) 1.11668
- d) 0.16186
- 13) The general second order linear differential equation in two independent variables x, y is given by

$$Au_{xx} + Bu_{xy} + Cu_{yy} + Du_x + Eu_y + Fu = 0$$

where A, B, C, D, E and F are given functions of x and y. The equation is hyperbolic if

- a) $B^2 4AC > 0$ b) $B^2 4AC = 0$ c) $B^2 4AC < 0$
- d) None

- 14) The power method is used to find
 - a) smallest eigen value of the matrix
 - b) largest eigen value of the matrix
 - c) only integer valued eigen value
 - d) none of the above



S.E. (Part – II) (Electrical) (CGPA) Examination, 2017 NUMERICAL METHODS AND COMPUTER PROGRAMMING

		NUMERICAL METHODS AND COMPUTER PROGRAMMING	
•		d Date : Tuesday, 16-5-2017 Marks : 0.00 a.m. to 1.00 p.m.	: 56
		Instructions: 1) Attempt any three questions from each Section. 2) Use of scientific calculator is allowed.	
		SECTION - I	
2.	a)	Find the root of the equation $\tan x + \tan hx = 0$ which lies in the interval (1.6, 3.0) correct to four significant digits using any one of the numerical method. (Perform three iterations only taking radian mode.)	3
	b)	Use the method of false position to find the root of the equation $x^3 - 18 = 0$, given that it lies between 2 and 3. Perform three iterations of the procedure.	3
	c)	Find by Newton-Raphson method a root of the equation $x \sin x + \cos x = 0$ which is near $x = \pi$. (Perform three iterations only taking radian mode.)	3
3.	a)	Use Jacobi's method to solve $10x - 2y - 3z = 205$ 2x - 10y + 2z = -154 2x + y - 10z = -120 upto the end of fifth iteration.	3
	b)	Apply Crouts-Triangulatization method (LU-factorization method) to solve the equations $x_1+2x_2+3x_3=14\\2x_1+5x_2+2x_3=18\\3x_1+2x_2+5x_3=22$	6
4.		Given $\log_{10} 654 = 2.8156$, $\log_{10} 658 = 2.8182$, $\log_{10} 659 = 2.8189$, $\log_{10} 661 = 2.8202$ find by using Lagrange's formula, the value of $\log_{10} 656$. Find least square polynomial of second degree parabola to the data	3
		x: 0 1 2 3 4 y: -4 -1 4 11 20	3
	c)	Using Newton's divided differences interpolation find $u(3)$, given that $u(1) = -26$, $u(2) = 12$ $u(4) = 256$, $u(6) = 844$.	
	c)	Fit a curve of the form $y = ax^b$ to the following data \mathbf{x} : 61 26 7 2.6	
		y : 350 400 500 600	3
5.	a)	Find the cubic splines for the following table of values x : 1 2 3	
		y : −6 −1 16	5
	b)	Apply Lin-Bairstow's method to find a quadratic factor of the equation $x^4 + 5x^3 + 3x^2 - 5x - 9 = 0$	
		close to $x^2 + 3x - 5$. (Perform only single iteration)	5
			et P

5

4

3

6

SECTION - II

- 6. a) Use Simpson's $\frac{1}{3}$ rd rule and Simpson's $\frac{3}{8}$ th to find $\int_{0}^{1} e^{-x^2} dx$ by taking 6 subintervales. 5
 - b) Evaluate $\int_0^1 \frac{dx}{1+x}$ correct to three decimal places using Romberg's method. Take h = 0.5, 0.25, 0.125.
- 7. a) Obtain by power method, numerically dominant eigen value and eigen vector of the matrix

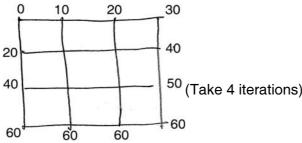
$$A = \begin{bmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \\ 2 & 0 & -4 \end{bmatrix}$$
 taking
$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$
 as initial eigen vector. Perform 5 iterations. 5

b) Find the bounds of eigen values of the following matrix using Gerschgorin

circle theorem
$$\begin{bmatrix} 1 & 2 & -1 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$$

8. a) Find the first and second derivative at x = 1 if

b) Solve $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary conditions as shown below



9. a) Using Runge Kutta method of fourth order find y(0.8) correct to 4 decimal places if

$$\frac{dy}{dx} = y - x^2 y(0.6) = 1.7379, h = 0.2.$$

b) Find the first and second derivative of the function at x = 0.8

- b) Compute $\int_0^1 \frac{dx}{1+x^2}$ by using trapezoidal rule with $h = \frac{1}{4}$.
- c) Using Crank-Nicholson's scheme, solve $u_{xx} = 16 u_t$, 0 < x < 1, t > 0, given u(x, 0) = 0, u(0, t) = 0, u(1, t) = 100 t. Compute u for one step in t direction taking $h = \frac{1}{4}$.

SLR-VB – 307

Seat	
No.	

14

S.E. (Part – II) (Electrical) (CGPA) Examination, 2017 NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date: Tuesday, 16-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **Use** of scientific calculator is **allowed**.

- 2) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 3) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 1. Choose the correct answers: 1) To apply Trapezoidal rule the number of sub intervals must be a) multiple of 6 b) multiple of 3 c) any d) even 2) The Laplace equation $u_{xx} + u_{yy} = 0$ is a) Parabolic b) Elliptic c) Hyperbolic d) Circular 3) Romberg's method improves accuracy of a) Trapezoidal method b) Milne's method d) None c) Liebmann method 4) For the following data: x: 0 05 1 15 2 v: 0 0.25 1 2.25 4

- a) 26.67
- b) 0.2667
- c) 2.6667
- d) 25
- 5) In solving a ODE by Runge Kutta method if y(0) = 1, h = 0.1, $k_1 = 0.1$, $k_2 = 0.1150$, $k_3 = 0.1171$, $k_4 = 0.1359$ then the value of y(0.1) =
 - a) 0.11668
- b) 0.16186
- c) 1.11668
- d) 0.16186



6)	is given by $Au_{xx} + Bu_{xy} + Cu_{yy} + Cu$	+ Du _x + Eu _y + Fu = and F are given fun	0 actions of x and y. T	independent variables x, y The equation is hyperbolic if d) None	
7)	The power method is a) smallest eigen value) largest eigen value) only integer valued) none of the above	alue of the matrix ue of the matrix ed eigen value			
8)	If $f(x)$ is continuous in	n the interval (a, b)	such that f(a) and	f(b) are of opposite signs then	
	a) $f(a) \cdot f(b) > 0$	b) $\frac{f(a)}{f(b)} > 0$	c) $f(a) \cdot f(b) < 0$	d) $f(a) \cdot f(b) = 0$	
9)	If a function f(x) co exponential then f(x) a) algebraic equation	= 0 is called	functions such as b) transcendental d) quadratic equat	•	
10)	In case of bisection r	method, the conver	gence is		
	a) quadratic	b) very slow	c) very fast	d) linear	
11)	-			method of least squares and	
	\sum y = 78 then \sum x = a) 35				
	a) 35	b) 40	c) 18	d) 72	
12)	If $y = x^2 + 1$, then the				
	a) 3	b) 1	c) 2	d) – 1	
13)	next step, this metho	od is called		it is used immediately in the	
	a) Gauss – Jacobe		b) Gauss – Seide		
	c) Gauss – Jordan		d) Gauss – elimination		

b) any ordered matrixd) singular matrix

14) LU-Decomposition of a matrix is possible for

a) any square matrix

c) only invertible matrix



S.E. (Part – II) (Electrical) (CGPA) Examination, 2017 NUMERICAL METHODS AND COMPUTER PROGRAMMING

		NUMERICAL METHODS AND COMPUTER PROGRAMMING	
•		d Date : Tuesday, 16-5-2017 Marks : 5 0.00 a.m. to 1.00 p.m.	56
		Instructions: 1) Attempt any three questions from each Section. 2) Use of scientific calculator is allowed.	
		SECTION - I	
2.	a)	Find the root of the equation $\tan x + \tan hx = 0$ which lies in the interval (1.6, 3.0) correct to four significant digits using any one of the numerical method. (Perform three iterations only taking radian mode.)	3
	b)	Use the method of false position to find the root of the equation $x^3 - 18 = 0$, given that it lies between 2 and 3. Perform three iterations of the procedure.	3
	c)	Find by Newton-Raphson method a root of the equation $x \sin x + \cos x = 0$ which is near $x = \pi$. (Perform three iterations only taking radian mode.)	3
3.	a)	Use Jacobi's method to solve $10x - 2y - 3z = 205$ 2x - 10y + 2z = -154 2x + y - 10z = -120 upto the end of fifth iteration.	3
	b)	Apply Crouts-Triangulatization method (LU-factorization method) to solve the equations $x_1+2x_2+3x_3=14 \\ 2x_1+5x_2+2x_3=18 \\ 3x_1+2x_2+5x_3=22$	6
4.	a)	Given $\log_{10} 654 = 2.8156$, $\log_{10} 658 = 2.8182$, $\log_{10} 659 = 2.8189$, $\log_{10} 661 = 2.8202$ find by using Lagrange's formula, the value of $\log_{10} 656$.	3
	b)	Find least square polynomial of second degree parabola to the data	
		x: 0 1 2 3 4 y: -4 -1 4 11 20	3
	c)	Using Newton's divided differences interpolation find $u(3)$, given that $u(1) = -26$, $u(2) = 12$, $u(4) = 256$, $u(6) = 844$.	3
	c)	OR Fit a curve of the form $y = ax^b$ to the following data x : 61 26 7 2.6	
		y : 350 400 500 600	3
5.	a)	Find the cubic splines for the following table of values x : 1 2 3	
		y: -6 -1 16	5
	b)	Apply Lin-Bairstow's method to find a quadratic factor of the equation $x^4 + 5x^3 + 3x^2 - 5x - 9 = 0$ close to $x^2 + 3x - 5$.	
		(Perform only single iteration)	5
		(i one my emigre iteration)	_

5

3

6

SECTION - II

- 6. a) Use Simpson's $\frac{1}{3}$ rd rule and Simpson's $\frac{3}{8}$ th to find $\int_{0}^{1} e^{-x^2} dx$ by taking 6 subintervales. 5
 - b) Evaluate $\int_0^1 \frac{dx}{1+x}$ correct to three decimal places using Romberg's method. Take h = 0.5, 0.25, 0.125.
- 7. a) Obtain by power method, numerically dominant eigen value and eigen vector of the matrix

 $A = \begin{bmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \\ 2 & 0 & -4 \end{bmatrix}$ taking $\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$ as initial eigen vector. Perform 5 iterations. 5

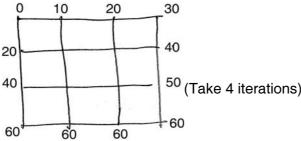
b) Find the bounds of eigen values of the following matrix using Gerschgorin

circle theorem $\begin{bmatrix} 1 & 2 & -1 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$ 4

8. a) Find the first and second derivative at x = 1 if

x: -2 -1 0 1 2 3 4 **y**: 104 17 0 -1 8 69 272

b) Solve $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary conditions as shown below



9. a) Using Runge Kutta method of fourth order find y(0.8) correct to 4 decimal places if

 $\frac{dy}{dx} = y - x^2 y(0.6) = 1.7379, h = 0.2.$

b) Find the first and second derivative of the function at x = 0.8

x: 0.4 | 0.5 | 0.6 | 0.7 | 0.8 y: 1.5836 | 1.7974 | 2.0442 | 2.3275 | 2.6511 OR

- b) Compute $\int_{0}^{1} \frac{dx}{1+x^2}$ by using trapezoidal rule with $h = \frac{1}{4}$.
- c) Using Crank-Nicholson's scheme, solve $u_{xx} = 16 u_t$, 0 < x < 1, t > 0, given u(x, 0) = 0, u(0, t) = 0, u(1, t) = 100 t. Compute u for one step in t direction taking $h = \frac{1}{4}$.

c) Liebmann method

SLR-VB - 307

Seat No.		Set	R
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	. (Part – II) (Electrica ICAL METHODS A			
Day and Date : Tuesday, Time : 10.00 a.m. to 1.00	16-5-2017			ax. Marks : 70
Instructions :	Answer Book Pag 3) Answer MCQ/Obj	pulsory . It should le No. 3. Each qu iective type ques	ved. d be solved in first 30 uestion carries one man stions on Page No. 3 on (R/S) on Top of Page.	k.
	MCQ/Object	ive Type Questi	ons	
Duration: 30 Minutes				Marks: 14
1. Choose the correct	answers:			14
1) If $y = x^2 + 1$, the	n the first divided diffe	rence of the argu	ıment 1 and 2 is	
a) 3	b) 1	c) 2	d) -1	
As soon as a ne next step, this n		found in the itera	tion, it is used immediat	ely in the
a) Gauss – Ja	cobe	b) Gauss – Se	eidel	
c) Gauss – Joi	rdan	d) Gauss – eli	mination	
3) LU-Decompositi	on of a matrix is poss	ible for		
a) any square	matrix	b) any ordered	d matrix	
c) only invertib	le matrix	d) singular ma	atrix	
4) To apply Trapez	coidal rule the number	of sub intervals r	nust be	
a) multiple of 6	b) multiple of 3	c) any	d) even	
5) The Laplace eq	uation $u_{xx} + u_{yy} = 0$ is			
a) Parabolic	b) Elliptic	c) Hyperbolic	d) Circular	
6) Romberg's metl	nod improves accurac	y of		
a) Trapezoidal	method	b) Milne's met	hod	

d) None



7) For the following data:

x: 0 0.5 1 1.5 2

v: 0 0.25 1 2.25 4

the value of $\int_{0}^{2} y \, dx$ by Simpson's $\frac{1}{3}$ rd rule is

- a) 26.67

- d) 25
- 8) In solving a ODE by Runge Kutta method if y(0) = 1, h = 0.1, $k_1 = 0.1$, $k_2 = 0.1150$, $k_3 = 0.1171$, $k_4 = 0.1359$ then the value of y(0.1) =
 - a) 0.11668
- b) 0.16186 c) 1.11668
- d) 0.16186
- 9) The general second order linear differential equation in two independent variables x, y is given by

 $Au_{xx} + Bu_{xy} + Cu_{yy} + Du_x + Eu_y + Fu = 0$

where A, B, C, D, E and F are given functions of x and y. The equation is hyperbolic if

- a) $B^2 4AC > 0$ b) $B^2 4AC = 0$ c) $B^2 4AC < 0$
- d) None

- 10) The power method is used to find
 - a) smallest eigen value of the matrix
 - b) largest eigen value of the matrix
 - c) only integer valued eigen value
 - d) none of the above
- 11) If f(x) is continuous in the interval (a, b) such that f(a) and f(b) are of opposite signs then
 - a) $f(a) \cdot f(b) > 0$ b) $\frac{f(a)}{f(b)} > 0$ c) $f(a) \cdot f(b) < 0$ d) $f(a) \cdot f(b) = 0$

- 12) If a function f(x) contains same other functions such as trigonometric, logarithmic, exponential then f(x) = 0 is called
 - a) algebraic equation
- b) transcendental equation

c) linear equation

- d) quadratic equation
- 13) In case of bisection method, the convergence is
 - a) quadratic
- b) very slow
- c) very fast
- 14) If y = 3x + 4 is the best fit of 6 pairs of values of (x, y) by the method of least squares and

 \sum y = 78 then \sum x = ____

- a) 35
- b) 40
- c) 18
- d) 72



S.E. (Part – II) (Electrical) (CGPA) Examination, 2017 NUMERICAL METHODS AND COMPUTER PROGRAMMING

		NUMERICAL METHODS AND COMPUTER PROGRAMMING	
-		d Date : Tuesday, 16-5-2017 Marks : 5 0.00 a.m. to 1.00 p.m.	56
		Instructions : 1) Attempt any three questions from each Section. 2) Use of scientific calculator is allowed.	
		SECTION - I	
2.	a)	Find the root of the equation $\tan x + \tan hx = 0$ which lies in the interval (1.6, 3.0) correct to four significant digits using any one of the numerical method. (Perform three iterations only taking radian mode.)	3
	b)	Use the method of false position to find the root of the equation $x^3 - 18 = 0$, given that it lies between 2 and 3. Perform three iterations of the procedure.	3
	c)	Find by Newton-Raphson method a root of the equation $x \sin x + \cos x = 0$ which is near $x = \pi$. (Perform three iterations only taking radian mode.)	3
3.	a)	Use Jacobi's method to solve $10x - 2y - 3z = 205$ $2x - 10y + 2z = -154$ $2x + y - 10z = -120$ upto the end of fifth iteration.	3
	b)	Apply Crouts-Triangulatization method (LU-factorization method) to solve the equations $x_1+2x_2+3x_3=14 \\ 2x_1+5x_2+2x_3=18 \\ 3x_1+2x_2+5x_3=22$	6
4.		Given $\log_{10} 654 = 2.8156$, $\log_{10} 658 = 2.8182$, $\log_{10} 659 = 2.8189$, $\log_{10} 661 = 2.8202$ find by using Lagrange's formula, the value of $\log_{10} 656$.	3
	b)	Find least square polynomial of second degree parabola to the data	
		x: 0 1 2 3 4 y: -4 -1 4 11 20	3
	c)	Using Newton's divided differences interpolation find $u(3)$, given that $u(1) = -26$, $u(2) = 12$, $u(4) = 256$, $u(6) = 844$.	3
	c)	OR Fit a curve of the form $y = ax^b$ to the following data x : 61 26 7 2.6	
		y : 350 400 500 600	3
5.	a)	Find the cubic splines for the following table of values x : 1 2 3	
		y: -6 -1 16	5
	b)	Apply Lin-Bairstow's method to find a quadratic factor of the equation $x^4 + 5x^3 + 3x^2 - 5x - 9 = 0$	
		close to $x^2 + 3x - 5$. (Perform only single iteration)	5
		Set	_

5

3

6

SECTION - II

- 6. a) Use Simpson's $\frac{1}{3}$ rule and Simpson's $\frac{3}{8}$ th to find $\int_{0}^{1} e^{-x^2} dx$ by taking 6 subintervales.
 - b) Evaluate $\int_0^1 \frac{dx}{1+x}$ correct to three decimal places using Romberg's method. Take h = 0.5, 0.25, 0.125.
- 7. a) Obtain by power method, numerically dominant eigen value and eigen vector of the matrix

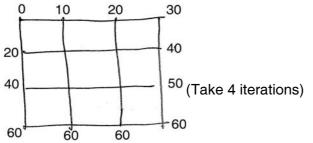
$$A = \begin{bmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \\ 2 & 0 & -4 \end{bmatrix}$$
 taking
$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$
 as initial eigen vector. Perform 5 iterations. 5

b) Find the bounds of eigen values of the following matrix using Gerschgorin

circle theorem
$$\begin{bmatrix} 1 & 2 & -1 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$$
 4

8. a) Find the first and second derivative at x = 1 if

b) Solve $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary conditions as shown below



9. a) Using Runge Kutta method of fourth order find y(0.8) correct to 4 decimal places if

$$\frac{dy}{dx} = y - x^2 \ y(0.6) = 1.7379, h = 0.2.$$

b) Find the first and second derivative of the function at x = 0.8

- b) Compute $\int_{0}^{1} \frac{dx}{1+x^2}$ by using trapezoidal rule with $h = \frac{1}{4}$.
- c) Using Crank-Nicholson's scheme, solve $u_{xx} = 16 u_t$, 0 < x < 1, t > 0, given u(x, 0) = 0, u(0, t) = 0, u(1, t) = 100 t. Compute u for one step in t direction taking $h = \frac{1}{4}$.

SLR-VB – 307

Seat	
No.	

S.E. (Part – II) (Electrical) (CGPA) Examination, 2017 NUMERICAL METHODS AND COMPUTER PROGRAMMING

Day and Date: Tuesday, 16-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **Use** of scientific calculator is **allowed**.

- 2) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 3) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answers:

14

- 1) Romberg's method improves accuracy of
 - a) Trapezoidal method
- b) Milne's method

c) Liebmann method

- d) None
- 2) For the following data:

the value of $\int_{0}^{2} y \, dx$ by Simpson's $\frac{1}{3}$ rd rule is

- a) 26.67
- b) 0.2667
- c) 2.6667
- d) 25
- 3) In solving a ODE by Runge Kutta method if y(0) = 1, h = 0.1, $k_1 = 0.1$, $k_2 = 0.1150$, $k_3 = 0.1171$, $k_4 = 0.1359$ then the value of y(0.1) =
 - a) 0.11668
- b) 0.16186
- c) 1.11668
- d) 0.16186
- 4) The general second order linear differential equation in two independent variables x, y is given by

$$Au_{xx} + Bu_{xy} + Cu_{yy} + Du_x + Eu_y + Fu = 0$$

where A, B, C, D, E and F are given functions of x and y. The equation is hyperbolic if

- a) $B^2 4AC > 0$ b) $B^2 4AC = 0$ c) $B^2 4AC < 0$
- d) None

- 5) The power method is used to find
 - a) smallest eigen value of the matrix b) largest eigen value of the matrix
 - c) only integer valued eigen value
- d) none of the above



6)	If f(x) is continuous i	n the interval (a, b)	su	ch that f(a) and	f(b) are of opposite signs then
	a) $f(a) \cdot f(b) > 0$	b) $\frac{f(a)}{f(b)} > 0$	c)	$f(a) \cdot f(b) < 0$	d) $f(a) \cdot f(b) = 0$
7)	If a function f(x) corexponential then f(x) a) algebraic equation) = 0 is called	b)	nctions such as transcendental quadratic equat	
8)	In case of bisection	method, the conver	rger	nce is	
	a) quadratic	b) very slow	c)	very fast	d) linear
9)	If $y = 3x + 4$ is the be	est fit of 6 pairs of va	alue	s of (x, y) by the	method of least squares and
	\sum y = 78 then \sum x = a) 35	:			
	a) 35	b) 40	c)	18	d) 72
10)	If $y = x^2 + 1$, then the a) 3	e first divided differe b) 1			nt 1 and 2 is d) <i>–</i> 1
11)	As soon as a new vanext step, this method		ound	d in the iteration,	it is used immediately in the
	a) Gauss – Jacobe		b)	Gauss - Seide	
	c) Gauss – Jordan		d)	Gauss – elimina	ation
12)	LU-Decomposition of	•			
	a) any square matr			any ordered ma	ıtrix
	c) only invertible m		,	singular matrix	
(3)	To apply Trapezoida				
	a) multiple of 6	•	C)	any	d) even
4)	The Laplace equation	on $u_{xx} + u_{yy} = 0$ is			
	a) Parabolic	b) Elliptic	c)	Hyperbolic	d) Circular



S.E. (Part – II) (Electrical) (CGPA) Examination, 2017 NUMERICAL METHODS AND COMPUTER PROGRAMMING

		NUMERICAL METHODS AND COMPUTER PROGRAMMING	
•		d Date : Tuesday, 16-5-2017 Marks : 0.00 a.m. to 1.00 p.m.	56
		Instructions : 1) Attempt any three questions from each Section. 2) Use of scientific calculator is allowed.	
		SECTION - I	
2.	a)	Find the root of the equation $\tan x + \tan hx = 0$ which lies in the interval (1.6, 3.0) correct to four significant digits using any one of the numerical method. (Perform three iterations only taking radian mode.)	3
	b)	Use the method of false position to find the root of the equation $x^3 - 18 = 0$, given that it lies between 2 and 3. Perform three iterations of the procedure.	3
	c)	Find by Newton-Raphson method a root of the equation $x \sin x + \cos x = 0$ which is near $x = \pi$. (Perform three iterations only taking radian mode.)	3
3.	a)	Use Jacobi's method to solve $10x - 2y - 3z = 205$ 2x - 10y + 2z = -154 2x + y - 10z = -120 upto the end of fifth iteration.	3
	b)	Apply Crouts-Triangulatization method (LU-factorization method) to solve the equations $x_1 + 2x_2 + 3x_3 = 14$ $2x_1 + 5x_2 + 2x_3 = 18$ $3x_1 + 2x_2 + 5x_3 = 22$	6
4.		Given $\log_{10} 654 = 2.8156$, $\log_{10} 658 = 2.8182$, $\log_{10} 659 = 2.8189$, $\log_{10} 661 = 2.8202$ find by using Lagrange's formula, the value of $\log_{10} 656$.	3
	b)	Find least square polynomial of second degree parabola to the data	
		x: 0 1 2 3 4 y: -4 -1 4 11 20	3
	c)	Using Newton's divided differences interpolation find u(3), given that u(1) = -26 , u(2) = 12, u(4) = 256, u(6) = 844.	3
	c)	Fit a curve of the form $y = ax^b$ to the following data \mathbf{x} : 61 26 7 2.6	
		y : 350 400 500 600	3
5.	a)	Find the cubic splines for the following table of values x : 1 2 3	
		y : −6 −1 16	5
	b)	Apply Lin-Bairstow's method to find a quadratic factor of the equation $x^4 + 5x^3 + 3x^2 - 5x - 9 = 0$	
		close to $x^2 + 3x - 5$. (Perform only single iteration)	5 : S

5

3

6

SECTION - II

- 6. a) Use Simpson's $\frac{1}{3}$ rd rule and Simpson's $\frac{3}{8}$ th to find $\int_{0}^{1} e^{-x^2} dx$ by taking 6 subintervales. 5
 - b) Evaluate $\int_0^1 \frac{dx}{1+x}$ correct to three decimal places using Romberg's method. Take h = 0.5, 0.25, 0.125.
- 7. a) Obtain by power method, numerically dominant eigen value and eigen vector of the matrix

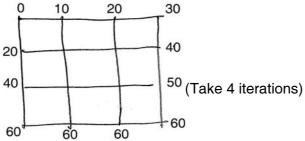
$$A = \begin{bmatrix} 25 & 1 & 2 \\ 1 & 3 & 0 \\ 2 & 0 & -4 \end{bmatrix}$$
 taking
$$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$$
 as initial eigen vector. Perform 5 iterations. 5

b) Find the bounds of eigen values of the following matrix using Gerschgorin

circle theorem
$$\begin{bmatrix} 1 & 2 & -1 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{bmatrix}$$
 4

8. a) Find the first and second derivative at x = 1 if

b) Solve $u_{xx} + u_{yy} = 0$ for the following square mesh with boundary conditions as shown below



9. a) Using Runge Kutta method of fourth order find y(0.8) correct to 4 decimal places if

$$\frac{dy}{dx} = y - x^2 \ y(0.6) = 1.7379, h = 0.2.$$

b) Find the first and second derivative of the function at x = 0.8

- b) Compute $\int_0^1 \frac{dx}{1+x^2}$ by using trapezoidal rule with $h = \frac{1}{4}$.
- c) Using Crank-Nicholson's scheme, solve $u_{xx} = 16 u_t$, 0 < x < 1, t > 0, given u(x, 0) = 0, u(0, t) = 0, u(1, t) = 100 t. Compute u for one step in t direction taking $h = \frac{1}{4}$.

c) Direct on line starter

SLR-VB - 308

Seat	Set	D
No.	Set	

140.					
	•	cal) (Part – II) (ELECTRICAL I	•		
-	d Date : Thursday, 18 0.00 a.m. to 1.00 p.n			Ma	ax. Marks : 70
	2) A	D. No. 1 is compuls In Answer Book Pag Inswer MCQ/Obje Don't forget to men	ge No. 3. Each que ctive type questi	estion carries o i ions on Page I	ne mark. No. 3 only.
		MCQ/Objective	Type Questions		
Duratio	n : 30 Minutes				Marks: 14
1. Ch	oose the correct ans	wer:			(1×14=14)
1)	The no-load speed	of an induction mot	tor is of the order o	of	
	a) 8%	b) 4%	c) 2%	d) 6%	
	a) frequency of roteb) flux linking the rec) flux density in thd) none of these	otor is of constant r	•		
3)	Full-load copper los 1455 rpm are 300 V a) 5 kW	•	•	uction motor ru d) 50 kW	nning at
4)	•	,	,	,	
4)	The starting torque a) the rotor reactan c) the stator resista	ce	b) the rotor resi d) none of thes	stance	creasing
5)	The crawling in the a) improper design c) high loads		caused by b) low supply v d) harmonics d	•	motor
6)	When rotor is at sta a) slip is zero		c) any slip	d) slip is ii	nfinitv
7)	Under which of the fo	, .	, .	, .	•
	a) Star-delta starte	r	b) Auto transfor	rmer starter	

d) Reduced voltage starter

-2-



8)	In a shaded pole motor, the direction of rotation is from				
	a) Main pole to shaded pole	b) Shaded pole to main pole			
	c) Depends on supply line polarity	d) None of the above			
9)	The transformation ratio of an induction	motor can be found by			
	a) Blocked rotor test	b) Open circuit test			
	c) Slip test	d) Stator resistance test			
10)	In a capacitor start motor, the capacitor	is connected in series with			
	a) Running winding	b) Starting winding			
	c) Compensating winding	d) None of the above			
11)	Line joining tangent and torque line in a	ı circle diagram gives			
	a) Cu loss	b) Stator loss			
	c) Maximum output	d) Maximum torque			
12)	If the stator voltage of an I.M. is reduced by	by 10% the torque of the motor will drop by			
	a) 10% b) 40%	c) 20% d) 30%			
13)	In the circle diagram for I.M. the diamete	er of the circle represents			
,	a) Slip	b) Rotor current			
	c) Running torque	d) Line voltage			
14)	In squirrel cage I.M. torque with auto trans with direct switching.	sformer starter is times the torque			
	a) K ²	b) 1/K			
	c) K	d) None of the above			



Seat	
No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 ELECTRICAL MACHINES – II

Day and Date: Thursday, 18-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four:

- A) A 50 Hz, 6 pole induction motor runs at 94.5% of synchronous speed developing torque of 120 N-m. The mechanical torque lost is 4 N-m and stator loss is 1430 watts. Calculate efficiency.
- B) 15 H.P., 4-pole, 50 Hz 3-phase I.M. is running at 1440 RPM and giving rated output. Friction and windage losses are 1000 W and stator Cu and core losses are 1500 W. Find the overall efficiency of the motor.
- C) Draw and explain torque slip characteristics of three phase induction motor assuming torque equation at slip s.
- D) Explain the following terms regarding three phase IM
 - a) Crawling
 - b) Cogging
- E) Explain DOL starter with neat circuit diagram.
- F) A full load slip of 400 V, 3 phase squirrel cage IM is 3.5% and with locked rotor, full load current is circulated when 92 V is applied between lines. Find the necessary tapping on an autotransformer to limit starting current to twice the full load current.

3. Solve the following:

 $(2\times6=12)$

 $(4 \times 4 = 16)$

- A) A 100 kW, 3300 V, 50 Hz, 3-phase, Y connected induction motor has Ns = 500 rpm. The full load slip is 1.8% and full load p.f. 0.85. Stator Cu loss = 2440 W. Iron loss = 3500 W. Rotational losses = 1200 W. Calculate
 - i) The rotor Cu loss
 - ii) The line current
 - iii) The full load efficiency.
- B) Three phase 50 Hz, 8 pole induction motor has full load slip of 2%, rotor standstill resistance and reactances are 0.001 Ohm and 0.005 Ohm respectively. Find the ratio of Tmax/Tfl and speed at which maximum torque occures.

OR

- B) Describe with circuit diagram the working of
 - 1) autotransformer starter
 - 2) rotor resistance starter.

Set P

SECTION - II

-4-

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Explain speed control of induction motor by pole changing method.
- b) Explain operation of induction machine as an induction generator.
- c) A 220 V, 1 \(\psi \) I.M. gave following test results.

Blocked Rotor Test: 120 V, 9.6 A, 460 W

No load Test: 220 V, 4.6 A, 125 W

Stator resistance is 1.5Ω . Determine the equivalent circuit parameters.

- d) Explain why single phase I.M. is not self starting.
- e) Explain slip power recovery scheme for speed control of 3-\$\phi I.M.

5. Attempt any two:

 $(6 \times 2 = 12)$

- a) Explain in detail any two types of single phase induction motors.
- b) Explain procedure to construct a circle diagram for induction motor from no load test and blocked rotor test data.
- c) Explain in detail the speed control of induction motor by
 - a) Cascade connection
 - b) Emf injection.

Seat No.	Set	Q

No.						Set Q
	S.E. (Elec	trical) (Part – II ELECTRICAL		•	ation, 20	17
•	nd Date : Thursday 10.00 a.m. to 1.00					Max. Marks : 70
) Q. No. 1 is compu in Answer Book P) Answer MCQ/Ob Don't forget to m	age No. i	3. Each ques t ype questio n	tion carries ns on Pag	s one mark. e No. 3 only.
		MCQ/Objectiv	e Type Q	Questions		
Durati	on : 30 Minutes					Marks: 14
1. C	hoose the correct a	ınswer :				(1×14=14)
1	a) Main pole to	motor, the directior shaded pole supply line polarity	b) S	Shaded pole t	•	Э
2	2) The transformatia) Blocked rotorc) Slip test	on ratio of an induct test	b) C	r can be foun Open circuit te Stator resistan	st	
3	B) In a capacitor statea) Running windc) Compensation	•	b) S	nnected in ser Starting windir None of the ab	ng	
4	Line joining tanga) Cu lossc) Maximum out	ent and torque line	b) S	e diagram giv Stator loss /laximum torq		
5	5) If the stator voltag	ge of an I.M. is reduc	ed by 109	% the torque o	of the motor	will drop by
	a) 10%	b) 40%	c) 2	20%	d) 30%	
6	6) In the circle diag a) Slip c) Running torq	ram for I.M. the dian ue	b) R	ne circle repre Rotor current .ine voltage	esents	
7	 7) In squirrel cage I. with direct switch a) K² c) K 	M. torque with auto to ining.	b) 1.			s the torque
	U) IX		u) IV	none of the at	70 V C	

a) Star-delta starter

c) Direct on line starter

-2-

b) Auto transformer starterd) Reduced voltage starter

8)	The no-load speed of	of an induction moto	r is	of the order of		
	a) 8%	b) 4%	c)	2%	d)	6%
9)	Iron losses in the rot a) frequency of roto b) flux linking the ro c) flux density in the d) none of these	r emf is too low tor is of constant ma	agn	_	ligib	le, because
10)	Full-load copper los 1455 rpm are 300 W a) 5 kW	•		·		motor running at 50 kW
11)	The starting torque of a) the rotor reactand c) the stator resistar	ce	b)	notor can be incre the rotor resistar none of these		ed by increasing
12)	The crawling in the in a) improper design of c) high loads		b)	ed by low supply volta harmonics devel	_	ed in the motor
13)	When rotor is at star a) slip is zero	ndstill b) slip is one	c)	any slip	d)	slip is infinity
14)	Under which of the fol currents?	llowing starting meth	ods	an induction moto	or d	raws high starting



Seat	
No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 ELECTRICAL MACHINES – II

Day and Date: Thursday, 18-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

- A) A 50 Hz, 6 pole induction motor runs at 94.5% of synchronous speed developing torque of 120 N-m. The mechanical torque lost is 4 N-m and stator loss is 1430 watts. Calculate efficiency.
- B) 15 H.P., 4-pole, 50 Hz 3-phase I.M. is running at 1440 RPM and giving rated output. Friction and windage losses are 1000 W and stator Cu and core losses are 1500 W. Find the overall efficiency of the motor.
- C) Draw and explain torque slip characteristics of three phase induction motor assuming torque equation at slip s.
- D) Explain the following terms regarding three phase IM
 - a) Crawling
 - b) Cogging
- E) Explain DOL starter with neat circuit diagram.
- F) A full load slip of 400 V, 3 phase squirrel cage IM is 3.5% and with locked rotor, full load current is circulated when 92 V is applied between lines. Find the necessary tapping on an autotransformer to limit starting current to twice the full load current.

3. Solve the following:

 $(2\times6=12)$

- A) A 100 kW, 3300 V, 50 Hz, 3-phase, Y connected induction motor has Ns = 500 rpm. The full load slip is 1.8% and full load p.f. 0.85. Stator Cu loss = 2440 W. Iron loss = 3500 W. Rotational losses = 1200 W. Calculate
 - i) The rotor Cu loss
 - ii) The line current
 - iii) The full load efficiency.
- B) Three phase 50 Hz, 8 pole induction motor has full load slip of 2%, rotor standstill resistance and reactances are 0.001 Ohm and 0.005 Ohm respectively. Find the ratio of Tmax/Tfl and speed at which maximum torque occures.

OR

- B) Describe with circuit diagram the working of
 - 1) autotransformer starter
 - 2) rotor resistance starter.

Set Q

-4-



SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Explain speed control of induction motor by pole changing method.
- b) Explain operation of induction machine as an induction generator.
- c) A 220 V, 1 \(\psi \) I.M. gave following test results.

Blocked Rotor Test: 120 V, 9.6 A, 460 W

No load Test: 220 V, 4.6 A, 125 W

Stator resistance is 1.5Ω . Determine the equivalent circuit parameters.

- d) Explain why single phase I.M. is not self starting.
- e) Explain slip power recovery scheme for speed control of 3-\$\phi I.M.

5. Attempt any two:

 $(6 \times 2 = 12)$

- a) Explain in detail any two types of single phase induction motors.
- b) Explain procedure to construct a circle diagram for induction motor from no load test and blocked rotor test data.
- c) Explain in detail the speed control of induction motor by
 - a) Cascade connection
 - b) Emf injection.

c) Maximum output

SLR-VB - 308

Seat	Set	R
No.	Set	n

	S.E. (Electrical) (Part – II) (ELECTRICAL N		-	ion, 2017	
-	d Date : Thursday, 18-5-2017 0.00 a.m. to 1.00 p.m.			Max. Marks: 70	
	Instructions:1) Q. No. 1 is compulse in Answer Book Page 2) Answer MCQ/Object Don't forget to men	e No ctive	o. 3 . Each questions e type questions	on carries one mark. o on Page No. 3 only.	
	MCQ/Objective T	уре	Questions		
Duration	n : 30 Minutes			Marks: 14	
1. Ch	oose the correct answer :			(1×14=14)	
1)	The crawling in the induction motor is o	aus	ed by		
	a) improper design of the machine		low supply voltage		
c) high loads		d) harmonics developed in the motor		oped in the motor	
2)	When rotor is at standstill				
	a) slip is zero b) slip is one	c)	any slip	d) slip is infinity	
3)	Under which of the following starting metl currents?	hods	s an induction moto	or draws high starting	
	a) Star-delta starter	b) Auto transformer starter			
	c) Direct on line starter	d)	Reduced voltage	e starter	
4)	In a shaded pole motor, the direction of	rota	ation is from		
	a) Main pole to shaded pole	b) Shaded pole to main pole			
	c) Depends on supply line polarity	d) None of the above			
5)	The transformation ratio of an induction				
	a) Blocked rotor test	,	b) Open circuit test		
c) Slip test d) Stator resistance test					
6)	In a capacitor start motor, the capacitor				
	a) Running winding	,	Starting winding None of the above		
-\	c) Compensating winding	•			
/)	Line joining tangent and torque line in a			3	
	a) Cu loss	D)	Stator loss		

d) Maximum torque

-2-



8)	If the stator voltage of an I.M. is reduced by 10% the torque of the motor will drop by					
	a) 10%	b) 40%	c)	20%	d)	30%
9)	In the circle diagram a) Slip	for I.M. the diamete		the circle represe Rotor current	ents	5
	c) Running torque		d)	Line voltage		
10)	In squirrel cage I.M. to with direct switching	=	sform	ner starter is		_times the torque
	a) K ²		b)	1/K		
	c) K		d)	None of the abo	ve	
11)	The no-load speed of	of an induction moto	r is c	of the order of		
	a) 8%	b) 4%	c)	2%	d)	6%
12)	Iron losses in the rot a) frequency of roto b) flux linking the ro c) flux density in the d) none of these	r emf is too low tor is of constant ma	agni	_	ligib	ole, because
13)	Full-load copper los 1455 rpm are 300 W	. The rotor input is		•		_
	a) 5 kW	b) 10 kW	c)	20 kW	d)	50 kW
14)	The starting torque of a) the rotor reactand c) the stator resistant	ce	b)	notor can be incre the rotor resistar none of these		ed by increasing



Seat	
No.	

S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 ELECTRICAL MACHINES – II

Day and Date: Thursday, 18-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

- A) A 50 Hz, 6 pole induction motor runs at 94.5% of synchronous speed developing torque of 120 N-m. The mechanical torque lost is 4 N-m and stator loss is 1430 watts. Calculate efficiency.
- B) 15 H.P., 4-pole, 50 Hz 3-phase I.M. is running at 1440 RPM and giving rated output. Friction and windage losses are 1000 W and stator Cu and core losses are 1500 W. Find the overall efficiency of the motor.
- C) Draw and explain torque slip characteristics of three phase induction motor assuming torque equation at slip s.
- D) Explain the following terms regarding three phase IM
 - a) Crawling
 - b) Cogging
- E) Explain DOL starter with neat circuit diagram.
- F) A full load slip of 400 V, 3 phase squirrel cage IM is 3.5% and with locked rotor, full load current is circulated when 92 V is applied between lines. Find the necessary tapping on an autotransformer to limit starting current to twice the full load current.

3. Solve the following:

 $(2\times6=12)$

- A) A 100 kW, 3300 V, 50 Hz, 3-phase, Y connected induction motor has Ns = 500 rpm. The full load slip is 1.8% and full load p.f. 0.85. Stator Cu loss = 2440 W. Iron loss = 3500 W. Rotational losses = 1200 W. Calculate
 - i) The rotor Cu loss
 - ii) The line current
 - iii) The full load efficiency.
- B) Three phase 50 Hz, 8 pole induction motor has full load slip of 2%, rotor standstill resistance and reactances are 0.001 Ohm and 0.005 Ohm respectively. Find the ratio of Tmax/Tfl and speed at which maximum torque occures.

OR

- B) Describe with circuit diagram the working of
 - 1) autotransformer starter
 - 2) rotor resistance starter.

Set R

-4-



SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Explain speed control of induction motor by pole changing method.
- b) Explain operation of induction machine as an induction generator.
- c) A 220 V, 1 \(\psi \) I.M. gave following test results.

Blocked Rotor Test: 120 V, 9.6 A, 460 W

No load Test: 220 V, 4.6 A, 125 W

Stator resistance is 1.5Ω . Determine the equivalent circuit parameters.

- d) Explain why single phase I.M. is not self starting.
- e) Explain slip power recovery scheme for speed control of 3-\$\phi I.M.

5. Attempt any two:

 $(6 \times 2 = 12)$

- a) Explain in detail any two types of single phase induction motors.
- b) Explain procedure to construct a circle diagram for induction motor from no load test and blocked rotor test data.
- c) Explain in detail the speed control of induction motor by
 - a) Cascade connection
 - b) Emf injection.

Seat	Set	9
No.	Set	3

S.E. (Electrical) (Part – II) (0 ELECTRICAL M	
Day and Date : Thursday, 18-5-2017 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks : 70
in Answer Book Page 2) Answer MCQ/Objec	ry. It should be solved in first 30 minutes No. 3. Each question carries one mark. tive type questions on Page No. 3 only. tion, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective T	ype Questions
Duration : 30 Minutes	Marks: 14
Choose the correct answer:	(1×14=14)
1) In a capacitor start motor, the capacitora) Running windingc) Compensating winding	is connected in series with b) Starting winding d) None of the above
2) Line joining tangent and torque line in aa) Cu lossc) Maximum output	circle diagram gives b) Stator loss d) Maximum torque
3) If the stator voltage of an I.M. is reduced I	by 10% the torque of the motor will drop by
a) 10% b) 40%	c) 20% d) 30%
4) In the circle diagram for I.M. the diametera) Slipc) Running torque	er of the circle represents b) Rotor current d) Line voltage
 5) In squirrel cage I.M. torque with auto transwith direct switching. a) K² c) K 	b) 1/K d) None of the above
6) The no-load speed of an induction motor a) 8% b) 4%	r is of the order of c) 2% d) 6%
7) Iron losses in the rotor of a 3-phase index a) frequency of rotor emf is too low b) flux linking the rotor is of constant m c) flux density in the rotor parts is too lo d) none of these	uction motor are negligible, because

-2-

8)	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
9)	The starting torque of a) the rotor reactand c) the stator resistar	e	b)	notor can be incr the rotor resistar none of these	•
10)	The crawling in the in a) improper design of c) high loads		b)	low supply volta	age Hoped in the motor
11)	When rotor is at stan a) slip is zero		c)	any slip	d) slip is infinity
12)	Under which of the fol currents?	lowing starting meth	ods	an induction mot	or draws high starting
	a) Star-delta starterc) Direct on line star	ter	,	Auto transforme Reduced voltage	
13)	In a shaded pole mod a) Main pole to shad c) Depends on supp	ded pole	b)	Shaded pole to	•
14)	The transformation ra a) Blocked rotor test c) Slip test		b)	tor can be found Open circuit test Stator resistance	t



Seat	
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S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 ELECTRICAL MACHINES – II

Day and Date: Thursday, 18-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

- A) A 50 Hz, 6 pole induction motor runs at 94.5% of synchronous speed developing torque of 120 N-m. The mechanical torque lost is 4 N-m and stator loss is 1430 watts. Calculate efficiency.
- B) 15 H.P., 4-pole, 50 Hz 3-phase I.M. is running at 1440 RPM and giving rated output. Friction and windage losses are 1000 W and stator Cu and core losses are 1500 W. Find the overall efficiency of the motor.
- C) Draw and explain torque slip characteristics of three phase induction motor assuming torque equation at slip s.
- D) Explain the following terms regarding three phase IM
 - a) Crawling
 - b) Cogging
- E) Explain DOL starter with neat circuit diagram.
- F) A full load slip of 400 V, 3 phase squirrel cage IM is 3.5% and with locked rotor, full load current is circulated when 92 V is applied between lines. Find the necessary tapping on an autotransformer to limit starting current to twice the full load current.

3. Solve the following:

 $(2\times6=12)$

- A) A 100 kW, 3300 V, 50 Hz, 3-phase, Y connected induction motor has Ns = 500 rpm. The full load slip is 1.8% and full load p.f. 0.85. Stator Cu loss = 2440 W. Iron loss = 3500 W. Rotational losses = 1200 W. Calculate
 - i) The rotor Cu loss
 - ii) The line current
 - iii) The full load efficiency.
- B) Three phase 50 Hz, 8 pole induction motor has full load slip of 2%, rotor standstill resistance and reactances are 0.001 Ohm and 0.005 Ohm respectively. Find the ratio of Tmax/Tfl and speed at which maximum torque occures.

OR

- B) Describe with circuit diagram the working of
 - 1) autotransformer starter
 - 2) rotor resistance starter.

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-4-



SECTION - II

4. Solve any four: (4×4=16)

- a) Explain speed control of induction motor by pole changing method.
- b) Explain operation of induction machine as an induction generator.
- c) A 220 V, 1 \(\psi \) I.M. gave following test results.

Blocked Rotor Test: 120 V, 9.6 A, 460 W

No load Test: 220 V, 4.6 A, 125 W

Stator resistance is 1.5Ω . Determine the equivalent circuit parameters.

- d) Explain why single phase I.M. is not self starting.
- e) Explain slip power recovery scheme for speed control of 3-φ I.M.

5. Attempt any two: (6×2=12)

- a) Explain in detail any two types of single phase induction motors.
- b) Explain procedure to construct a circle diagram for induction motor from no load test and blocked rotor test data.
- c) Explain in detail the speed control of induction motor by
 - a) Cascade connection
 - b) Emf injection.

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No.	Set	P

) (CGPA) Examination, 20 ⁻ POWER SYSTEMS	17
Day and Date : Saturday, 20-5-2017 Time : 10.00 a.m. to 1.00 p.m.	M	lax. Marks : 70
one mark. 2) Answer MCQ/O b	pulsory. It should be solved be solved be solved be Book Page No. 3. Each questions on Page pertion, Q.P. Set (P/Q/R/S) on the solved be solved.	tion carries ne No. 3 only.
MCQ/Objective Duration: 30 Minutes	e Type Questions	Marks : 14
Solve all:		(14×1=14)
1) The material commonly used for sh A) Rubber C) Lead	heath of underground cable is B) Copper D) Iron	(1471-14)
 2) In A.C.S.R conductor the function A) Provide additional mechanical s B) Prevent corona C) Take care of surge D) Reduce inductance and consec 	strength	
 Charging current in the cable A) Leads the voltage by 180° 	B) Leads the voltage by 90	0

B) 11 KV

D) Lags the voltage by 180°

C) 9.9 KV D) 132 KV

C) Lags the voltage by 90°

5) In the 3 unit insulator string voltage across lower unit is 17.5 KV and string efficiency is 84.28%, the voltage across string will be equal to

A) 8.285 KV

A) 6.6 KV

B) 44.25 KV

C) 88.25 KV

D) 442.5KV



6)	In the intersheat A) Composite C) Both (A) and	th grading insulation i	B)	able is Homogeneous Either (A) or (B	3)
7)	The distribution A) Radial	n system in India are n B) Parallel		tly Network	D) Either (A) or (C)
8)	•	sulation cost and incre sulation cost but decre oth		_	
9)	For medium tra A) Equal to B C) Equal to D	nsmission line, A is		Equal to C None	
10)	A) GMD is high	e of a transmission line I and GMR are high	B)	GMR is high	d GMR is high
11)	Under no load of A) Capacitance C) Proximity ef		B)	ransmission line Corona effect Back flow from	
12)	_		is ir B)		%, the sag will be 5%
13)	A conductor due A) Ellipse C) Catenary	e to sag between two	B)	al supports take Hyperbola Semi-circle	es the form of
14)	In medium trans A) T-methods C) Steinmetz m	smission line the shur nethod	B)	apacitance is tal ∏-methods All	ken into account in



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S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 ELEMENTS OF POWER SYSTEMS

Day and Date: Saturday, 20-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four: (4×4=16)

1) Explain typical AC power supply system.

- 2) The cost of a 3 phase overhead transmission line is Rs. (25,000a + 2,500) per km. Where 'a' is the area of cross section of each conductor in cm². The line is supplying a load of 5 MW at 33 KV and 0.8 p.f. lag assumed to be constant throughout the year. Energy cost 4 paise per kwh and interest and depreciation total 10% per annum. Find most economical size of the conductor. Given that specific resistance of conductor material is $10^{-6} \Omega cm$.
- 3) The self-capacitance of each unit in a string of 3 suspension insulator is 'C'. The shunt capacitance of connecting metal work of each insulator to earth is 0.15 C while for line it is 0.1C. Calculate i) The voltage cross each insulator as percentage of line voltage to earth ii) String efficiency.
- 4) What are the factors affecting corona?
- 5) A single core cable of conductor diameter of 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV, 3-ph system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and sheath. If the maximum stress in the layer is the same, find the voltage on intersheath.

- 1) Derive expression for voltage distribution in 3 insulators in a string.
- 2) The tower of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg. find the minimum clearance of the conductor and water and clearance mid-way between the supports. Weight of conductor is 1.5 kg/m. Base of the tower can be considered to be at water level.



 $(4 \times 4 = 16)$

3) A single core lead sheath cable is graded by using three dielectrics of relative permittivity 5, 4 and 3 respectively. The conductor diameter is 2 cm and overall diameter is 8 cm. If the three dielectrics are worked at same maximum stress of 40 KV/cm, find the safe working voltage of the cable. What will be the value of safe working voltage for an ungraded cable, assuming the same conductor and overall diameter and maximum dielectric stress?

SECTION - II

1. Solve any four:

- 1) Write a short note on substation equipment.
- 2) Define and explain the term:
 - i) Feeder
 - ii) Distributor
 - iii) Service mains
- 3) Deduce an expression for voltage regulation of a short transmission line giving the vector diagram.
- 4) Derive an expression for a inductance of a single phase two wire line.
- 5) What do you understand by medium transmission line? How capacitance effects are taken into account in such lines?

- 1) A 3-ph 50 Hz 150 km line has a resistance, inductive reactance and capacitive shunt admittance of $0.1\,\Omega$, $0.5\,\Omega$ and $3\times10^{-6}\,\mathrm{S}$ 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.
- 2) A single phase distributor 2 km long supplied a load of 120 A at 0.8 p.f. lagging at its far end and a load of 80 A at 0.9 p.f. lagging at its mid-point. Both power factors are referred to the voltage at far end. The resistance and reactance per km (go and return) are 0.05 Ω and 0.1 Ω respectively. If the voltage at the far end is maintained at 230 V calculate:
 - i) Voltage at sending end
 - ii) Phase angle between voltage at the two ends.
- 3) Explain the following system of distribution:
 - i) Radial system
 - ii) Ring main system
 - iii) Interconnected system.

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S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 **ELEMENTS OF POWER SYSTEMS**

Day and Date: Saturday, 20-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

> 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCO/Objective Type Questions

MCG/Objective Type Questions	
Duration: 30 Minutes	Marks : 14
1. Solve all:	(14×1=14)
1) Grading of cables	

- - A) Reduces insulation cost and increases current rating
 - B) Reduces insulation cost but decreases current rating
 - C) Increases both
 - D) None of these
- 2) For medium transmission line, A is
 - A) Equal to B

B) Equal to C

C) Equal to D

- D) None
- 3) The inductance of a transmission line is minimum when
 - A) GMD is high

B) GMR is high

C) Both GMD and GMR are high

- D) GMD is low and GMR is high
- 4) Under no load condition the current in a transmission line is because of
 - A) Capacitance effect

B) Corona effect

C) Proximity effect

- D) Back flow from earth
- 5) The sag of the conductor of a transmission line is 2.5 m when the span is 250 m. Now if the height of supporting tower is increased by 25%, the sag will be
 - A) Reduced by 25%

B) Increased by 25%

C) Reduced by 12.5%

D) Remain unchanged

P.T.O.



6)	A conductor due to sag between two A) Ellipse C) Catenary	equal supports takes the form of B) Hyperbola D) Semi-circle
7)	In medium transmission line the shun A) T-methods C) Steinmetz method	t capacitance is taken into account in B) ∏-methods D) All
8)	The material commonly used for shear A) Rubber C) Lead	ath of underground cable is B) Copper D) Iron
9)	 In A.C.S.R conductor the function of the A) Provide additional mechanical streeth B) Prevent corona C) Take care of surge D) Reduce inductance and consequent 	ength
10)	Charging current in the cable A) Leads the voltage by 180° C) Lags the voltage by 90°	B) Leads the voltage by 90°D) Lags the voltage by 180°
11)	Which of the following is not usually g A) 6.6 KV C) 9.9 KV	enerating voltage ? B) 11 KV D) 132 KV
12)	In the 3 unit insulator string voltage a efficiency is 84.28%, the voltage acro A) 8.285 KV C) 88.25 KV	cross lower unit is 17.5 KV and string oss string will be equal to B) 44.25 KV D) 442.5 KV
13)	In the intersheath grading insulation in A) Composite C) Both (A) and (B)	n cable is B) Homogeneous D) Either (A) or (B)
14)	The distribution system in India are m A) Radial C) Network	nostly B) Parallel D) Either (A) or (C)



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S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 ELEMENTS OF POWER SYSTEMS

Day and Date: Saturday, 20-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four: (4×4=16)

1) Explain typical AC power supply system.

- 2) The cost of a 3 phase overhead transmission line is Rs. (25,000a + 2,500) per km. Where 'a' is the area of cross section of each conductor in cm². The line is supplying a load of 5 MW at 33 KV and 0.8 p.f. lag assumed to be constant throughout the year. Energy cost 4 paise per kwh and interest and depreciation total 10% per annum. Find most economical size of the conductor. Given that specific resistance of conductor material is $10^{-6} \Omega cm$.
- 3) The self-capacitance of each unit in a string of 3 suspension insulator is 'C'. The shunt capacitance of connecting metal work of each insulator to earth is 0.15 C while for line it is 0.1C. Calculate i) The voltage cross each insulator as percentage of line voltage to earth ii) String efficiency.
- 4) What are the factors affecting corona?
- 5) A single core cable of conductor diameter of 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV, 3-ph system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and sheath. If the maximum stress in the layer is the same, find the voltage on intersheath.

- 1) Derive expression for voltage distribution in 3 insulators in a string.
- 2) The tower of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg. find the minimum clearance of the conductor and water and clearance mid-way between the supports. Weight of conductor is 1.5 kg/m. Base of the tower can be considered to be at water level.



3) A single core lead sheath cable is graded by using three dielectrics of relative permittivity 5, 4 and 3 respectively. The conductor diameter is 2 cm and overall diameter is 8 cm. If the three dielectrics are worked at same maximum stress of 40 KV/cm, find the safe working voltage of the cable. What will be the value of safe working voltage for an ungraded cable, assuming the same conductor and overall diameter and maximum dielectric stress?

SECTION - II

1. Solve any four: (4×4=16)

- 1) Write a short note on substation equipment.
- 2) Define and explain the term:
 - i) Feeder
 - ii) Distributor
 - iii) Service mains
- 3) Deduce an expression for voltage regulation of a short transmission line giving the vector diagram.
- 4) Derive an expression for a inductance of a single phase two wire line.
- 5) What do you understand by medium transmission line? How capacitance effects are taken into account in such lines?

- 1) A 3-ph 50 Hz 150 km line has a resistance, inductive reactance and capacitive shunt admittance of $0.1\,\Omega$, $0.5\,\Omega$ and $3\times10^{-6}\,\mathrm{S}$ 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.
- 2) A single phase distributor 2 km long supplied a load of 120 A at 0.8 p.f. lagging at its far end and a load of 80 A at 0.9 p.f. lagging at its mid-point. Both power factors are referred to the voltage at far end. The resistance and reactance per km (go and return) are 0.05 Ω and 0.1 Ω respectively. If the voltage at the far end is maintained at 230 V calculate:
 - i) Voltage at sending end
 - ii) Phase angle between voltage at the two ends.
- 3) Explain the following system of distribution:
 - i) Radial system
 - ii) Ring main system
 - iii) Interconnected system.

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S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 **ELEMENTS OF POWER SYSTEMS**

Day and Date: Saturday, 20-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

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MCQ/Objective Type Questions

Duration: 30 Minutes	Marks : 14
1. Solve all:	(14×1=14)
1) In the 3 unit insulator string voltage across lower unit is 17.5 k	(V and string
efficiency is 84.28%, the voltage across string will be equal to	

A) 8.285 KV

B) 44.25KV

C) 88.25 KV

D) 442.5KV

2) In the intersheath grading insulation in cable is

A) Composite

B) Homogeneous

C) Both (A) and (B)

D) Either (A) or (B)

3) The distribution system in India are mostly

A) Radial

B) Parallel

C) Network

D) Either (A) or (C)

4) Grading of cables

A) Reduces insulation cost and increases current rating

B) Reduces insulation cost but decreases current rating

C) Increases both

D) None of these

5) For medium transmission line, A is

A) Equal to B

B) Equal to C

C) Equal to D

D) None

P.T.O.



6)	The inductance of a transmission lineA) GMD is highC) Both GMD and GMR are high	B) GMR is high
7)	Under no load condition the current in A) Capacitance effect C) Proximity effect	,
8)	The sag of the conductor of a transmiss Now if the height of supporting tower A) Reduced by 25% C) Reduced by 12.5%	ion line is 2.5 m when the span is 250 m. is increased by 25%, the sag will be B) Increased by 25% D) Remain unchanged
9)	A conductor due to sag between two A) Ellipse C) Catenary	equal supports takes the form of B) Hyperbola D) Semi-circle
10)	In medium transmission line the shur A) T-methods C) Steinmetz method	t capacitance is taken into account in B) ∏-methods D) All
11)	The material commonly used for shear A) Rubber C) Lead	ath of underground cable is B) Copper D) Iron
12)	 In A.C.S.R conductor the function of A) Provide additional mechanical streets B) Prevent corona C) Take care of surge D) Reduce inductance and consequent 	ength
13)	Charging current in the cable A) Leads the voltage by 180° C) Lags the voltage by 90°	B) Leads the voltage by 90°D) Lags the voltage by 180°
14)	Which of the following is not usually g A) 6.6 KV C) 9.9 KV	enerating voltage ? B) 11 KV D) 132 KV



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S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 ELEMENTS OF POWER SYSTEMS

Day and Date: Saturday, 20-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four: (4×4=16)

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- 2) The cost of a 3 phase overhead transmission line is Rs. (25,000a + 2,500) per km. Where 'a' is the area of cross section of each conductor in cm². The line is supplying a load of 5 MW at 33 KV and 0.8 p.f. lag assumed to be constant throughout the year. Energy cost 4 paise per kwh and interest and depreciation total 10% per annum. Find most economical size of the conductor. Given that specific resistance of conductor material is $10^{-6} \Omega cm$.
- 3) The self-capacitance of each unit in a string of 3 suspension insulator is 'C'. The shunt capacitance of connecting metal work of each insulator to earth is 0.15 C while for line it is 0.1C. Calculate i) The voltage cross each insulator as percentage of line voltage to earth ii) String efficiency.
- 4) What are the factors affecting corona?
- 5) A single core cable of conductor diameter of 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV, 3-ph system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and sheath. If the maximum stress in the layer is the same, find the voltage on intersheath.

- 1) Derive expression for voltage distribution in 3 insulators in a string.
- 2) The tower of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg. find the minimum clearance of the conductor and water and clearance mid-way between the supports. Weight of conductor is 1.5 kg/m. Base of the tower can be considered to be at water level.



3) A single core lead sheath cable is graded by using three dielectrics of relative permittivity 5, 4 and 3 respectively. The conductor diameter is 2 cm and overall diameter is 8 cm. If the three dielectrics are worked at same maximum stress of 40 KV/cm, find the safe working voltage of the cable. What will be the value of safe working voltage for an ungraded cable, assuming the same conductor and overall diameter and maximum dielectric stress?

SECTION - II

1. Solve any four: (4×4=16)

- 1) Write a short note on substation equipment.
- 2) Define and explain the term:
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- 3) Explain the following system of distribution:
 - i) Radial system
 - ii) Ring main system
 - iii) Interconnected system.

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C) Steinmetz method

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Day and Date : Saturday, 20-5-2017 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks : 70
minutes in Answe one mark. 2) Answer MCQ/Obj	oulsory. It should be solved in first 30 er Book Page No. 3. Each question carries iective type questions on Page No. 3 only. ention, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective Duration: 30 Minutes	Type Questions Marks: 14
1. Solve all:	(14×1=14)
 The inductance of a transmission line A) GMD is high Both GMD and GMR are high Under no load condition the current A) Capacitance effect 	B) GMR is high D) GMD is low and GMR is high t in a transmission line is because of B) Corona effect
	D) Back flow from earth ission line is 2.5 m when the span is 250 m. er is increased by 25%, the sag will be B) Increased by 25% D) Remain unchanged
4) A conductor due to sag between twA) EllipseC) Catenary	o equal supports takes the form of B) Hyperbola D) Semi-circle
5) In medium transmission line the shA) T-methods	unt capacitance is taken into account in B) Π -methods

D) All



6)	The material commonly used for shear A) Rubber C) Lead	ath of underground cable is B) Copper D) Iron
7)	 In A.C.S.R conductor the function of the A) Provide additional mechanical streeth B) Prevent corona C) Take care of surge D) Reduce inductance and consequent 	ength
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10)	In the 3 unit insulator string voltage a efficiency is 84.28%, the voltage acro A) 8.285 KV C) 88.25 KV	cross lower unit is 17.5 KV and string oss string will be equal to B) 44.25 KV D) 442.5 KV
11)	In the intersheath grading insulation in A) Composite C) Both (A) and (B)	n cable is B) Homogeneous D) Either (A) or (B)
12)	The distribution system in India are m A) Radial C) Network	nostly B) Parallel D) Either (A) or (C)
13)	Grading of cables A) Reduces insulation cost and incre B) Reduces insulation cost but decre C) Increases both D) None of these	_
14)	For medium transmission line, A is A) Equal to B C) Equal to D	B) Equal to C D) None



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S.E. (Electrical) (Part – II) (CGPA) Examination, 2017 ELEMENTS OF POWER SYSTEMS

Day and Date: Saturday, 20-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

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1) Explain typical AC power supply system.

- 2) The cost of a 3 phase overhead transmission line is Rs. (25,000a + 2,500) per km. Where 'a' is the area of cross section of each conductor in cm². The line is supplying a load of 5 MW at 33 KV and 0.8 p.f. lag assumed to be constant throughout the year. Energy cost 4 paise per kwh and interest and depreciation total 10% per annum. Find most economical size of the conductor. Given that specific resistance of conductor material is $10^{-6} \Omega cm$.
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- 2) The tower of height 30 m and 90 m respectively support a transmission line conductor at water crossing. The horizontal distance between the towers is 500 m. If the tension in the conductor is 1600 kg. find the minimum clearance of the conductor and water and clearance mid-way between the supports. Weight of conductor is 1.5 kg/m. Base of the tower can be considered to be at water level.



 $(4 \times 4 = 16)$

3) A single core lead sheath cable is graded by using three dielectrics of relative permittivity 5, 4 and 3 respectively. The conductor diameter is 2 cm and overall diameter is 8 cm. If the three dielectrics are worked at same maximum stress of 40 KV/cm, find the safe working voltage of the cable. What will be the value of safe working voltage for an ungraded cable, assuming the same conductor and overall diameter and maximum dielectric stress?

SECTION - II

1. Solve any four:

- 1) Write a short note on substation equipment.
- 2) Define and explain the term:
 - i) Feeder
 - ii) Distributor
 - iii) Service mains
- 3) Deduce an expression for voltage regulation of a short transmission line giving the vector diagram.
- 4) Derive an expression for a inductance of a single phase two wire line.
- 5) What do you understand by medium transmission line? How capacitance effects are taken into account in such lines?

- 1) A 3-ph 50 Hz 150 km line has a resistance, inductive reactance and capacitive shunt admittance of $0.1\,\Omega$, $0.5\,\Omega$ and $3\times10^{-6}\,\mathrm{S}$ 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.
- 2) A single phase distributor 2 km long supplied a load of 120 A at 0.8 p.f. lagging at its far end and a load of 80 A at 0.9 p.f. lagging at its mid-point. Both power factors are referred to the voltage at far end. The resistance and reactance per km (go and return) are 0.05 Ω and 0.1 Ω respectively. If the voltage at the far end is maintained at 230 V calculate :
 - i) Voltage at sending end
 - ii) Phase angle between voltage at the two ends.
- 3) Explain the following system of distribution :
 - i) Radial system
 - ii) Ring main system
 - iii) Interconnected system.

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No.	Set	

S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date: Tuesday, 23-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION - I

1. Choose the correct option:

 $(14 \times 1 = 14)$

- 1) Change in input offset voltage caused by variations in supply voltage is called
 - a) Output offset voltage

b) Output voltage adjustment range

c) SVRR

- d) Power consumption
- 2) Open loop bandwidth of IC 741 is approximately

a) 1 KHz

b) 1 MHz

c) 10 KHz

d) 5 Hz

- 3) Output offset voltage is cause by
 - a) Input bias current

b) Input offset voltage

c) Both a) and b)

- d) None of the above
- 4) For voltage follower, which of the following is true?
 - a) Non-inverting amplifier with feedback
 - b) Output = Input
 - c) Gain = 1
 - d) All of the above

5) Since input resistance of an ideal opamp is infinite,



ŕ	a) its output resistance is zerob) its output becomes independent ofc) its input current is zerod) it becomes a current controlled de		
6)	For inverting amplifier, if $R_f = 100 \text{ K}$ a a) 100000 c) 101	nd R _i = 1 K, then closed loop gain is b) 1000 d) 100	
7)	Basic integrator circuit contains feedba) Resistor c) Inductor	back b) Capacitor d) None of the above	
	SECTIO	N – II	
8)	The logic family with complementary a) TTL c) DTL	logic levels is b) ECL d) CMOS	
9)	In K-map, 4-square eliminates a) 2 c) 4	b) 3 d) 5	
10)	can also be called as	data selector.	
	a) Multiplexerc) Adder	b) Demultiplexerd) Subtractor	
11)	Toggle state for JK flip flop is when a) $J = 0$, $K = 0$ c) $J = 1$, $K = 1$	b) J = 0, K = 1d) None of the above	
12)	When a flip flop is reset, its outputs w a) $Q = 0$, $\bar{Q} = 1$ c) $Q = 0$, $\bar{Q} = 0$	vill be b) $Q = 1$, $\bar{Q} = 0$ d) $Q = 1$, $\bar{Q} = 1$	
13)	Universal shift register a) accepts serial input c) gives serial and parallel outputs	b) accepts parallel inputd) is capable of all of the above	
14)	Twisted Ring counter isa) Serial in serial out c) Parallel in serial out	register. b) Serial in parallel out d) Parallel in parallel out	
			5



Seat	
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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017

ANALOG AND DIGITAL INTEGRATED CIRCUITS Day and Date: Tuesday, 23-5-2017 Marks: 56 Time: 10.00 a.m. to 1.00 p.m. 2. Solve any four: 16 a) Explain DC analysis of differential amplifier (DIBO). b) Mention the ideal characteristics of an ideal op-amp. c) Draw and explain op-amp as a adder. d) With the help of neat diagram explain concept of virtual ground. e) Draw and explain integrator. 3. Solve any two: 12 a) Derive an expression for closed loop gain, input resistance, bandwidth and output resistance for voltage series feedback amplifier. b) Define the following with respect to op-amp: i) CMRR ii) SVRR iii) Slew rate c) Explain opamp as a differentiator and draw frequency response of it. 4. Solve any four: 16 a) Define the following characteristics of digital ICs. i) Propagation delay ii) Fan-out iii) Noise margin iv) Fan in b) Simplify the following function using K-map. F(A, B, C) = (1, 3, 5, 7)c) Explain 4: 1 MUX with the help of neat diagram and truth table. d) Define flip flop. Draw the logical diagram and truth table of SR flip flop. e) Draw and explain SISO register. 12 5. Solve any two: a) Simplify the following function using K-map and realize it using NOR gates only. $F(A, B, C, D) = \sum m(0, 2, 4, 6, 7, 8, 10, 12, 13, 15) + d(3, 9)$. b) Design BCD ripple counter. c) Design a sequence detector which produces an output 1 every time the input sequence 1010 is detected.

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Set Q

S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date: Tuesday, 23-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION - I

1. Choose the correct option:

 $(14 \times 1 = 14)$

- 1) Output offset voltage is cause by
 - a) Input bias current

b) Input offset voltage

c) Both a) and b)

- d) None of the above
- 2) For voltage follower, which of the following is true?
 - a) Non-inverting amplifier with feedback
 - b) Output = Input
 - c) Gain = 1
 - d) All of the above
- 3) Since input resistance of an ideal opamp is infinite,
 - a) its output resistance is zero
 - b) its output becomes independent of load resistance
 - c) its input current is zero
 - d) it becomes a current controlled device
- 4) For inverting amplifier, if $R_f = 100 \text{ K}$ and $R_i = 1 \text{ K}$, then closed loop gain is
 - a) 100000

b) 1000

c) 101

d) 100



5)	Basic integrator circuit contains feedb	pack
	a) Resistor	b) Capacitor
	c) Inductor	d) None of the above
6)	Change in input offset voltage caus called	ed by variations in supply voltage is
	a) Output offset voltagec) SVRR	b) Output voltage adjustment ranged) Power consumption
7)	Open loop bandwidth of IC 741 is app	roximately
	a) 1 KHz	b) 1 MHz
	c) 10 KHz	d) 5 Hz
	SECTIO	N – II
8)	can also be called as	data selector.
	a) Multiplexer	b) Demultiplexer
	c) Adder	d) Subtractor
9)	Toggle state for JK flip flop is when	
	a) J = 0, K = 0	b) J = 0, K = 1
	c) J = 1, K = 1	d) None of the above
10)	When a flip flop is reset, its outputs w	
	a) $Q = 0$, $\bar{Q} = 1$ c) $Q = 0$, $\bar{Q} = 0$	b) $Q = 1$, $\bar{Q} = 0$ d) $Q = 1$, $\bar{Q} = 1$
44\	, <u> </u>	u) Q = 1, Q = 1
11)	Universal shift register a) accepts serial input	b) accepts parallel input
	c) gives serial and parallel outputs	
12)	Twisted Ring counter is	, .
,	a) Serial in serial out	b) Serial in parallel out
	c) Parallel in serial out	d) Parallel in parallel out
13)	The logic family with complementary	logic levels is
	a) TTL	b) ECL
	c) DTL	d) CMOS
14)	In K-map, 4-square eliminates	
	a) 2	b) 3
	c) 4	d) 5



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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 ANALOG AND DIGITAL INTEGRATED CIRCUITS

ANALOG AND DIGITAL INTEGRATED CIRCUITS Day and Date: Tuesday, 23-5-2017 Marks: 56 Time: 10.00 a.m. to 1.00 p.m. 2. Solve any four: 16 a) Explain DC analysis of differential amplifier (DIBO). b) Mention the ideal characteristics of an ideal op-amp. c) Draw and explain op-amp as a adder. d) With the help of neat diagram explain concept of virtual ground. e) Draw and explain integrator. 3. Solve any two: 12 a) Derive an expression for closed loop gain, input resistance, bandwidth and output resistance for voltage series feedback amplifier. b) Define the following with respect to op-amp: i) CMRR ii) SVRR iii) Slew rate c) Explain opamp as a differentiator and draw frequency response of it. 4. Solve any four: 16 a) Define the following characteristics of digital ICs. i) Propagation delay ii) Fan-out iii) Noise margin iv) Fan in b) Simplify the following function using K-map. F(A, B, C) = (1, 3, 5, 7)c) Explain 4: 1 MUX with the help of neat diagram and truth table. d) Define flip flop. Draw the logical diagram and truth table of SR flip flop. e) Draw and explain SISO register. 12 5. Solve any two: a) Simplify the following function using K-map and realize it using NOR gates only. $F(A, B, C, D) = \sum m(0, 2, 4, 6, 7, 8, 10, 12, 13, 15) + d(3, 9)$. b) Design BCD ripple counter. c) Design a sequence detector which produces an output 1 every time the input sequence 1010 is detected.

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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date: Tuesday, 23-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION - I

1. Choose the correct option:

 $(14 \times 1 = 14)$

- 1) Since input resistance of an ideal opamp is infinite,
 - a) its output resistance is zero
 - b) its output becomes independent of load resistance
 - c) its input current is zero
 - d) it becomes a current controlled device
- 2) For inverting amplifier, if $R_f = 100 \text{ K}$ and $R_i = 1 \text{ K}$, then closed loop gain is
 - a) 100000

b) 1000

c) 101

- d) 100
- 3) Basic integrator circuit contains feedback
 - a) Resistor

b) Capacitor

c) Inductor

- d) None of the above
- 4) Change in input offset voltage caused by variations in supply voltage is called
 - a) Output offset voltage

b) Output voltage adjustment range

c) SVRR

d) Power consumption



5)	Open loop bandwidth of IC 741 is app a) 1 KHz c) 10 KHz	roximately b) 1 MHz d) 5 Hz
6)	Output offset voltage is cause by a) Input bias current c) Both a) and b)	b) Input offset voltaged) None of the above
7)	For voltage follower, which of the followanter inverting amplifier with feedbard by Output = Input contains an analysis of the above	•
	SECTIO	N – II
8)	When a flip flop is reset, its outputs w	vill be
	a) $Q = 0$, $\bar{Q} = 1$	b) $Q = 1, \ \overline{Q} = 0$
	c) $Q = 0$, $\bar{Q} = 0$	d) $Q = 1, \bar{Q} = 1$
9)	Universal shift register a) accepts serial input c) gives serial and parallel outputs	b) accepts parallel inputd) is capable of all of the above
10)	Twisted Ring counter isa) Serial in serial out c) Parallel in serial out	register. b) Serial in parallel out d) Parallel in parallel out
11)	The logic family with complementary	logic levels is
	a) TTL c) DTL	b) ECL d) CMOS
12)	In K-map, 4-square eliminates	variables.
	a) 2 c) 4	b) 3 d) 5
13)	can also be called as	,
.0,	a) Multiplexer	b) Demultiplexer
	c) Adder	d) Subtractor
14)	Toggle state for JK flip flop is when	h) 0 / 4
	a) J = 0, K = 0 c) J = 1, K = 1	b) J = 0, K = 1d) None of the above
	0, 0 - 1, 10 - 1	a) 140110 of the above



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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017

ANALOG AND DIGITAL INTEGRATED CIRCUITS Day and Date: Tuesday, 23-5-2017 Marks: 56 Time: 10.00 a.m. to 1.00 p.m. 2. Solve any four: 16 a) Explain DC analysis of differential amplifier (DIBO). b) Mention the ideal characteristics of an ideal op-amp. c) Draw and explain op-amp as a adder. d) With the help of neat diagram explain concept of virtual ground. e) Draw and explain integrator. 3. Solve any two: 12 a) Derive an expression for closed loop gain, input resistance, bandwidth and output resistance for voltage series feedback amplifier. b) Define the following with respect to op-amp: i) CMRR ii) SVRR iii) Slew rate c) Explain opamp as a differentiator and draw frequency response of it. 4. Solve any four: 16 a) Define the following characteristics of digital ICs. i) Propagation delay ii) Fan-out iii) Noise margin iv) Fan in b) Simplify the following function using K-map. F(A, B, C) = (1, 3, 5, 7)c) Explain 4: 1 MUX with the help of neat diagram and truth table. d) Define flip flop. Draw the logical diagram and truth table of SR flip flop. e) Draw and explain SISO register. 12 5. Solve any two: a) Simplify the following function using K-map and realize it using NOR gates only. $F(A, B, C, D) = \sum m(0, 2, 4, 6, 7, 8, 10, 12, 13, 15) + d(3, 9)$. b) Design BCD ripple counter. c) Design a sequence detector which produces an output 1 every time the input sequence 1010 is detected.

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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 ANALOG AND DIGITAL INTEGRATED CIRCUITS

Day and Date: Tuesday, 23-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

SECTION - I

1. Choose the correct option:

 $(14 \times 1 = 14)$

- 1) For voltage follower, which of the following is true?
 - a) Non-inverting amplifier with feedback
 - b) Output = Input
 - c) Gain = 1
 - d) All of the above
- 2) Since input resistance of an ideal opamp is infinite,
 - a) its output resistance is zero
 - b) its output becomes independent of load resistance
 - c) its input current is zero
 - d) it becomes a current controlled device
- 3) For inverting amplifier, if $R_f = 100 \text{ K}$ and $R_i = 1 \text{ K}$, then closed loop gain is

a) 100000

b) 1000

c) 101

d) 100

- 4) Basic integrator circuit contains feedback
 - a) Resistor

b) Capacitor

c) Inductor

d) None of the above



5)	Change in input offset voltage caus called	ed	by variations in supply voltage is
	a) Output offset voltagec) SVRR		Output voltage adjustment range Power consumption
6)	Open loop bandwidth of IC 741 is app a) 1 KHz c) 10 KHz	b)	imately 1 MHz 5 Hz
7)	Output offset voltage is cause by a) Input bias current c) Both a) and b)		Input offset voltage None of the above
	SECTIO	N –	-11
8)	Toggle state for JK flip flop is when		
	a) J = 0, K = 0 c) J = 1, K = 1	•	J = 0, K = 1 None of the above
9)	When a flip flop is reset, its outputs w	,	
Ο,	a) $Q = 0$, $\bar{Q} = 1$		$Q = 1, \overline{Q} = 0$
	c) $Q = 0$, $\bar{Q} = 0$	d)	$Q=1,\ \bar{Q}=1$
10)	Universal shift register	L-\	and the second of the second
	a) accepts serial inputc) gives serial and parallel outputs	-	accepts parallel input is capable of all of the above
11)	Twisted Ring counter is		
	a) Serial in serial out		Serial in parallel out
10\	c) Parallel in serial out		Parallel in parallel out
12)	The logic family with complementary a) TTL	_	ECL
	c) DTL		CMOS
13)	In K-map, 4-square eliminates		variables.
	a) 2 c) 4	b) d)	
14)	can also be called as o	,	
,	a) Multiplexer		Demultiplexer
	c) Adder	d)	Subtractor



Seat	
No.	

S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017

ANALOG AND DIGITAL INTEGRATED CIRCUITS Day and Date: Tuesday, 23-5-2017 Marks: 56 Time: 10.00 a.m. to 1.00 p.m. 2. Solve any four: 16 a) Explain DC analysis of differential amplifier (DIBO). b) Mention the ideal characteristics of an ideal op-amp. c) Draw and explain op-amp as a adder. d) With the help of neat diagram explain concept of virtual ground. e) Draw and explain integrator. 3. Solve any two: 12 a) Derive an expression for closed loop gain, input resistance, bandwidth and output resistance for voltage series feedback amplifier. b) Define the following with respect to op-amp: i) CMRR ii) SVRR iii) Slew rate c) Explain opamp as a differentiator and draw frequency response of it. 4. Solve any four: 16 a) Define the following characteristics of digital ICs. i) Propagation delay ii) Fan-out iii) Noise margin iv) Fan in b) Simplify the following function using K-map. F(A, B, C) = (1, 3, 5, 7)c) Explain 4: 1 MUX with the help of neat diagram and truth table. d) Define flip flop. Draw the logical diagram and truth table of SR flip flop. e) Draw and explain SISO register. 12 5. Solve any two: a) Simplify the following function using K-map and realize it using NOR gates only. $F(A, B, C, D) = \sum m(0, 2, 4, 6, 7, 8, 10, 12, 13, 15) + d(3, 9)$. b) Design BCD ripple counter. c) Design a sequence detector which produces an output 1 every time the input sequence 1010 is detected.

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c) $LC < 4R^2C^2$

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Seat No.			Set	Р
	S.E.	(Part – II) (Electrical Engg.) (CGPA) Examination, 2017		

S.E		gg.) (CGPA) Examination, 2 K ANALYSIS	2017
Day and Date : Thursda Time : 10.00 a.m. to 1.0	•		Total Marks : 70
Instructions :	 Q. No. 1 is compu Answer Book Page Answer MCQ/Obje 	e data whenever necessary. Isory. It should be solved in No. 3. Each question carries ctive type questions on Pa Q.P. Set (P/Q/R/S) on Top o	one mark. age No. 3 only. Don't
	MCQ/Objectiv	e Type Questions	
Duration: 30 Minutes			Marks: 14
1. Choose the correct	answer:		14
1) Conductivity is	expressed in terms of		
a) Ohm/m		b) Siemens-m	
c) Mho/m		d) Mho	
2) Kirchhoff's volt	age law is related to		
a) Battery E.N	I.F's and IR drops	b) Battery E.M.F's only	
c) IR drops or	nly	d) Junction currents	
3) Time constant	of a circuit is the time in se	conds taken after application	n of current to reach
a) 25% of ma		b) 50% of maximum val	
c) 63% of ma	ximum value	d) 90% of the maximum	n value
•	e star connected circuit,		
,	$e = \sqrt{3}$ phase voltage	b) Line voltage = phase	e voltage
•	nt = $\sqrt{3}$ phase current	d) None of the above	
<i>,</i>	e source should have		
a) Large value		b) Small value of E.M.F	
c) Zero sourc		d) Infinite source resista	
•	_	the following acts as open cir	
a) Inductor	b) Capacitor	c) Resistor d) All of the above
•	circuit is under damped wh		
a) LC > 4R ² C	, <u> </u>	b) $LC = 4R^2C^2$	

d) None of the above

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- 8) In Nortons theorem, to find Z_N
 - a) All independent current sources are short circuited and independent voltage sources are open circuited
 - b) All independent voltage and current sources are open circuited
 - c) All independent voltage and current sources are short circuited
 - d) All independent voltage sources are short circuited and independent current sources are open circuited
- 9) Application of Thevenin's theorem to a circuit yields
 - a) Equivalent voltage source and impedance in series
 - b) Equivalent current source and impedance in parallel
 - c) Equivalent impedance
 - d) Equivalent current source
- 10) Ohm's law is not applicable to
 - a) DC circuits

b) High currents

c) Small resistors

- d) Semi-conductors
- 11) Time constant of a capacitive circuit
 - a) Increases with the decrease of capacitance and resistance
 - b) Increases with the decrease of capacitance and increase of resistance
 - c) Increases with the increase of capacitance and decrease of resistance
 - d) Increase with increase of capacitance and resistance
- 12) The concept on which Superposition theorem is based is
 - a) reciprocity
- b) duality
- c) non-linearity
- d) linearity

- 13) In an electrical circuit's transient are due to
 - a) inductor

b) capacitor

c) inductor and capacitor

d) none of the above

- 14) Millman's theorem yields
 - a) Equivalent resistance

- b) Equivalent impedance
- c) Equivalent voltage source
- d) Equivalent voltage or current source



Seat	
No.	

S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 NETWORK ANALYSIS

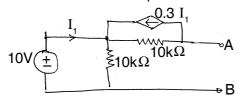
Day and Date: Thursday, 25-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

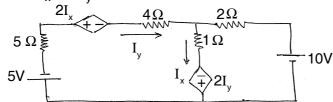
Instruction: Assume the suitable data whenever necessary.

2. Solve any four:

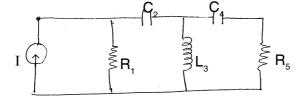
1) Obtain the Thevenin's equivalent network between A and B.



- 2) Derive the condition for maximum power transfer.
- 3) State and explain Superposition theorem.
- 4) Find the I_x and I_y for the circuit shown by mesh method.

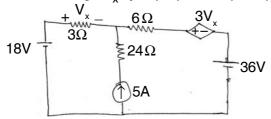


5) Draw the dual of the network.



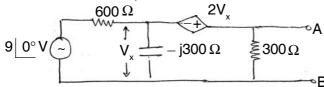
3. Solve any two:

1) Find the voltage V_x by superposition principle.

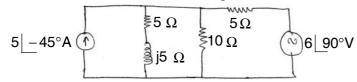




2) Find the Norton's equivalent network for the circuit shown.



3) Find current I in 10 Ω resistance using Millmans theorem.



4. Solve any four:

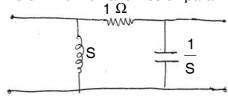
12

- 1) Derive Y-Parameter in terms of Z and transmission parameters.
- 2) Find the current through 5H inductor at t = 200 msec.

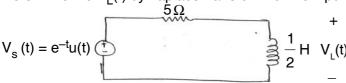
$$40 \Omega = 10 \Omega$$

$$10 \Omega$$

- 3) Derive an expression for response given by RL circuit.
- 4) Determine the transmission parameter for the two port network shown.



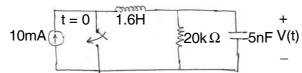
5) Determine the V_1 (t) by Laplace transform for the input shown in the network.



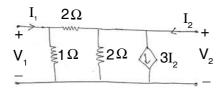
5. Solve any two:

16

- 1) Find the response given by RC circuit for the following inputs by Laplace transform.
 - i) Unit step function
- ii) Ramp function
- iii) Impulse function.
- 2) The switch in the circuit closed at t = 0, find V(t).



3) Find Y and Z parameter for the two port network shown.



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Seat	
No.	

Set

Q

S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 NETWORK ANALYSIS

Day and Date: Thursday, 25-5-2017 Total Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **Assume** the suitable data **whenever** necessary.

- 2) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- 3) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

...a...

14

- 1) In Nortons theorem, to find Z_N
 - a) All independent current sources are short circuited and independent voltage sources are open circuited
 - b) All independent voltage and current sources are open circuited
 - c) All independent voltage and current sources are short circuited
 - d) All independent voltage sources are short circuited and independent current sources are open circuited
- 2) Application of Thevenin's theorem to a circuit yields
 - a) Equivalent voltage source and impedance in series
 - b) Equivalent current source and impedance in parallel
 - c) Equivalent impedance
 - d) Equivalent current source
- 3) Ohm's law is not applicable to
 - a) DC circuits

b) High currents

c) Small resistors

- d) Semi-conductors
- 4) Time constant of a capacitive circuit
 - a) Increases with the decrease of capacitance and resistance
 - b) Increases with the decrease of capacitance and increase of resistance
 - c) Increases with the increase of capacitance and decrease of resistance
 - d) Increase with increase of capacitance and resistance
- 5) The concept on which Superposition theorem is based is
 - a) reciprocity
- b) duality
- c) non-linearity
- d) linearity

- 6) In an electrical circuit's transient are due to
 - a) inductor

b) capacitor

c) inductor and capacitor

d) none of the above

- 7) Millman's theorem yields
 - a) Equivalent resistance

- b) Equivalent impedance
- c) Equivalent voltage source
- d) Equivalent voltage or current source

- 8) Conductivity is expressed in terms of
 - a) Ohm/m

b) Siemens-m

c) Mho/m

- d) Mho
- 9) Kirchhoff's voltage law is related to
 - a) Battery E.M.F's and IR drops
- b) Battery E.M.F's only

c) IR drops only

- d) Junction currents
- 10) Time constant of a circuit is the time in seconds taken after application of current to reach
 - a) 25% of maximum value
- b) 50% of maximum value
- c) 63% of maximum value
- d) 90% of the maximum value
- 11) For three phase star connected circuit,
 - a) Line voltage = $\sqrt{3}$ phase voltage
- b) Line voltage = phase voltage
- c) Line current = $\sqrt{3}$ phase current
- d) None of the above
- 12) An ideal voltage source should have
 - a) Large value of E.M.F.

- b) Small value of E.M.F.
- c) Zero source resistance

- d) Infinite source resistance
- 13) For DC, at switching condition, which of the following acts as open circuit?
 - a) Inductor
- b) Capacitor
- c) Resistor
- d) All of the above

- 14) Second order circuit is under damped when
 - a) $LC > 4R^2C^2$

b) $LC = 4R^2C^2$

c) $LC < 4R^2C^2$

d) None of the above



Seat	
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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 NETWORK ANALYSIS

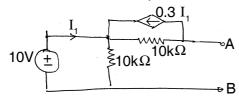
Day and Date: Thursday, 25-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

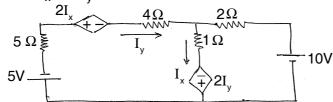
Instruction: Assume the suitable data whenever necessary.

2. Solve any four:

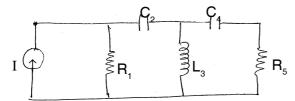
1) Obtain the Thevenin's equivalent network between A and B.



- 2) Derive the condition for maximum power transfer.
- 3) State and explain Superposition theorem.
- 4) Find the I_x and I_y for the circuit shown by mesh method.

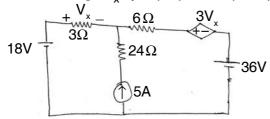


5) Draw the dual of the network.



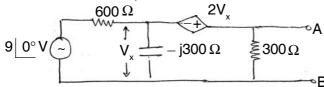
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1) Find the voltage V_x by superposition principle.

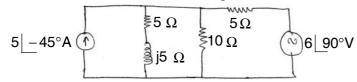




2) Find the Norton's equivalent network for the circuit shown.



3) Find current I in 10 Ω resistance using Millmans theorem.



4. Solve any four:

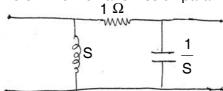
12

- 1) Derive Y-Parameter in terms of Z and transmission parameters.
- 2) Find the current through 5H inductor at t = 200 msec.

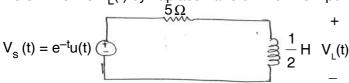
$$40 \Omega = 10 \Omega$$

$$10 \Omega$$

- 3) Derive an expression for response given by RL circuit.
- 4) Determine the transmission parameter for the two port network shown.



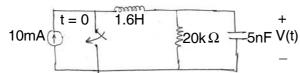
5) Determine the V_1 (t) by Laplace transform for the input shown in the network.



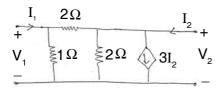
5. Solve any two:

16

- 1) Find the response given by RC circuit for the following inputs by Laplace transform.
 - i) Unit step function
- ii) Ramp function
- iii) Impulse function.
- 2) The switch in the circuit closed at t = 0, find V(t).



3) Find Y and Z parameter for the two port network shown.



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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 NETWORK ANALYSIS

Day and Date: Thursday, 25-5-2017	Total Marks : 70
Time = 140,00 = 100 to 4,00 m = 100	

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **Assume** the suitable data **whenever** necessary.

- 2) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- 3) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes

1. Choose the correct answer :

14

- 1) An ideal voltage source should have
 - a) Large value of E.M.F.

- b) Small value of E.M.F.
- c) Zero source resistance
- d) Infinite source resistance
- 2) For DC, at switching condition, which of the following acts as open circuit?
 - a) Inductor
- b) Capacitor
- c) Resistor
- d) All of the above

- 3) Second order circuit is under damped when
 - a) $LC > 4R^2C^2$

b) $LC = 4R^2C^2$

c) $LC < 4R^2C^2$

- d) None of the above
- 4) In Nortons theorem, to find Z_N
 - a) All independent current sources are short circuited and independent voltage sources are open circuited
 - b) All independent voltage and current sources are open circuited
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- 7) Time constant of a capacitive circuit
 - a) Increases with the decrease of capacitance and resistance
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- 8) The concept on which Superposition theorem is based is
 - a) reciprocity
- b) duality
- c) non-linearity
- d) linearity

- 9) In an electrical circuit's transient are due to
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d) none of the above

- 10) Millman's theorem yields
 - a) Equivalent resistance

- b) Equivalent impedance
- c) Equivalent voltage source
- d) Equivalent voltage or current source
- 11) Conductivity is expressed in terms of
 - a) Ohm/m

b) Siemens-m

c) Mho/m

- d) Mho
- 12) Kirchhoff's voltage law is related to
 - a) Battery E.M.F's and IR drops
- b) Battery E.M.F's only

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- d) Junction currents
- 13) Time constant of a circuit is the time in seconds taken after application of current to reach
 - a) 25% of maximum value
- b) 50% of maximum value
- c) 63% of maximum value
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 - a) Line voltage = $\sqrt{3}$ phase voltage
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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 NETWORK ANALYSIS

-3-

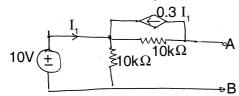
Day and Date: Thursday, 25-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

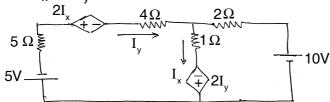
Instruction: Assume the suitable data whenever necessary.

2. Solve any four:

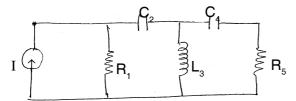
1) Obtain the Thevenin's equivalent network between A and B.



- 2) Derive the condition for maximum power transfer.
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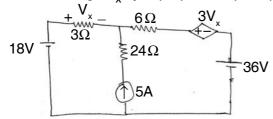


5) Draw the dual of the network.



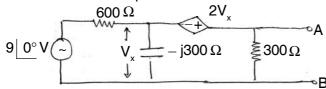
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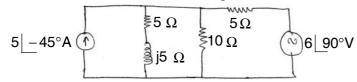




2) Find the Norton's equivalent network for the circuit shown.



3) Find current I in 10 Ω resistance using Millmans theorem.



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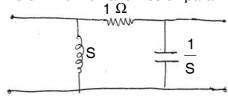
12

- 1) Derive Y-Parameter in terms of Z and transmission parameters.
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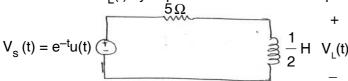
$$40 \Omega = 10 \Omega$$

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- 3) Derive an expression for response given by RL circuit.
- 4) Determine the transmission parameter for the two port network shown.



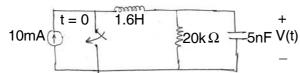
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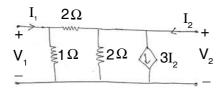
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16

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3) Find Y and Z parameter for the two port network shown.





SLR-VB – 311

Seat	
No.	

14

S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 **NETWORK ANALYSIS**

Day and Date : Thursday, 25-5-2017	Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.	

Instructions:

c) IR drops only

- 1) **Assume** the suitable data **whenever** necessary.
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- 3) Answer MCQ/Objective type questions on Page No. 3 only. Don't

d) Junction currents

forget to mention, Q.P. Set (P/Q/R/S) on Top of Page. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 14 1. Choose the correct answer: 1) Ohm's law is not applicable to a) DC circuits b) High currents c) Small resistors d) Semi-conductors 2) Time constant of a capacitive circuit a) Increases with the decrease of capacitance and resistance b) Increases with the decrease of capacitance and increase of resistance c) Increases with the increase of capacitance and decrease of resistance d) Increase with increase of capacitance and resistance 3) The concept on which Superposition theorem is based is a) reciprocity b) duality c) non-linearity d) linearity 4) In an electrical circuit's transient are due to a) inductor b) capacitor c) inductor and capacitor d) none of the above 5) Millman's theorem yields a) Equivalent resistance b) Equivalent impedance c) Equivalent voltage source d) Equivalent voltage or current source 6) Conductivity is expressed in terms of a) Ohm/m b) Siemens-m c) Mho/m d) Mho 7) Kirchhoff's voltage law is related to a) Battery E.M.F's and IR drops b) Battery E.M.F's only

-2-



- 8) Time constant of a circuit is the time in seconds taken after application of current to reach
 - a) 25% of maximum value
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S.E. (Part – II) (Electrical Engg.) (CGPA) Examination, 2017 NETWORK ANALYSIS

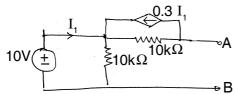
Day and Date: Thursday, 25-5-2017 Marks: 56

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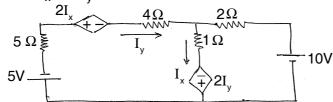
Instruction: **Assume** the suitable data **whenever** necessary.

2. Solve any four:

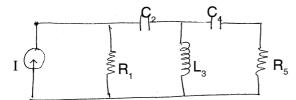
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- 2) Derive the condition for maximum power transfer.
- 3) State and explain Superposition theorem.
- 4) Find the I_x and I_y for the circuit shown by mesh method.

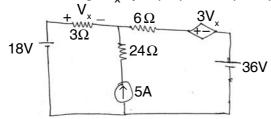


5) Draw the dual of the network.



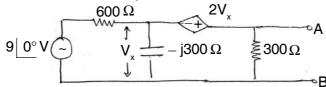
3. Solve any two:

1) Find the voltage V_x by superposition principle.

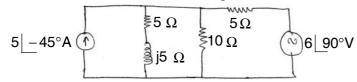




2) Find the Norton's equivalent network for the circuit shown.



3) Find current I in 10 Ω resistance using Millmans theorem.



4. Solve any four:

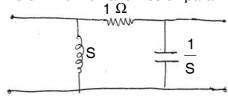
12

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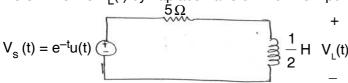
$$40 \Omega = 10 \Omega$$

$$10 \Omega$$

- 3) Derive an expression for response given by RL circuit.
- 4) Determine the transmission parameter for the two port network shown.



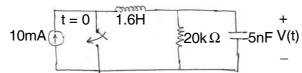
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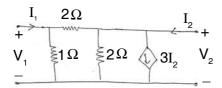
5. Solve any two:

16

- 1) Find the response given by RC circuit for the following inputs by Laplace transform.
 - i) Unit step function
- ii) Ramp function
- iii) Impulse function.
- 2) The switch in the circuit closed at t = 0, find V(t).



3) Find Y and Z parameter for the two port network shown.



SLR-VB - 312

Seat	
No.	

S.E. (Electrical) (Part – II) (Old) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Friday, 19-5-2017 Total Marks: 100

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion carries one mark.

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Make suitable assumptions if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

1. Choose the correct answer:

 $(20 \times 1 = 20)$

- 1) If average power of the signal satisfies the condition 0 is called
 - a) Energy signal

- b) Power signal
- c) Neither energy nor power signal
- d) Both energy and power signal
- 2) Which of the following is causal system?
 - a) y(t) = x(t+1)
- b) $y(t) = x(t^2)$
- c) y(t) = x(t-2) d) y(t) = x(-t)

- 3) Which of the following is static system?
 - a) y(t) = x(1 t)
- b) $y(t) = x(t^2)$
- c) y(t) = x(t + 5) d) y(t) = x(t) + 1
- 4) Any signal x(t) can be represented as
 - a) $x_{e}(t) + x_{0}(t)$
- b) $x_{e}(t) x_{0}(t)$
- c) $x_{e}(t) / x_{0}(t)$
- d) $x_0(t)$. $x_0(t)$
- 5) The convolution of $x(n) = \{1 \ 2 \ 2 \ 1\}$ and $h(n) = \{1 \ 1 \ 1\}$ is
 - a) {1 3 5 5 3 1}
- b) {1 3 5 5}
- c) {1 2 3 5 6}
- d) {1 2 2 2 1}

- 6) The time period of x(t) = cos(50t) is
 - a) 25π
- b) 50
- c) $\pi/2$
- d) $\pi/25$
- 7) When the system has poles inside the unit circle in z-domain, then system is
 - a) Stable
- b) Unstable
- c) Can't say
- d) None of these
- 8) Sampling a signal is equivalent to multiplying it with
 - a) A sync function

- b) A train of impulse
- c) A train of sync function
- d) A rectangular window
- 9) Which signal is anticausal?
 - a) x(t) = 0, t < 0 b) x(t) = 0, t > 0 c) x(t) = 1, t > 0 d) none



10)	The Fourier transform of u(t) is				
	a) 1/jω	b) $1/(1 + j\omega)$	c) jω	d) $\pi\delta(\omega) + (1/j\omega)$	
11)	The z-transform of u(n) is				
	a) $\frac{z}{z-1}$	b) $\frac{1}{z-1}$	c) 1	d) $\frac{1}{z}$	
12)	The Fourier transfo	rm of a rectangula	r pulse is a	function.	
	a) Sine	b) Cosine	c) Sinc	d) Rectangular	
13)	A signal $x(t) = cos(t)$ a) 50 Hz	50πt) has Nyquist b) 25 Hz	sampling rate as c) 100 Hz	d) 200 Hz	
14)	The Laplace transfo				
	a) 1	•	c) $1/(s + 1)$	d) 1/s ²	
15)	If $x(n) = u(n) - u(n - n)$				
	a) Entire z-plane, eb) Entire z-plane, e	•			
	c) Entire z-plane	ελο ο ρί 2 = 33			
	d) Entire z-plane, e	except $z = 0$ and z	= ∞		
16)	The time shifting property of Fourier transform can be expressed as				
	a) $x(t + t_0) \leftrightarrow e^{-j\omega}$	t0 X(W)	b) $x(t - t_0) \leftrightarrow e^{-j}$	^{ωt0} X(W)	
	c) $x(t - t_0) \leftrightarrow x(W$	$-W_0$	d) None of these		
17)	If x(t) is an odd sign	nal then			
	a) x(-t) is even		b) $x^2(-t)$ is even		
	c) $x^2(-t)$ is odd		d) $x^2(t)$ is odd		
18)	If x(n) exist only for a) Unilateral		•		
19)	With $\delta(t)$ as unit impulse sequence, $x(t)$. $\delta(t-t_0)$ is				
	a) $x(t).\delta(t)$	b) $x(t_0)$	c) $x(t_0)$. $\delta(t-t_0)$	d) $x(t-t_0)$	
20)	In order to get original Low pass filter c) Band pass filter	nal signal from sar	mpled signal it is ne b) High pass filter d) Band stop filter		

Seat No.

S.E. (Electrical) (Part – II) (Old) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Friday, 19-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

2) Make suitable assumptions if necessary.

SECTION-I

2. Attempt any four:

 $(4 \times 5 = 20)$

1) Which of the following signals are causal or non-causal?

i)
$$x(t) = e^{-3t} u(t)$$

ii)
$$x(t) = u(1 - t)$$

2) Determine fundamental period of following signals.

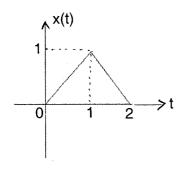
i)
$$x(t) = 2 \cos 5t + 6 \sin 2t$$

ii)
$$x(n) = \cos(6\pi n) + 3\sin(2\pi n)$$

3) Find Laplace transform of the signal $x(t) = e^{-3t} u(t)$.

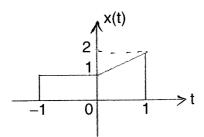
4) Prove the linearity property of Laplace transform.

5) Find even and odd part of given signal.



3. A) A continuous time signal x(t) is shown below. Sketch the following transformations.

10



i)
$$x(t-2)$$

ii)
$$x(1 - t)$$

iii)
$$3x(t + 1)$$

iv)
$$x(t/2)$$

B) Perform the convolution of following signals.

x(t) = u(t) and $h(t) = e^{-5t} u(t)$.

OR

B) Obtain Laplace transform of $x(t) = e^{-at} \cos w_0 t u(t)$.

10

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SECTION - II

4. Attempt any four:

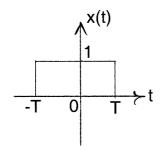
 $(4 \times 5 = 20)$

- 1) Find z-transform of signal $x(n) = (0.5)^n u(n)$.
- 2) Find DFT of the signal x(n) = (1 2 3 4).
- 3) Explain sampling theorem.
- 4) The analog signal x(t) is given as x(t) = $2\cos 100\pi t + 5\sin 200\pi t$. Find Nyquist sampling rate.
- 5) Find Fourier transform of unit step function.

5. Attempt any two:

 $(2 \times 10 = 20)$

1) Find fourier transform of signal shown below.



2) Find inverse z-transform of

$$X(z) = \frac{1 + 2z^{-1}}{1 - 2z^{-1} + z^{-2}}$$
 for $x(n)$ is

- i) Causal
- ii) Anticausal using power series method.
- 3) Find inverse z-transform of

$$X(z) = \frac{1 + 2z + 3z^2}{2 + 3z + z^2}$$

using partial fraction expansion method.

	-	
Seat No.	Set	Q

) (Old) Examination, 2017 ID SYSTEMS
Day and Date : Friday, 19-5-2017 Time : 10.00 a.m. to 1.00 p.m.	Total Marks : 100
in Answer Book Pa 2) Answer MCQ/Obj o Don't forget to me	sory. It should be solved in first 30 minutes age No. 3. Each question carries one mark. ective type questions on Page No. 3 only. ention, Q.P. Set (P/Q/R/S) on Top of Page. cumptions if necessary.
	Type Questions
Duration: 30 Minutes	Marks : 20
1. Choose the correct answer:	(20×1=20)
1) The time shifting property of Fourier a) $x(t + t_0) \leftrightarrow e^{-j \omega t_0} X(W)$ c) $x(t - t_0) \leftrightarrow x(W - W_0)$	transform can be expressed as b) $x(t - t_0) \leftrightarrow e^{-j \omega t_0} X(W)$ d) None of these
 c) x(t - t₀) ↔ x(vv - vv₀) 2) If x(t) is an odd signal then a) x(-t) is even c) x²(-t) is odd 	b) $x^2(-t)$ is even d) $x^2(t)$ is odd
3) If x(n) exist only for n ≤ 0 then it is can also also be a	alled as sequence. c) Both a and b d) None
4) With $\delta(t)$ as unit impulse sequence	, $x(t).\delta(t-t_0)$ is
a) $x(t).\delta(t)$ b) $x(t_0)$	c) $x(t_0) \cdot \delta(t - t_0)$ d) $x(t - t_0)$
5) In order to get original signal from sa) Low pass filterc) Band pass filter	ampled signal it is necessary to use b) High pass filter d) Band stop filter
6) If average power of the signal satisfa) Energy signalc) Neither energy nor power signal	b) Power signal
7) Which of the following is causal sys a) $y(t) = x(t+1)$ b) $y(t) = x(t^2)$	tem? c) $y(t) = x(t-2)$ d) $y(t) = x(-t)$
8) Which of the following is static system: a) $y(t) = x(1 - t)$ b) $y(t) = x(t^2)$	em? c) $y(t) = x(t + 5)$ d) $y(t) = x(t) + 1$



	-			
a) $x_e(t) + x_0(t)$	b) $x_{e}(t) - x_{0}(t)$	c) $x_{e}(t) / x_{0}(t)$	d)	$x_e(t) . x_0(t)$
a) {1 3 5 5 3 1}	b) {1 3 5 5}	c) {1 2 3 5 6}	d)	{1 2 2 2 1}
•	` ' ' ' '			10 –
,	,	,	,	$\pi/25$
•	•			•
,	,	,	a)	None of these
	•	1 \ A \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	00	
, ,		,		OW
		a) / (Toolai igalai i		· · ·
•		c) $x(t) = 1, t > 0$	d)	none
The Fourier transfo	orm of u(t) is	, (,	,	
a) 1/jω	b) $1/(1 + j\omega)$	c) jω	d)	$\pi\delta(\omega) + (1/j\omega)$
The z-transform of	u(n) is			
a) Z	b) 1	c) 1	٩)	1
z-1	z-1	<i>C)</i> 1	u)	Z
The Fourier transfo	rm of a rectangula	r pulse is a		_ function.
a) Sine	b) Cosine	c) Sinc	d)	Rectangular
		•		
•	,	•	d)	200 Hz
•	•			4 / 2
•	•	c) $1/(s + 1)$	a)	1/s ²
` ' ' ' '	•			
,	•			
	ελυ σ ρι ∠ – ∽			
•	except $z = 0$ and z	= ∞		
	a) $x_e(t) + x_0(t)$ The convolution of a) $\{1\ 3\ 5\ 5\ 3\ 1\}$ The time period of a) 25π When the system ha) Stable Sampling a signal ia) A sync function c) A train of sync f Which signal is ant a) $x(t) = 0$, $t < 0$ The Fourier transfora) $1/j\omega$ The z-transform of a) $\frac{z}{z-1}$ The Fourier transfora) Sine A signal $x(t) = \cos(a)$ A signal $x(t) = \cos(a)$ 1 If $x(n) = u(n) - u(n)$ a) Entire z-plane, 6 b) Entire z-plane, 6 c) Entire z-plane	a) $x_e(t) + x_0(t)$ b) $x_e(t) - x_0(t)$ The convolution of $x(n) = \{1 \ 2 \ 2 \ 1\}$ and a) $\{1 \ 3 \ 5 \ 5 \ 3 \ 1\}$ b) $\{1 \ 3 \ 5 \ 5\}$ The time period of $x(t) = \cos(50t)$ is a) 25π b) 50 When the system has poles inside the a) Stable b) Unstable Sampling a signal is equivalent to mutal A sync function c) A train of sync function Which signal is anticausal? a) $x(t) = 0$, $t < 0$ b) $x(t) = 0$, $t > 0$ The Fourier transform of $u(t)$ is a) $1/j\omega$ b) $1/(1 + j\omega)$ The z -transform of $u(n)$ is a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$ The Fourier transform of a rectangular a) Sine b) Cosine A signal $x(t) = \cos(50\pi t)$ has Nyquist a) $50 \ Hz$ b) $25 \ Hz$ The Laplace transform of unit step funds a) 1 b) $1/s$ If $x(n) = u(n) - u(n-4)$ then ROC is a) Entire z -plane, except $z = 0$ b) Entire z -plane, except $z = \infty$ c) Entire z -plane	The convolution of $x(n) = \{1\ 2\ 2\ 1\}$ and $h(n) = \{1\ 1\ 1\}$ is a) $\{1\ 3\ 5\ 5\ 3\ 1\}$ b) $\{1\ 3\ 5\ 5\}$ c) $\{1\ 2\ 3\ 5\ 6\}$ The time period of $x(t) = \cos(50t)$ is a) 25π b) 50 c) $\pi/2$ When the system has poles inside the unit circle in z-don a) Stable b) Unstable c) Can't say Sampling a signal is equivalent to multiplying it with a) A sync function b) A train of impul c) A train of sync function d) A rectangular which signal is anticausal? a) $x(t) = 0, t < 0$ b) $x(t) = 0, t > 0$ c) $x(t) = 1, t > 0$ The Fourier transform of $u(t)$ is a) $1/j\omega$ b) $1/(1+j\omega)$ c) $j\omega$ The z-transform of $u(n)$ is a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$ c) 1 The Fourier transform of a rectangular pulse is a a) Sine b) Cosine c) Sinc A signal $x(t) = \cos(50\pi t)$ has Nyquist sampling rate as a) $50\ Hz$ b) $25\ Hz$ c) $100\ Hz$ The Laplace transform of unit step function is a) 1 b) $1/s$ c) $1/(s+1)$ If $x(n) = u(n) - u(n-4)$ then ROC is a) Entire z-plane, except $z = 0$ b) Entire z-plane, except $z = \infty$	a) $x_e(t) + x_0(t)$ b) $x_e(t) - x_0(t)$ c) $x_e(t) / x_0(t)$ d) The convolution of $x(n) = \{1 \ 2 \ 2 \ 1\}$ and $h(n) = \{1 \ 1 \ 1\}$ is a) $\{1 \ 3 \ 5 \ 5 \ 3 \ 1\}$ b) $\{1 \ 3 \ 5 \ 5\}$ c) $\{1 \ 2 \ 3 \ 5 \ 6\}$ d) The time period of $x(t) = \cos(50t)$ is a) 25π b) 50 c) $\pi/2$ d) When the system has poles inside the unit circle in z-domain a) Stable b) Unstable c) Can't say d) Sampling a signal is equivalent to multiplying it with a) A sync function b) A train of impulse c) A train of sync function d) A rectangular wind Which signal is anticausal? a) $x(t) = 0, \ t < 0$ b) $x(t) = 0, \ t > 0$ c) $x(t) = 1, \ t > 0$ d) The Fourier transform of $u(t)$ is a) $1/j\omega$ b) $1/(1 + j\omega)$ c) $j\omega$ d) The z-transform of $u(n)$ is a) $\frac{z}{z-1}$ b) $\frac{1}{z-1}$ c) 1 d) The Fourier transform of a rectangular pulse is a a) Sine b) Cosine c) Sinc d) A signal $x(t) = \cos(50 \pi t)$ has Nyquist sampling rate as a) $50 \ Hz$ b) $25 \ Hz$ c) $100 \ Hz$ d) The Laplace transform of unit step function is a) 1 b) $1/s$ c) $1/(s+1)$ d) If $x(n) = u(n) - u(n-4)$ then ROC is a) Entire z-plane, except $z = \omega$ c) Entire z-plane, except $z = \omega$ c) Entire z-plane

Seat No.

S.E. (Electrical) (Part – II) (Old) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Friday, 19-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

2) Make suitable assumptions if necessary.

SECTION-I

2. Attempt any four:

 $(4 \times 5 = 20)$

1) Which of the following signals are causal or non-causal?

i)
$$x(t) = e^{-3t} u(t)$$

ii)
$$x(t) = u(1 - t)$$

2) Determine fundamental period of following signals.

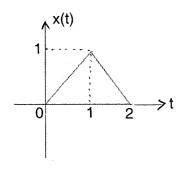
i)
$$x(t) = 2 \cos 5t + 6 \sin 2t$$

ii)
$$x(n) = \cos (6\pi n) + 3\sin (2\pi n)$$

3) Find Laplace transform of the signal $x(t) = e^{-3t} u(t)$.

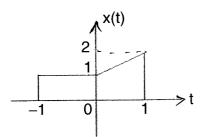
4) Prove the linearity property of Laplace transform.

5) Find even and odd part of given signal.



3. A) A continuous time signal x(t) is shown below. Sketch the following transformations.

10



i)
$$x(t-2)$$

ii)
$$x(1 - t)$$

iii)
$$3x(t + 1)$$

iv)
$$x(t/2)$$



B) Perform the convolution of following signals.

x(t) = u(t) and $h(t) = e^{-5t} u(t)$.

OR

B) Obtain Laplace transform of $x(t) = e^{-at} \cos w_0 t u(t)$.

10

10

SECTION - II

4. Attempt any four:

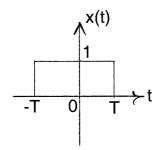
 $(4 \times 5 = 20)$

- 1) Find z-transform of signal $x(n) = (0.5)^n u(n)$.
- 2) Find DFT of the signal x(n) = (1 2 3 4).
- 3) Explain sampling theorem.
- 4) The analog signal x(t) is given as x(t) = $2\cos 100\pi t + 5\sin 200\pi t$. Find Nyquist sampling rate.
- 5) Find Fourier transform of unit step function.

5. Attempt any two:

 $(2 \times 10 = 20)$

1) Find fourier transform of signal shown below.



2) Find inverse z-transform of

$$X(z) = \frac{1 + 2z^{-1}}{1 - 2z^{-1} + z^{-2}}$$
 for x(n) is

- i) Causal
- ii) Anticausal using power series method.
- 3) Find inverse z-transform of

$$X(z) = \frac{1 + 2z + 3z^2}{2 + 3z + z^2}$$

using partial fraction expansion method.

	-	
Seat No.	Set	R

S.E.	(Electrical) (Part – SIGNALS A	II) (OId) Examina ND SYSTEMS	tion,	2017
Day and Date: Frid Time: 10.00 a.m. to	-			Total Marks : 100
Instruction	2) Answer MCQ/Ob	Page No. 3. Each que pjective type question pention, Q.P. Set (P/	estion ons oi 'Q/R/S	carries one mark. n Page No. 3 only.
Duration : 30 Minute	_	e Type Questions		Marks : 20
Choose the cor	rrect answer:			(20×1=20
	sform of u(n) is			(20×1-20)
•	b) $\frac{1}{z-1}$	c) 1	d)	$\frac{1}{z}$
2) The Fourier a) Sine	r transform of a rectang b) Cosine	ular pulse is a c) Sinc		_ function. Rectangular
3) A signal x(t a) 50 Hz	b) = cos(50 πt) has Nyqı b) 25 Hz	uist sampling rate as c) 100 Hz		200 Hz
4) The Laplac a) 1	e transform of unit step b) 1/s	function is c) 1/(s + 1)	d)	1/s ²
a) Entire zo b) Entire zo c) Entire zo	n) – u(n – 4) then ROC -plane, except z = 0 -plane, except z = ∞ -plane -plane, except z = 0 an			
	$\leftrightarrow e^{-j \omega t 0} X(W)$	er transform can be b) $x(t - t_0) \leftrightarrow \epsilon$	-	
	$\leftrightarrow x(W - W_0)$	d) None of these	е	
7) If x(t) is an a) x(-t) is c) x ² (-t) is		b) $x^2(-t)$ is ever d) $x^2(t)$ is odd	า	



8)	If x(n) exist only for a) Unilateral				
9)	With $\delta(t)$ as unit im	pulse sequence, >	$\kappa(t).\delta(t-t_0)$ is		
	a) $x(t).\delta(t)$	b) $x(t_0)$	c) $x(t_0) \cdot \delta(t - t_0)$	d)	$x(t-t_0)$
10)	In order to get origi a) Low pass filter c) Band pass filter	nal signal from sar	mpled signal it is no b) High pass filter d) Band stop filter	ſ	ssary to use
11)	If average power of a) Energy signal c) Neither energy r	-	b) Power signal		
12)	Which of the follow a) $y(t) = x(t+1)$			d)	y(t) = x(-t)
13)	Which of the follow a) $y(t) = x(1 - t)$			d)	y(t) = x(t) + 1
14)	Any signal $x(t)$ can a) $x_e(t) + x_0(t)$	-		d)	$x_e(t) \cdot x_0(t)$
15)	The convolution of a) {1 3 5 5 3 1}	` '	` '	d)	{1 2 2 2 1}
16)	The time period of a) 25π	x(t) = cos(50t) is b) 50	c) π/2	d)	π/25
17)	When the system h a) Stable	•	e unit circle in z-don c) Can't say		, then system is None of these
18)	Sampling a signal is a) A sync function c) A train of sync for	•	Itiplying it with b) A train of impu d) A rectangular v		ow
19)	Which signal is antial $x(t) = 0, t < 0$		c) $x(t) = 1, t > 0$	d)	none
20)	The Fourier transfo	orm of u(t) is			
	a) 1/jω	b) $1/(1 + j\omega)$	c) jw	d)	$\pi\delta(\omega) + (1/j\omega)$

Seat No.

S.E. (Electrical) (Part – II) (Old) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Friday, 19-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

2) Make suitable assumptions if necessary.

SECTION-I

2. Attempt any four:

 $(4 \times 5 = 20)$

1) Which of the following signals are causal or non-causal?

i)
$$x(t) = e^{-3t} u(t)$$

ii)
$$x(t) = u(1 - t)$$

2) Determine fundamental period of following signals.

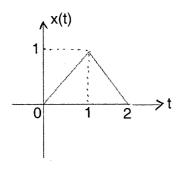
i)
$$x(t) = 2 \cos 5t + 6 \sin 2t$$

ii)
$$x(n) = \cos(6\pi n) + 3\sin(2\pi n)$$

3) Find Laplace transform of the signal $x(t) = e^{-3t} u(t)$.

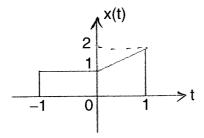
4) Prove the linearity property of Laplace transform.

5) Find even and odd part of given signal.



3. A) A continuous time signal x(t) is shown below. Sketch the following transformations.

10



i)
$$x(t-2)$$

ii)
$$x(1 - t)$$

iii)
$$3x(t + 1)$$

iv)
$$x(t/2)$$



B) Perform the convolution of following signals.

x(t) = u(t) and $h(t) = e^{-5t} u(t)$.

OR

B) Obtain Laplace transform of $x(t) = e^{-at} \cos w_0 t u(t)$.

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SECTION - II

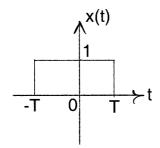
4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Find z-transform of signal $x(n) = (0.5)^n u(n)$.
- 2) Find DFT of the signal x(n) = (1 2 3 4).
- 3) Explain sampling theorem.
- 4) The analog signal x(t) is given as x(t) = $2\cos 100\pi t + 5\sin 200\pi t$. Find Nyquist sampling rate.
- 5) Find Fourier transform of unit step function.
- 5. Attempt any two:

 $(2 \times 10 = 20)$

1) Find fourier transform of signal shown below.



2) Find inverse z-transform of

$$X(z) = \frac{1 + 2z^{-1}}{1 - 2z^{-1} + z^{-2}}$$
 for x(n) is

- i) Causal
- ii) Anticausal using power series method.
- 3) Find inverse z-transform of

$$X(z) = \frac{1 + 2z + 3z^2}{2 + 3z + z^2}$$

using partial fraction expansion method.

	-	
Seat No.	Set	S

S.F. (Flectrical) (Part - II) (Old) Examination 2017

	J.L. (Liecti	SIGNALS AND	SYSTEMS)II, 2017	
-	d Date : Friday, 19-5 10.00 a.m. to 1.00 p			Total M	1arks : 100
1	2) A D	Answer Book Pag nswer MCQ/Object on't forget to men	ory. It should be solve te No. 3. Each quest tive type question tion, Q.P. Set (P/Q/ mptions if necessal	tion carries o l s on Page No / R/S) on Top (n e mark. o. 3 only.
Donatio	00 M' 1	MCQ/Objective T	ype Questions		Marila OC
Duratio	n : 30 Minutes				Marks : 20
1. Ch	oose the correct ans	swer:			(20×1=20)
1)	The time period of a) 25π	x(t) = cos(50t) is b) 50	c) $\pi/2$	d) π/25	
2)	When the system ha) Stable	as poles inside the b) Unstable	e unit circle in z-dom c) Can't say		
3)	Sampling a signal i a) A sync function c) A train of sync f	·	Itiplying it with b) A train of impul d) A rectangular w		
4)	Which signal is ant a) $x(t) = 0$, $t < 0$		c) $x(t) = 1, t > 0$	d) none	
5)	The Fourier transfo	orm of u(t) is			
	a) 1/jω	b) $1/(1 + j\omega)$	c) jω	d) $\pi\delta(\omega) + ($	1/ jω)
6)	The z-transform of	u(n) is			
	a) $\frac{z}{z-1}$	b) $\frac{1}{z-1}$	c) 1	d) $\frac{1}{z}$	
7)	The Fourier transfo	orm of a rectangula b) Cosine	r pulse is a c) Sinc	function d) Rectangu	
8)	A signal $x(t) = cos(a)$ 50 Hz	50πt) has Nyquist b) 25 Hz	sampling rate as c) 100 Hz	d) 200 Hz	
9)	The Laplace transf a) 1	orm of unit step fur b) 1/s	nction is c) 1/(s + 1)	d) 1/s ²	

- 10) If x(n) = u(n) u(n 4) then ROC is
 - a) Entire z-plane, except z = 0
 - b) Entire z-plane, except $z = \infty$
 - c) Entire z-plane
 - d) Entire z-plane, except z = 0 and $z = \infty$
- 11) The time shifting property of Fourier transform can be expressed as
 - a) $x(t + t_0) \leftrightarrow e^{-j\omega t_0} X(W)$
- b) $x(t-t_0) \leftrightarrow e^{-j\omega t_0} X(W)$
- c) $x(t-t_0) \leftrightarrow x(W-W_0)$
- d) None of these
- 12) If x(t) is an odd signal then
 - a) x(-t) is even

b) $x^2(-t)$ is even

c) $x^2(-t)$ is odd

- d) $x^2(t)$ is odd
- 13) If x(n) exist only for $n \le 0$ then it is called as _____ sequence.
 - a) Unilateral
- b) Bilateral
- c) Both a and b
- d) None
- 14) With $\delta(t)$ as unit impulse sequence, x(t). $\delta(t-t_0)$ is
 - a) $x(t) \cdot \delta(t)$
- b) $x(t_0)$
- c) $x(t_0)$. $\delta(t-t_0)$ d) $x(t-t_0)$
- 15) In order to get original signal from sampled signal it is necessary to use
 - a) Low pass filter

b) High pass filter

c) Band pass filter

- d) Band stop filter
- 16) If average power of the signal satisfies the condition 0 is called
 - a) Energy signal

- b) Power signal
- c) Neither energy nor power signal
- d) Both energy and power signal
- 17) Which of the following is causal system?
 - a) y(t) = x(t+1)
- b) $y(t) = x(t^2)$
- c) y(t) = x(t-2) d) y(t) = x(-t)

- 18) Which of the following is static system?
 - a) y(t) = x(1 t)
- b) $y(t) = x(t^2)$
- c) y(t) = x(t + 5) d) y(t) = x(t) + 1

- 19) Any signal x(t) can be represented as
 - a) $x_{e}(t) + x_{0}(t)$
- b) $x_{e}(t) x_{0}(t)$
- c) $x_{e}(t) / x_{0}(t)$
- d) $x_{e}(t) . x_{0}(t)$
- 20) The convolution of $x(n) = \{1 \ 2 \ 2 \ 1\}$ and $h(n) = \{1 \ 1 \ 1\}$ is
 - a) {1 3 5 5 3 1}
- b) {1 3 5 5}
- c) {1 2 3 5 6}
- d) {1 2 2 2 1}

Seat No.

S.E. (Electrical) (Part – II) (Old) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Friday, 19-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

2) Make suitable assumptions if necessary.

SECTION-I

2. Attempt any four:1) Which of the following signals are causal or non-causal?

i) $x(t) = e^{-3t} u(t)$

ii) x(t) = u(1 - t)

2) Determine fundamental period of following signals.

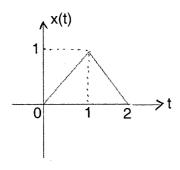
i) $x(t) = 2 \cos 5t + 6 \sin 2t$

ii) $x(n) = \cos (6\pi n) + 3\sin (2\pi n)$

3) Find Laplace transform of the signal $x(t) = e^{-3t} u(t)$.

4) Prove the linearity property of Laplace transform.

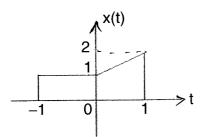
5) Find even and odd part of given signal.



3. A) A continuous time signal x(t) is shown below. Sketch the following transformations.

10

 $(4 \times 5 = 20)$



i) x(t-2)

ii) x(1 - t)

iii) 3x(t + 1)

iv) x(t/2)

v) x(3t).

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B) Perform the convolution of following signals.

x(t) = u(t) and $h(t) = e^{-5t} u(t)$.

OR

B) Obtain Laplace transform of $x(t) = e^{-at} \cos w_0 t u(t)$.

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SECTION - II

4. Attempt any four:

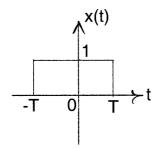
 $(4 \times 5 = 20)$

- 1) Find z-transform of signal $x(n) = (0.5)^n u(n)$.
- 2) Find DFT of the signal x(n) = (1 2 3 4).
- 3) Explain sampling theorem.
- 4) The analog signal x(t) is given as x(t) = $2\cos 100\pi t + 5\sin 200\pi t$. Find Nyquist sampling rate.
- 5) Find Fourier transform of unit step function.

5. Attempt any two:

 $(2 \times 10 = 20)$

1) Find fourier transform of signal shown below.



2) Find inverse z-transform of

$$X(z) = \frac{1 + 2z^{-1}}{1 - 2z^{-1} + z^{-2}}$$
 for x(n) is

- i) Causal
- ii) Anticausal using power series method.
- 3) Find inverse z-transform of

$$X(z) = \frac{1 + 2z + 3z^2}{2 + 3z + z^2}$$

using partial fraction expansion method.

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S.E. (Electrical) (Part – II) (Old) Examination, 2017 **COMPUTER PROGRAMMING - C++**

Total Marks: 100 Day and Date: Monday, 22-5-2017

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Each Section carries 40 marks.

- 2) Attempt all questions in each Section.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't

	•		P. Set (P/Q/R/S) on		ny. Don t
		MCQ/Objective T	ype Questions		
Duratio	n : 30 Minutes				Marks : 20
1. Cł	noose the correct answe	er:			20
1) Which of the followingA) Copy constructorC) Default constructor	2.	tructor ? B) Friend construct D) Parameterized (
2	A) Scope resolution		dynamic memory allo	ocation. D) Membersh	ip access
3	Cout is a/an A) Operator	B) Function	C) Object	D) Macro	
4	 Which of the following A) A constructor is can B) A constructor is can C) A constructor is can D) A constructor is can 	alled at the time of de alled at the time of us alled at the time of de	claration of an object e of an object claration of a class		
5	A destructor takes A) One	B) Two	nts. C) Three	D) No	
6	Which of the followingA) Static function		f class ? C) Const function	D) Virtual fund	ction
7	Which of the followingA) The types of argurC) The number of arg	ments are different	B) The order of arg	ument is differen	t
8	 Which of the following A) Class can have m B) Class data member C) Pointer to structur D) Class data member 	ember functions whilers are public by defa or classes cannot be	e structure cannot ult while that of struc pe declared	•	default
9) Which of the following A) Abstraction	concepts means wra B) Encapsulation		I functions togethe D) Polymorph	



10)	Which of the following A) Data hiding	•	•	hat method to invoke? D) Dynamic loading
11)	Which of the following class to outer world?	·		·
	A) Encapsulation	B) Abstraction	C) Data hiding	D) Data binding
12)	Which of the following A) this->x	ways are legal to acc B) this.x	ess a class data mem C) *this.x	ber using this pointer? D) *this-x
13)	Which of the following I) All operators can b II) We can change the A) Only I is true	e overloaded in C++	•	
	C) Only II is true		D) Both I and II are t	
14)	What happens if the b prototype?			of a function with same
	A) Compiler reports aB) Only base class fuC) Only derived classD) Base class object vclass function	nction will get called function will get called	irrespective of object ed irrespective of obje	ct s object will call derived
15)	Which inheritance type	e is used in the class	given below?	
	Class A : Public X, Pu	blic Y		
	{ }			
	A) Multilevel inheritanceC) Hybrid inheritance	ce	B) Multiple inheritantD) Hierarchical Inhe	
16)	Which one of the follow	wing is correct about	the statements given l	below?
	I. All function calls are	e resolved at compile	-time in Procedure Or	iented Programming.
	II. All function calls are	e resolved at run time		
	A) Only II is correctC) Only I is correct		B) Both I and II are of D) Both I and II are i	
17)	Which of the following A) Public	_	•	
18)	Which of the following A) Member variable			class? D) Classic function
19)	How many instances of A) 1	of an abstract class of B) 5	an be created ? C) 13	D) 0
20)	Destructor has the sar A)!	me name as the cons B) ?	structor and its is prec C) ~	eded by D) \$



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S.E. (Electrical) (Part – II) (Old) Examination, 2017 COMPUTER PROGRAMMING – C++

Day and Date: Monday, 22-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Each Section carries 40 marks.

- 2) All questions are compulsory.
- 3) Figures to right indicate full marks.

SECTION - I

2. Solve any four: (5×4=20)

- 1) Explain basic concepts of OOP.
- 2) Explain looping statements in C++.
- 3) With example discuss function declaration in C++.
- 4) Differentiate structure and class in C++.
- 5) What is destructor? How it is called? Give example.
- 6) What is function overloading, give example.
- 3. What is constructor and its types? With a proper code example, explain constructor overloading.

4. Explain with example:

- A) Object as data type
- B) Object as function argument.

OR

Explain following concepts:

- a) Declaration of structure
- b) Inline function.

10



SECTION - II

- 5. Solve any four: (5×4=20)
 - 1) What is concept of inheritance in OOP? Explain in brief.
 - 2) Explain:
 - a) Array declaration
 - b) Array initialization with code example.
 - 3) What a program to demonstrate overloading a unary operator?
 - 4) Explain type conversion/casting in C++.
 - 5) Write a short note on 'this' keyword in C++.
 - 6) Write a short note on pointers.
- 6. With code example explain:

10

- a) Friend function
- b) Virtual function.
- 7. With a proper code example explain various inheritance types in C++.

10

OR

With a suitable code example explain binary operator overloading.

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	S.E. (E	, .	II) (Old) Examinatio DGRAMMING – C++		
-	d Date : Monday, 22-5 0.00 a.m. to 1.00 p.m.			Total Mark	ks : 100
	3) (4) 1	Attempt all question Q. No. 1 is compul Answer book Page N Answer MCQ/Obje	s in each Section. sory . It should be solv lo. 3. Each question ca	on Page No. 3 only. L	
Duration	a . 20 Minutos	MCQ/Objective	e Type Questions	Mo	rko i 00
Duration	n : 30 Minutes			IVIA	rks : 20
1. Ch	oose the correct answ	ver:			20
1)		•	out the statements give		
		•	•	Oriented Programming	J.
	II. All function calls aA) Only II is correctC) Only I is correct		time in OOPS. B) Both I and II and I		
2)	Which of the followin A) Public	ig is an invalid visibi B) Private	lity label while inheritin C) Protected	ng a class ? D) Friend	
3)		•	function defined insidention C) Class function		'n
4)	How many instances A) 1	s of an abstract clas B) 5	ss can be created? C) 13	D) 0	
5)	Destructor has the s A)!	ame name as the c B) ?	onstructor and its is pr	receded by D) \$	
6)	Which of the followin A) Copy constructo C) Default construct	r	onstructor ? B) Friend constru D) Parameterized		
7)	In C++A) Scope resolution	-	for dynamic memory a C) New	llocation. D) Membership a	ccess
8)	Cout is a/an A) Operator	B) Function	C) Object	D) Macro	
9)	Which of the following	ng statement is corre	ect?		

A) A constructor is called at the time of declaration of an object

B) A constructor is called at the time of use of an objectC) A constructor is called at the time of declaration of a class

D) A constructor is called at the time of use of a class

10)	A destructor takes		argumen	ts.			
	A) One	B) Two		C)	Three	D)	No
11)	Which of the following A) Static function				ss ? Const function	D)	Virtual function
12)	Which of the following A) The types of argur C) The number of arg	nents are dif	ferent	B)	•	men	t is different
13)	 Which of the following is correct about class and structure? A) Class can have member functions while structure cannot B) Class data members are public by default while that of structure are private. C) Pointer to structure or classes cannot be declared D) Class data members are private by default while that of structure are public by default 						
14)	Which of the following A) Abstraction	•	•	•	g up of data and f Inheritance		ions together? Polymorphism
15)	Which of the following A) Data hiding	•			ning at run time wh Dynamic binding		
16)	Which of the following class to outer world? A) Encapsulation	concepts of B) Abstrac			s exposing only ne Data hiding		sary information of Data binding
17)	Which of the following A) this->x	,	gal to acce	ess	•	er ι	J
18)	Which of the following I) All operators can b II) We can change the A) Only I is true C) Only II is true	e overloade	ed in C++ ning of an	ор В)	•	alse	
19)	What happens if the b prototype? A) Compiler reports a B) Only base class fu C) Only derived class D) Base class object w class function	n error on co inction will g function wil	ompilation et called i I get calle	rres	spective of object respective of object	et	
20)	Which inheritance type	e is used in t	the class (give	en below?		
	Class A: Public X, Pu	blic Y					
	{ }A) Multilevel inheritanC) Hybrid inheritance	ce		•	Multiple inheritand Hierarchical Inher		ce

-2-



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S.E. (Electrical) (Part – II) (Old) Examination, 2017 COMPUTER PROGRAMMING – C++

Day and Date: Monday, 22-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Each Section carries 40 marks.

- 2) All questions are compulsory.
- 3) Figures to right indicate full marks.

SECTION - I

2. Solve any four: (5×4=20)

- 1) Explain basic concepts of OOP.
- 2) Explain looping statements in C++.
- 3) With example discuss function declaration in C++.
- 4) Differentiate structure and class in C++.
- 5) What is destructor? How it is called? Give example.
- 6) What is function overloading, give example.
- 3. What is constructor and its types? With a proper code example, explain constructor overloading.
- 4. Explain with example:
 - A) Object as data type
 - B) Object as function argument.

OR

Explain following concepts:

- a) Declaration of structure
- b) Inline function.

10



SECTION - II

- 5. Solve any four: (5×4=20)
 - 1) What is concept of inheritance in OOP? Explain in brief.
 - 2) Explain:
 - a) Array declaration
 - b) Array initialization with code example.
 - 3) What a program to demonstrate overloading a unary operator?
 - 4) Explain type conversion/casting in C++.
 - 5) Write a short note on 'this' keyword in C++.
 - 6) Write a short note on pointers.
- 6. With code example explain:

10

- a) Friend function
- b) Virtual function.
- 7. With a proper code example explain various inheritance types in C++.

10

OR

With a suitable code example explain binary operator overloading.

Set Q

Seat No.			Set	R

S.	.E. (Electrical) (Part – COMPUTER PR	II) (Old) Examinatio OGRAMMING – C++	•
Day and Date : Monday, Time : 10.00 a.m. to 1.00			Total Marks: 100
Instructions :	Answer book Page I 4) Answer MCQ/Obje	ns in each Section. Isory . It should be solv No. 3. Each question ca	on Page No. 3 only. Don't
Duration : 30 Minutes	MCQ/Objectiv	e Type Questions	Marks : 20
Duration . 30 Minutes			Warks . 20
1. Choose the correct	answer:		20
Which of the fol class to outer w		S means exposing only	y necessary information of
A) Encapsulati		C) Data hiding	D) Data binding
 Which of the foliation this->x 	llowing ways are legal to B) this.x	access a class data m C) *this.x	ember using this pointer ? D) *this-x
I) All operator		C++	re false
prototype? A) Compiler re B) Only base of C) Only derive	eports an error on compile class function will get cal d class function will get object will call base class	ation lled irrespective of objective of o	
5) Which inheritar	nce type is used in the cl	ass given below?	
Class A : Public	c X, Public Y		
{ } A) Multilevel in C) Hybrid inhe		B) Multiple inheri	
6) Which one of the	ne following is correct ab	out the statements give	en below ?
		•	Oriented Programming.
II. All function of A) Only II is concern of C) Only I is concern of C)		time in OOPS. B) Both I and II a D) Both I and II a	



7)	Which of the following A) Public	is an invalid visibility B) Private		el while inheriting a Protected		ss ? Friend
8)	Which of the following A) Member variable					ss ? Classic function
9)	How many instances of A) 1	of an abstract class of B) 5		oe created ? 13	D)	0
10)	Destructor has the sar A) !	me name as the cons B) ?	strud C)		eded D)	-
11)	Which of the following A) Copy constructor C) Default constructo		B)	tor ? Friend constructo Parameterized co		ructor
12)	In C++A) Scope resolution		-	amic memory alloo New		n. Membership access
13)	Cout is a/an A) Operator	B) Function	C)	Object	D)	Macro
14)	Which of the following A) A constructor is ca B) A constructor is ca C) A constructor is ca D) A constructor is ca	lled at the time of dec lled at the time of use lled at the time of de	clara e of clar	an object ation of a class		
15)	A destructor takes A) One	B) Two		Three	D)	No
16)	Which of the following A) Static function	is not the member of B) Friend function			D)	Virtual function
17)	Which of the following A) The types of argun C) The number of arg	nents are different	B)	overloading ? The order of argu Both A) and B)	men	t is different
18)	Which of the following A) Class can have more B) Class data member C) Pointer to structure D) Class data member	ember functions while ers are public by defa e or classes cannot b	e sti ult v e d	ructure cannot vhile that of structu eclared		·
19)	Which of the following A) Abstraction	concepts means wra B) Encapsulation		ng up of data and f Inheritance		ions together ? Polymorphism
20)	Which of the following A) Data hiding	concepts means dete B) Dynamic typing		•		



Seat	
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S.E. (Electrical) (Part – II) (Old) Examination, 2017 COMPUTER PROGRAMMING – C++

Day and Date: Monday, 22-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Each Section carries 40 marks.

- 2) All questions are compulsory.
- 3) Figures to right indicate full marks.

SECTION - I

2. Solve any four: (5×4=20)

- 1) Explain basic concepts of OOP.
- 2) Explain looping statements in C++.
- 3) With example discuss function declaration in C++.
- 4) Differentiate structure and class in C++.
- 5) What is destructor? How it is called? Give example.
- 6) What is function overloading, give example.
- 3. What is constructor and its types? With a proper code example, explain constructor overloading.

4. Explain with example:

A) Object as data type

B) Object as function argument.

OR

Explain following concepts:

- a) Declaration of structure
- b) Inline function.

10

10



SECTION - II

- 5. Solve any four: (5×4=20)
 - 1) What is concept of inheritance in OOP? Explain in brief.
 - 2) Explain:
 - a) Array declaration
 - b) Array initialization with code example.
 - 3) What a program to demonstrate overloading a unary operator?
 - 4) Explain type conversion/casting in C++.
 - 5) Write a short note on 'this' keyword in C++.
 - 6) Write a short note on pointers.
- 6. With code example explain:

10

- a) Friend function
- b) Virtual function.
- 7. With a proper code example explain various inheritance types in C++.

10

OR

With a suitable code example explain binary operator overloading.

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		ectrical) (Part – II) (COMPUTER PROG	(Old) Examination, RAMMING – C++	2017
•	Date : Monday, 22-5-2 0.00 a.m. to 1.00 p.m.	2017		Total Marks : 100
	3) Q. Ai 4) A i	ttempt all questions il . No. 1 is compulso l nswer book Page No. nswer MCQ/Objecti	n each Section. r y . It should be solved 3. Each question carri	n Page No. 3 only. Don't
Duration	: 30 Minutes	MCQ/Objective T	ype Questions	Marks : 20
	oose the correct answe Which of the following		folges 2	20
1)	A) Static function		C) Const function	D) Virtual function
2)	Which of the following A) The types of argur C) The number of argur	ments are different		ument is different
3)	Which of the following A) Class can have m B) Class data membe C) Pointer to structur D) Class data membe	ember functions whil ers are public by defa e or classes cannot t	e structure cannot ult while that of struct se declared	ure are private. ure are public by default
4)	Which of the following A) Abstraction	concepts means wra B) Encapsulation		functions together ? D) Polymorphism
5)	Which of the following A) Data hiding	•	•	hat method to invoke ? D) Dynamic loading
6)	class to outer world?	•	. 0	ecessary information of
7)	A) Encapsulation Which of the following			ber using this pointer?
1)	A) this->x	B) this.x	C) *this.x	D) *this-x
8)	Which of the following I) All operators can be II) We can change the A) Only I is true C) Only II is true	oe overloaded in C++	•	false

-2-



9)	What happens if the base and derived class contains definition of a function with same prototype? A) Compiler reports an error on compilation						
B) Only base class function will get called irrespective of object							
	C) Only derived class	fun	ction will get call	ed ir	respective of objective		
	D) Base class object v	vill c	all base class fun	ctio	n and derived class	obj	ect will call derived
4.0\	class function						
10)	Which inheritance type			give	en below ?		
	Class A: Public X, Pu	blic	Υ				
	A Mariti arral into a vita a			Β\	NA de la la la la cuita a a	_	
	A) Multilevel inheritanC) Hybrid inheritance			,	Multiple inheritand Hierarchical Inher		ce
11)	Which one of the follow		is correct about	,			
,	I. All function calls ar				•		
	II. All function calls ar	e re	solved at run tim	e in	OOPS.		
	A) Only II is correct			,	Both I and II are o		
	C) Only I is correct			,	Both I and II are in		
12)	Which of the following		•		•		
4.0\	A) Public	,	Private	,	Protected	,	Friend
13)	Which of the following A) Member variable						ss ? Classic function
14)	How many instances					D)	0
4 = \	A) 1	B)		,	13	D)	
15)	Destructor has the sar A) !	me r B)		C)	•	D)	. · •
16)	Which of the following	is n	ot a type of cons				
	A) Copy constructorC) Default constructo	r		,	Friend constructor Parameterized co		ructor
17\	•		orator is used for	,			
17)	In C++A) Scope resolution		Conditional		amic memory alloo New		Membership access
18)	Cout is a/an	D)	Franctica	O \	Ohiaat	Β)	Massa
4.0\	A) Operator	,	Function	•	Object	D)	Macro
19)	Which of the following A) A constructor is ca				ation of an object		
	B) A constructor is ca				-		
	C) A constructor is ca				-		
	D) A constructor is ca	lled	at the time of us	e of	a class		
20)	A destructor takes				T:	Γ,	N
	A) One	B)	Two	C)	Three	D)	No



Seat	
No.	

S.E. (Electrical) (Part – II) (Old) Examination, 2017 COMPUTER PROGRAMMING – C++

Day and Date: Monday, 22-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Each Section carries 40 marks.

- 2) All questions are compulsory.
- 3) Figures to right indicate full marks.

SECTION - I

2. Solve any four: (5×4=20)

- 1) Explain basic concepts of OOP.
- 2) Explain looping statements in C++.
- 3) With example discuss function declaration in C++.
- 4) Differentiate structure and class in C++.
- 5) What is destructor? How it is called? Give example.
- 6) What is function overloading, give example.
- 3. What is constructor and its types? With a proper code example, explain constructor overloading.

4. Explain with example:

- A) Object as data type
- B) Object as function argument.

OR

Explain following concepts:

- a) Declaration of structure
- b) Inline function.

10



SECTION - II

- 5. Solve any four: (5×4=20)
 - 1) What is concept of inheritance in OOP? Explain in brief.
 - 2) Explain:
 - a) Array declaration
 - b) Array initialization with code example.
 - 3) What a program to demonstrate overloading a unary operator?
 - 4) Explain type conversion/casting in C++.
 - 5) Write a short note on 'this' keyword in C++.
 - 6) Write a short note on pointers.
- 6. With code example explain:

10

- a) Friend function
- b) Virtual function.
- 7. With a proper code example explain various inheritance types in C++.

10

OR

With a suitable code example explain binary operator overloading.

Set S

6) Fault level means

c) Fault power factor

a) Voltage at the point of fault

SLR-VB-314

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T.E. (Electrical Engineering) Part – I (CGPA) Examination, 2017 **POWER SYSTEM ANALYSIS**

Day and Date : Thursday, 4-5-2017	Max. Marks: 70
Time: 10.00 a.m. to 1.00 p.m.	

Instructions: 1) **All** questions are **compulsory**.

- 2) Assume suitable data if necessary.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

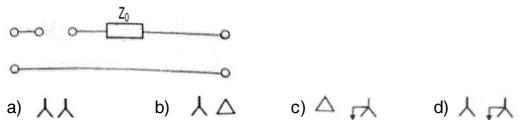
b) Fault current

d) Fault MVA

		MCQ/Objective T	ype	Questions		
Durati	on : 30 Minutes	•	•			Marks: 14
1. CI	noose the correct ans		(14×1=14)			
 The magnitude of p.u. impedance of a transformer determined from t side and LT side of a transformer are a) Unequal b) Equal c) Depends on the turn's ratio d) None of the above 						the HT
2	.) A 25MVA, 33 kV tra at a new base of 50 a) 16.2	nsformer has a p.u.	ld b		The p.u. impo	edance
3) The p.u. value of a 20hm resistor at 100MVA base and 10kV base voltagep.u.					ltage is	
	a) 4	b) 2	c)	1/2	d) 0.2	
4) Normally Z _{bus} mati a) Null matrix	rix is a b) Sparse matrix	c)	Full matrix	d) Unity m	atrix
5) For accurate load f method isa) Newton-Raphsoc) Decoupled New	n method	b)	ge power syste Gauss-Seidel r None of these		t



- The three phase SC MVA to be interrupted by a circuit breaker in a power system is given by
 - a) $\sqrt{3} \times \text{post fault line voltage in kV} \times \text{SC current in kA}$
 - b) 3 × prefault line voltage in kV × SC current in kA
 - c) $\sqrt{3}$ x prefault line voltage in kV x SC current in kA
 - d) $\frac{1}{\sqrt{3}}$ × prefault line voltage in kV × SC current in kA
- 8) A balanced 3-phase system consist of
 - a) Zero sequence currents only
 - b) Positive sequence currents only
 - c) Negative sequence currents only
 - d) Zero, positive and negative sequence currents only
- 9) Symmetrical components are used in power system for the analysis of
 - a) Balanced three phase faults
 - b) Unbalanced faults
 - c) Normal power system under steady conditions
 - d) Stability of system
- Below figure shows the zero sequence network of transformer. Transformer connections are



- 11) The three sequence voltages at the point of fault in a power system are found to be equal. The nature of fault is
 - a) L-G
- b) L-L-L
- c) L-L
- d) L-L-G

- 12) Equal area criterion is used to study
 - a) Load flow analysis

b) Fault analysis

c) Stability analysis

- d) None of these
- 13) Stability of a power system can be improved by
 - a) Using series compensators
 - b) Using parallel transmission lines
 - c) Reducing voltage of transmission line
 - d) Both a) and b)
- 14) Lightening arresters should be located
 - a) Near the circuit breaker
- b) Away from circuit breaker
- c) Near the transformer
- d) Away from transformer

Set P



Seat	
No.	

T.E. (Electrical Engineering) Part – I (CGPA) Examination, 2017 POWER SYSTEM ANALYSIS

Day and Date: Thursday, 4-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

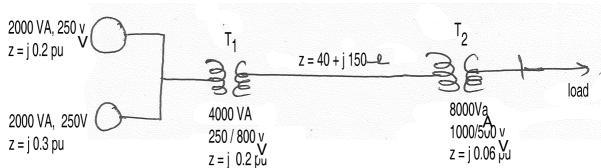
2) Assume suitable data if necessary.

SECTION - I

2. Solve any four:

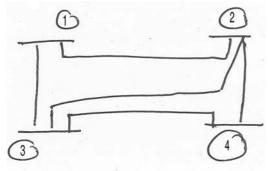
 $(4 \times 3 = 12)$

- a) Explain short circuit of synchronous machine at no load condition.
- b) Express the representation of transformer model in per unit (pu) system.
- c) Draw per unit impedance diagram represented on 5000 VA base and common system base voltage of 250 V for G1



d) Find the Y bus for the given data.

Line	R	X
1 - 2	0.05	0.15
1 - 3	0.1	0.3
2 - 3	0.15	0.45
2 - 4	0.1	0.3
3 - 4	0.05	0.15



e) Explain per unit representation of 3 supply system.



3. Solve any two:

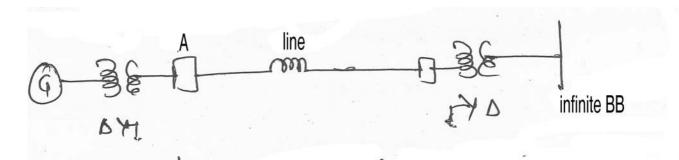
 $(8 \times 2 = 16)$

a) The system shown in figure below is delivering 50 MVA at 11kV, 0.8 lagging pf into a bus which may be regarded as infinite. Particulars of various components are Gen^r = 60 MVA, 12 kV, Xd' = 0.35 pu.

Transformer (each) = 80 MVA, 12/66 kV, X = 0.08 pu.

Line = Reactance 12 Ω , resistance negligible.

Calculate the symmetrical current that the circuit breaker A and B will be called upon to interrupt in the event of 3 \(\phi \) fault occurring at f near the circuit breaker B.



b) For the sample system generators are connected to all the three buses, while load are at bus 2 and 3. Values of reactive and real powers are listed in table. All the buses other than slack buses are PQ. Assuming flat voltage start, find voltage and bus angle at three buses at end of first GS iteration.

Bus	Pi pu	Qi pu	Vi pu	Remark
1	_	_	1.04 < 00	slack bus
2	0.5	-0.2	_	PQ bus
3	-1.0	0.5	_	PG bus
4	0.3	-0.1	_	PG bus

The calculated Y bus for the above sample system is as follows:

$$\begin{bmatrix} 3 - j9 & -2 + j6 & -1 + j3 & 0 \\ -2 + j6 & 3.666 - j11 & -0.666 + j2 & -1 + j3 \\ -1 + j3 & -0.666 + j2 & 3.666 - j11 & -2 + j6 \\ 0 & -1 + j3 & -2 + j6 & 3 - j9 \end{bmatrix}$$

c) Derive an expression for Newton Raphson Algorithm method. Also draw a flow chart.



SECTION - II

4. Solve any four: (4×3=12)

- a) A 2 pole, 50Hz, 11kV, turbo alternator has a rating of 100mw, pf of 0.85 lagging. The rotor has a moment of inertia of a 10000 kg-m. Calculate H & M.
- b) Write detail note on zero sequence network of 3 \(\phi \) transformer for the different types of connection with the help of neat diagram.
- c) The phase voltage across a certain unbalanced load are given as (r = 176 j132, Gy = -128 j96, Gb = -160 + j 100). Find the symmetrical components.
- d) Compare symmetrical and unsymmetrical fault.
- e) Explain the principle of lightening arrestor, explain any one brief.

5. Solve any two: (8×2=16)

- a) Draw a diagram showing interconnection of sequence n/w for size to size fault. Derive equation for sequence currents and voltages.
- b) A synchronous generator is rated 25 MVA, 11 kV, it is star connected with the neutral point is solidly grounded. The generator is operating at rated no load condition at rated voltage. Its reactances are $x_1'' = x2 = 0.2$ and x0 = 0.08 pu. Calculate the symmetrical subtransient line currents for single line to ground fault. Also calculate the actual current and sc MVA of SLG fault.
- c) The voltages at the terminals of a balanced load consisting of three 20Ω Y connected resistors are $200 \angle 0^\circ$, $100 \angle 255.50^\circ$ and $200 \angle 151^\circ$ V. Find the like currents from the symmetrical components of the line voltage in the neutral of the load is isolated. What relation exists between the symmetrical component of size and phase voltages. Find the power expanded in three 20Ω resistor from symmetrical components of current and voltages.

Set P

Seat	
No.	

Set Q

Max. Marks: 70

T.E. (Electrical Engineering) Part – I (CGPA) Examination, 2017 POWER SYSTEM ANALYSIS

Day and Date: Thursday, 4-5-2017

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Assume suitable data if necessary.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

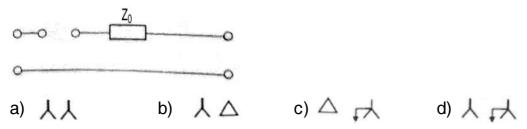
MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 1) A balanced 3-phase system consist of
 - a) Zero sequence currents only
 - b) Positive sequence currents only
 - c) Negative sequence currents only
 - d) Zero, positive and negative sequence currents only
- 2) Symmetrical components are used in power system for the analysis of
 - a) Balanced three phase faults
 - b) Unbalanced faults
 - c) Normal power system under steady conditions
 - d) Stability of system
- 3) Below figure shows the zero sequence network of transformer. Transformer connections are



- 4) The three sequence voltages at the point of fault in a power system are found to be equal. The nature of fault is
 - a) L-G
- b) L-L-L
- c) L-L
- d) L-L-G



5)	•		b) Fault analysisd) None of these					
6)	Stability of a power system can be improved by a) Using series compensators b) Using parallel transmission lines c) Reducing voltage of transmission line d) Both a) and b)							
7)	Lightening arresters should be located a) Near the circuit breaker c) Near the transformer	b)	d b) Away from circuit breaker d) Away from transformer					
8)	The magnitude of p.u. impedance of a side and LT side of a transformer are a) Unequal c) Depends on the turn's ratio	a transformer determined from the HT b) Equal d) None of the above						
9)	A 25MVA, 33 kV transformer has a p.u.	-			p.u. impedance			
-,	at a new base of 50MVA at 11kV would				p			
	a) 16.2 b) 10.4	c)	14.4	d)	12.2			
10)	The p.u. value of a 20hm resistor at 10p.u.	NOC	IVA base and 10	OkV	base voltage is			
	a) 4 b) 2	c)	1/2	d)	0.2			
11)	Normally Z_{bus} matrix is a a) Null matrix b) Sparse matrix	c)	Full matrix	d)	Unity matrix			
12)	For accurate load flow calculations or	ı la	rge power syste	ms,	the best			
	method is a) Newton-Raphson method c) Decoupled Newton method		Gauss-Seidel method None of these					
13)	Fault level meansa) Voltage at the point of faultc) Fault power factor		b) Fault current d) Fault MVA					
14)	The three phase SC MVA to be intersystem is given by	•		brea	aker in a power			
	a) $\sqrt{3} \times \text{post fault line voltage in kV} \times \text{SC current in kA}$ b) $3 \times \text{prefault line voltage in kV} \times \text{SC current in kA}$ c) $\sqrt{3} \times \text{prefault line voltage in kV} \times \text{SC current in kA}$							
	d) $\frac{1}{\sqrt{3}}$ × prefault line voltage in kV ×	SC	current in kA					



Seat	
No.	

T.E. (Electrical Engineering) Part – I (CGPA) Examination, 2017 POWER SYSTEM ANALYSIS

Day and Date: Thursday, 4-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

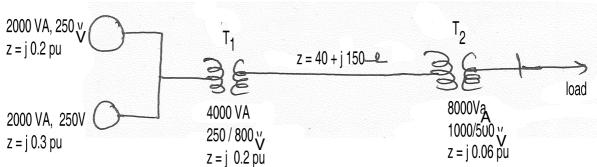
2) Assume suitable data if necessary.

SECTION-I

2. Solve any four:

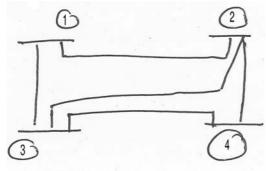
 $(4 \times 3 = 12)$

- a) Explain short circuit of synchronous machine at no load condition.
- b) Express the representation of transformer model in per unit (pu) system.
- c) Draw per unit impedance diagram represented on 5000 VA base and common system base voltage of 250 V for G1



d) Find the Y bus for the given data.

Line	R	X
1 - 2	0.05	0.15
1 - 3	0.1	0.3
2 - 3	0.15	0.45
2 - 4	0.1	0.3
3 - 4	0.05	0.15



e) Explain per unit representation of 3 supply system.



3. Solve any two:

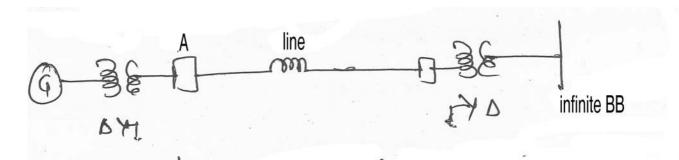
 $(8 \times 2 = 16)$

a) The system shown in figure below is delivering 50 MVA at 11kV, 0.8 lagging pf into a bus which may be regarded as infinite. Particulars of various components are Gen^r = 60 MVA, 12 kV, Xd' = 0.35 pu.

Transformer (each) = 80 MVA, 12/66 kV, X = 0.08 pu.

Line = Reactance 12 Ω , resistance negligible.

Calculate the symmetrical current that the circuit breaker A and B will be called upon to interrupt in the event of 3 \(\phi \) fault occurring at f near the circuit breaker B.



b) For the sample system generators are connected to all the three buses, while load are at bus 2 and 3. Values of reactive and real powers are listed in table. All the buses other than slack buses are PQ. Assuming flat voltage start, find voltage and bus angle at three buses at end of first GS iteration.

Bus	Pi pu	Qi pu	Vi pu	Remark
1	_	_	1.04 < 00	slack bus
2	0.5	-0.2	_	PQ bus
3	-1.0	0.5	_	PG bus
4	0.3	-0.1	_	PG bus

The calculated Y bus for the above sample system is as follows:

$$\begin{bmatrix} 3-j9 & -2+j6 & -1+j3 & 0 \\ -2+j6 & 3.666-j11 & -0.666+j2 & -1+j3 \\ -1+j3 & -0.666+j2 & 3.666-j11 & -2+j6 \\ 0 & -1+j3 & -2+j6 & 3-j9 \end{bmatrix}$$

c) Derive an expression for Newton Raphson Algorithm method. Also draw a flow chart.



SECTION - II

4. Solve any four: (4×3=12)

- a) A 2 pole, 50Hz, 11kV, turbo alternator has a rating of 100mw, pf of 0.85 lagging. The rotor has a moment of inertia of a 10000 kg-m. Calculate H & M.
- b) Write detail note on zero sequence network of 3 \(\phi \) transformer for the different types of connection with the help of neat diagram.
- c) The phase voltage across a certain unbalanced load are given as (r = 176 j132, Gy = -128 j96, Gb = -160 + j 100). Find the symmetrical components.
- d) Compare symmetrical and unsymmetrical fault.
- e) Explain the principle of lightening arrestor, explain any one brief.

5. Solve any two: (8×2=16)

- a) Draw a diagram showing interconnection of sequence n/w for size to size fault. Derive equation for sequence currents and voltages.
- b) A synchronous generator is rated 25 MVA, 11 kV, it is star connected with the neutral point is solidly grounded. The generator is operating at rated no load condition at rated voltage. Its reactances are $x_1'' = x2 = 0.2$ and x0 = 0.08 pu. Calculate the symmetrical subtransient line currents for single line to ground fault. Also calculate the actual current and sc MVA of SLG fault.
- c) The voltages at the terminals of a balanced load consisting of three 20Ω Y connected resistors are $200 \angle 0^\circ$, $100 \angle 255.50^\circ$ and $200 \angle 151^\circ$ V. Find the like currents from the symmetrical components of the line voltage in the neutral of the load is isolated. What relation exists between the symmetrical component of size and phase voltages. Find the power expanded in three 20Ω resistor from symmetrical components of current and voltages.

Set Q

SLR-VB-314

Seat	
No.	

Set R

T.E. (Electrical Engineering) Part – I (CGPA) Examination, 2017 POWER SYSTEM ANALYSIS

Day and Date: Thursday, 4-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Assume suitable data if necessary.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

- 1) For accurate load flow calculations on large power systems, the best method is
 - a) Newton-Raphson method
- b) Gauss-Seidel method
- c) Decoupled Newton method
- d) None of these

- 2) Fault level means
 - a) Voltage at the point of fault
- b) Fault current

c) Fault power factor

- d) Fault MVA
- The three phase SC MVA to be interrupted by a circuit breaker in a power system is given by
 - a) $\sqrt{3} \times \text{post fault line voltage in kV} \times \text{SC current in kA}$
 - b) $3 \times$ prefault line voltage in kV \times SC current in kA
 - c) $\sqrt{3}$ x prefault line voltage in kV x SC current in kA
 - d) $\frac{1}{\sqrt{3}}$ × prefault line voltage in kV × SC current in kA
- 4) A balanced 3-phase system consist of
 - a) Zero sequence currents only
 - b) Positive sequence currents only
 - c) Negative sequence currents only
 - d) Zero, positive and negative sequence currents only



5)	Symmetrical comp a) Balanced three b) Unbalanced fau c) Normal power s d) Stability of syste	phase faults Its system under stead		·	the	analysis of
6)	Below figure shows connections are	s the zero sequenc	e n	etwork of transfo	orm	er. Transformer
	0-0 0 Z ₀	O				
	0	O management of the same of th				
	a) 人人	b) 人 △	c)	\triangle \forall	d)	人,人
7)	The three sequence		oint	of fault in a powe	er s	ystem are found
	to be equal. The na a) L-G	b) L-L-L	c)	L-L	d)	L-L-G
8)	Equal area criterion a) Load flow analy c) Stability analysi	sis		Fault analysis None of these		
9)	Stability of a power a) Using series con b) Using parallel tr c) Reducing voltage d) Both a) and b)	mpensators ansmission lines	•	•		
10)	Lightening arrester a) Near the circuit c) Near the transfer	breaker	b)	Away from circ Away from tran		
11)	The magnitude of p side and LT side of a) Unequal c) Depends on the	a transformer are	b)	ansformer deter Equal None of the abo		ned from the HT
12)	A 25MVA, 33 kV tra at a new base of 50	MVA at 11kV wou	ıld b	e		
10\	a) 16.2	b) 10.4	•	14.4	,	12.2
13)	The p.u. value of a p.u.	ZOHIH TESISIOI AL T	UUIN	IVA Dase and T	UKV	base voltage is
44	a) 4	b) 2	c)	1/2	d)	0.2
14)	Normally Z _{bus} mate a) Null matrix	rıx ıs a b) Sparse matrix	(c)	Full matrix	d)	Unity matrix
						Set R



Seat	
No.	

T.E. (Electrical Engineering) Part – I (CGPA) Examination, 2017 POWER SYSTEM ANALYSIS

Day and Date: Thursday, 4-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

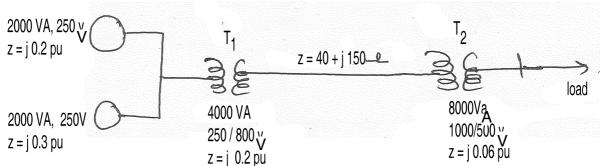
2) Assume suitable data if necessary.

SECTION-I

2. Solve any four:

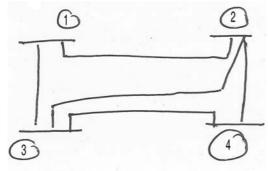
 $(4 \times 3 = 12)$

- a) Explain short circuit of synchronous machine at no load condition.
- b) Express the representation of transformer model in per unit (pu) system.
- c) Draw per unit impedance diagram represented on 5000 VA base and common system base voltage of 250 V for G1



d) Find the Y bus for the given data.

Line	R	X
1 - 2	0.05	0.15
1 - 3	0.1	0.3
2 - 3	0.15	0.45
2 - 4	0.1	0.3
3 - 4	0.05	0.15



e) Explain per unit representation of 3 supply system.



3. Solve any two:

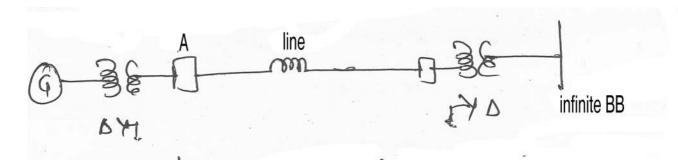
 $(8 \times 2 = 16)$

a) The system shown in figure below is delivering 50 MVA at 11kV, 0.8 lagging pf into a bus which may be regarded as infinite. Particulars of various components are Gen^r = 60 MVA, 12 kV, Xd' = 0.35 pu.

Transformer (each) = 80 MVA, 12/66 kV, X = 0.08 pu.

Line = Reactance 12 Ω , resistance negligible.

Calculate the symmetrical current that the circuit breaker A and B will be called upon to interrupt in the event of 3 \(\phi \) fault occurring at f near the circuit breaker B.



b) For the sample system generators are connected to all the three buses, while load are at bus 2 and 3. Values of reactive and real powers are listed in table. All the buses other than slack buses are PQ. Assuming flat voltage start, find voltage and bus angle at three buses at end of first GS iteration.

Bus	Pi pu	Qi pu	Vi pu	Remark
1	_	_	1.04 < 00	slack bus
2	0.5	-0.2	_	PQ bus
3	-1.0	0.5	_	PG bus
4	0.3	-0.1	_	PG bus

The calculated Y bus for the above sample system is as follows:

$$\begin{bmatrix} 3-j9 & -2+j6 & -1+j3 & 0 \\ -2+j6 & 3.666-j11 & -0.666+j2 & -1+j3 \\ -1+j3 & -0.666+j2 & 3.666-j11 & -2+j6 \\ 0 & -1+j3 & -2+j6 & 3-j9 \end{bmatrix}$$

c) Derive an expression for Newton Raphson Algorithm method. Also draw a flow chart.



SECTION - II

4. Solve any four: (4×3=12)

- a) A 2 pole, 50Hz, 11kV, turbo alternator has a rating of 100mw, pf of 0.85 lagging. The rotor has a moment of inertia of a 10000 kg-m. Calculate H & M.
- b) Write detail note on zero sequence network of 3 \(\phi \) transformer for the different types of connection with the help of neat diagram.
- c) The phase voltage across a certain unbalanced load are given as (r = 176 j132, Gy = -128 j96, Gb = -160 + j 100). Find the symmetrical components.
- d) Compare symmetrical and unsymmetrical fault.
- e) Explain the principle of lightening arrestor, explain any one brief.

5. Solve any two: (8×2=16)

- a) Draw a diagram showing interconnection of sequence n/w for size to size fault. Derive equation for sequence currents and voltages.
- b) A synchronous generator is rated 25 MVA, 11 kV, it is star connected with the neutral point is solidly grounded. The generator is operating at rated no load condition at rated voltage. Its reactances are $x_1'' = x2 = 0.2$ and x0 = 0.08 pu. Calculate the symmetrical subtransient line currents for single line to ground fault. Also calculate the actual current and sc MVA of SLG fault.
- c) The voltages at the terminals of a balanced load consisting of three 20Ω Y connected resistors are $200 \angle 0^\circ$, $100 \angle 255.50^\circ$ and $200 \angle 151^\circ$ V. Find the like currents from the symmetrical components of the line voltage in the neutral of the load is isolated. What relation exists between the symmetrical component of size and phase voltages. Find the power expanded in three 20Ω resistor from symmetrical components of current and voltages.

Set R

Seat	
No.	

Set S

Max. Marks: 70

T.E. (Electrical Engineering) Part – I (CGPA) Examination, 2017 POWER SYSTEM ANALYSIS

Day and Date: Thursday, 4-5-2017

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Assume suitable data if necessary.
- 3) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

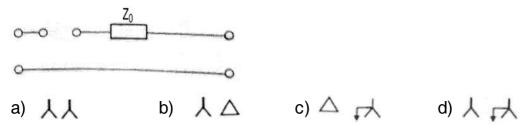
MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

 $(14 \times 1 = 14)$

1) Below figure shows the zero sequence network of transformer. Transformer connections are



- 2) The three sequence voltages at the point of fault in a power system are found to be equal. The nature of fault is
 - a) L-G
- b) L-L-L
- c) L-L
- d) L-L-G

- 3) Equal area criterion is used to study
 - a) Load flow analysis

b) Fault analysis

c) Stability analysis

- d) None of these
- 4) Stability of a power system can be improved by
 - a) Using series compensators
 - b) Using parallel transmission lines
 - c) Reducing voltage of transmission line
 - d) Both a) and b)



5)	Lightening arresters should be located				
	•		o) Away from circuit breaker d) Away from transformer		
6)	6) The magnitude of p.u. impedance of a transformer determined from the side and LT side of a transformer are				
	a) Unequalc) Depends on the turn's ratio		Equal None of the abo)Ve	
7)	A 25MVA, 33 kV transformer has a p.u.	•			p.u. impedance
,	at a new base of 50MVA at 11kV wou	ld b	e		
	a) 16.2 b) 10.4	,	14.4	,	12.2
8)	The p.u. value of a 20hm resistor at 10p.u.	NOC	IVA base and 10)kV	base voltage is
	a) 4 b) 2	c)	1/2	d)	0.2
9)	Normally Z _{bus} matrix is a a) Null matrix b) Sparse matrix	c)	Full matrix	d)	Unity matrix
10)	For accurate load flow calculations or method is	ı la	rge power syste	ms,	the best
	a) Newton-Raphson methodc) Decoupled Newton method	,	Gauss-Seidel m None of these	neth	od
11)	Fault level means				
	a) Voltage at the point of faultc) Fault power factor		Fault current Fault MVA		
12)	The three phase SC MVA to be interrupted by a circuit breaker in a power system is given by				
	a) $\sqrt{3} \times \text{post fault line voltage in kV} \times$				
	b) $3 \times$ prefault line voltage in kV \times SC c) $\sqrt{8} \times$ prefault line voltage in kV \times	SC	current in kA		
	d) $\frac{\sqrt{3}}{\sqrt{3}}$ × prefault line voltage in kV ×	SC	current in kA		
13)	A balanced 3-phase system consist of	f			
	a) Zero sequence currents only				
	b) Positive sequence currents onlyc) Negative sequence currents only				
	d) Zero, positive and negative seque	nce	currents only		
14)	Symmetrical components are used in	ро	wer system for t	he a	analysis of
	a) Balanced three phase faults				
	b) Unbalanced faultsc) Normal power system under stead	lv c	onditions		
	d) Stability of system	., 0	2.13.1.3110		



Seat	
No.	

T.E. (Electrical Engineering) Part – I (CGPA) Examination, 2017 POWER SYSTEM ANALYSIS

Day and Date: Thursday, 4-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

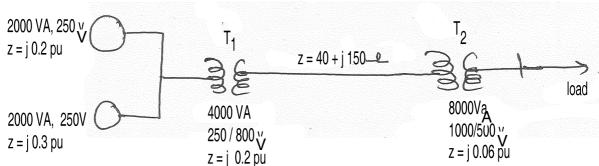
2) Assume suitable data if necessary.

SECTION-I

2. Solve any four:

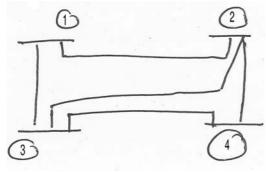
 $(4 \times 3 = 12)$

- a) Explain short circuit of synchronous machine at no load condition.
- b) Express the representation of transformer model in per unit (pu) system.
- c) Draw per unit impedance diagram represented on 5000 VA base and common system base voltage of 250 V for G1



d) Find the Y bus for the given data.

Line	R	X
1 - 2	0.05	0.15
1 - 3	0.1	0.3
2 - 3	0.15	0.45
2 - 4	0.1	0.3
3 - 4	0.05	0.15



e) Explain per unit representation of 3 supply system.



3. Solve any two:

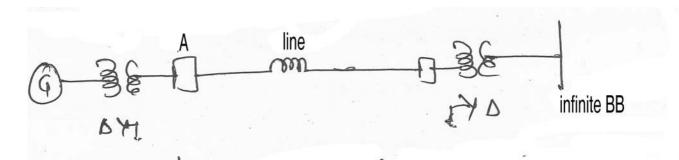
 $(8 \times 2 = 16)$

a) The system shown in figure below is delivering 50 MVA at 11kV, 0.8 lagging pf into a bus which may be regarded as infinite. Particulars of various components are Gen^r = 60 MVA, 12 kV, Xd' = 0.35 pu.

Transformer (each) = 80 MVA, 12/66 kV, X = 0.08 pu.

Line = Reactance 12 Ω , resistance negligible.

Calculate the symmetrical current that the circuit breaker A and B will be called upon to interrupt in the event of 3 \(\phi \) fault occurring at f near the circuit breaker B.



b) For the sample system generators are connected to all the three buses, while load are at bus 2 and 3. Values of reactive and real powers are listed in table. All the buses other than slack buses are PQ. Assuming flat voltage start, find voltage and bus angle at three buses at end of first GS iteration.

Bus	Pi pu	Qi pu	Vi pu	Remark
1	_	_	1.04 < 00	slack bus
2	0.5	-0.2	_	PQ bus
3	-1.0	0.5	_	PG bus
4	0.3	-0.1	_	PG bus

The calculated Y bus for the above sample system is as follows:

$$\begin{bmatrix} 3-j9 & -2+j6 & -1+j3 & 0 \\ -2+j6 & 3.666-j11 & -0.666+j2 & -1+j3 \\ -1+j3 & -0.666+j2 & 3.666-j11 & -2+j6 \\ 0 & -1+j3 & -2+j6 & 3-j9 \end{bmatrix}$$

c) Derive an expression for Newton Raphson Algorithm method. Also draw a flow chart.



SECTION - II

4. Solve any four: (4×3=12)

- a) A 2 pole, 50Hz, 11kV, turbo alternator has a rating of 100mw, pf of 0.85 lagging. The rotor has a moment of inertia of a 10000 kg-m. Calculate H & M.
- b) Write detail note on zero sequence network of 3 \(\phi \) transformer for the different types of connection with the help of neat diagram.
- c) The phase voltage across a certain unbalanced load are given as (r = 176 j132, Gy = -128 j96, Gb = -160 + j 100). Find the symmetrical components.
- d) Compare symmetrical and unsymmetrical fault.
- e) Explain the principle of lightening arrestor, explain any one brief.

5. Solve any two: (8×2=16)

- a) Draw a diagram showing interconnection of sequence n/w for size to size fault. Derive equation for sequence currents and voltages.
- b) A synchronous generator is rated 25 MVA, 11 kV, it is star connected with the neutral point is solidly grounded. The generator is operating at rated no load condition at rated voltage. Its reactances are $x_1'' = x2 = 0.2$ and x0 = 0.08 pu. Calculate the symmetrical subtransient line currents for single line to ground fault. Also calculate the actual current and sc MVA of SLG fault.
- c) The voltages at the terminals of a balanced load consisting of three 20Ω Y connected resistors are $200 \angle 0^\circ$, $100 \angle 255.50^\circ$ and $200 \angle 151^\circ$ V. Find the like currents from the symmetrical components of the line voltage in the neutral of the load is isolated. What relation exists between the symmetrical component of size and phase voltages. Find the power expanded in three 20Ω resistor from symmetrical components of current and voltages.

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T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date: Friday, 5-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

14

- 1) Economics is the science which studies
 - A) Moral things
 - B) Human behaviour with reference to human needs and its means
 - C) Only profits and loss in the business
 - D) Human psychology
- 2) Inventory is nothing but
 - A) Infrastructure in the business
 - B) Shares of the businessman
 - C) List of movable items required to produce the product in the factory
 - D) Production cost of the product
- 3) In ABC analysis, 'C' items are
 - A) Maximum in value minimum numbers
 - B) Medium in value medium in numbers
 - C) Low valued and maximum in numbers
 - D) None of the above
- 4) Joint stock company has
 - A) Unlimited liability
 - B) Limited liability
 - C) No liability
 - D) None of the above
- 5) Controlling function includes
 - A) Prepare a strategy plan
 - B) Guiding the staff wherever necessary
 - C) Measuring the actual results in relations to the plans made
 - D) Identification and classification of activities

P.T.O.

6)	Wha	at is CSIR ?
	A)	Council of Sub Indu
	B)	Council of Scientific

- ustrial Research
- and Industrial Research
- C) Council for State Industrial Research
- D) Commission for State and Industry Review
- 7) The coal reserves in India are sufficient only for
 - A) Approximately next 20 years
 - B) Approximately next 70 years
 - C) Approximately next 130 years
 - D) Approximately next 5 years
- 8) 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
- 9) Short term planning means
 - A) Period upto one year
 - B) More than two year
 - C) More than one year but less than two year
 - D) Period upto three year
- 10) Working hours of adults in factory is
 - A) 49 hours in a week

B) 30 hours in a week

C) 51 hours in a week

- D) 48 hours in a week
- 11) The Factory Act of 1948 came into existence on
 - A) 26th Dec. 1948

B) 1st April 1948

C) 1st April 1949

- D) 2nd October 1948
- 12) The opportunity cost of factor of production with specific use is
 - A) Very high
- B) Infinite
- C) Zero
- D) Constant

- 13) High tech industries may find it difficult to set
 - A) Short term plans

B) Intermediate plans

C) Long term plans

- D) Co-ordinating plans
- 14) Function of Entrepreneur is
 - A) To bear risk and uncertainty
 - B) To control and manage efficiency
 - C) To increase co-ordination
 - D) All of above

Set P



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T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEM	ENT
y and Date : Friday, 5-5-2017 ne : 10.00 a.m. to 1.00 p.m.	Marks : 56
SECTION - I	
Write an short note on (any four):	(4×4=16)
A) Micro and Macro economics.	
B) Science and Technological development in India since independence.	
C) Features of Indian Economy.	
D) EOQ	
E) Advantages and Disadvantages of partnership firm.	
A) Explain in detail what is make or buy decision? List the factors influencing make decision.	or buy
B) Distinguish between Private and Public limited company. List the advantage disadvantages?	je and
OR	
B) Discuss the problems of power sector and suggest the remedies.	6
SECTION - II	
Write a short note on (any four):	(4×4=16)
A) Functions of Management.	
B) Factory Act 1948	
C) Management Information System	
D) Entrepreneurship Development	
E) Industrial safety and its advantages.	
Explain in detail PERT and CPM methods with suitable diagram in Project Implement	ation. 6
List the stages of setting of SSI.	6
OR	
Explain Electricity Act, 2003 and suggest measures to reduce theft of Electricity.	
ה	ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMINATION Date: Friday, 5-5-2017 e: 10.00 a.m. to 1.00 p.m. SECTION – I Write an short note on (any four): A) Micro and Macro economics. B) Science and Technological development in India since independence. C) Features of Indian Economy. D) EOQ E) Advantages and Disadvantages of partnership firm. A) Explain in detail what is make or buy decision? List the factors influencing make decision. B) Distinguish between Private and Public limited company. List the advantage disadvantages? OR B) Discuss the problems of power sector and suggest the remedies. SECTION – II Write a short note on (any four): A) Functions of Management. B) Factory Act 1948 C) Management Information System D) Entrepreneurship Development E) Industrial safety and its advantages. Explain in detail PERT and CPM methods with suitable diagram in Project Implement. List the stages of setting of SSI. OR

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i	•	, ,	•	PA) Examination, 20 NDUSTRIAL MANA	
-	nd Date : Friday, 5-5-2 10.00 a.m. to 1.00 p.				Max. Marks : 70
	,	Answer Book Page Answer MCQ/Obje	No. 3. ective ty	should be solved in first of Each question carries one proper page Note (P/Q/R/S) on Top of Page Note (P/Q/R/S)	e mark. Io. 3 only. Don't
Duratio	on : 30 Minutes	MCQ/Objectiv	е Туре	Questions	Marks : 14
1. Cl	hoose the correct ans	Mor :			14
					14
1,	Measures to tackleA) To stepping up	0, 1			
	B) Control over co	·			
	C) Expansion of e	•			
	D) All of the above	•			
2)) Short term planning	means			
ŕ	A) Period upto one	e year			
	B) More than two	year			
	C) More than one	year but less than tw	vo year		
	D) Period upto three	ee year			
3)) Working hours of a	dults in factory is			
	A) 49 hours in a w		•	30 hours in a week	
	C) 51 hours in a w	eek	D)	48 hours in a week	
4)	•	1948 came into exist			
	A) 26 th Dec. 1948		,	1 st April 1948	
	C) 1 st April 1949		,	2 nd October 1948	
5	The appartunity cas	et of factor of produc	tion with	enacific usa is	

6) High tech industries may find it difficult to set

A) Short term plans B) Intermediate plans

B) Infinite

C) Long term plans D) Co-ordinating plans

7) Function of Entrepreneur is

A) Very high

A) To bear risk and uncertainty B) To control and manage efficiency

C) Zero

C) To increase co-ordination D) All of above D) Constant



- 8) Economics is the science which studies
 - A) Moral things
 - B) Human behaviour with reference to human needs and its means
 - C) Only profits and loss in the business
 - D) Human psychology
- 9) Inventory is nothing but
 - A) Infrastructure in the business
 - B) Shares of the businessman
 - C) List of movable items required to produce the product in the factory
 - D) Production cost of the product
- 10) In ABC analysis, 'C' items are
 - A) Maximum in value minimum numbers
 - B) Medium in value medium in numbers
 - C) Low valued and maximum in numbers
 - D) None of the above
- 11) Joint stock company has
 - A) Unlimited liability
 - B) Limited liability
 - C) No liability
 - D) None of the above
- 12) Controlling function includes
 - A) Prepare a strategy plan
 - B) Guiding the staff wherever necessary
 - C) Measuring the actual results in relations to the plans made
 - D) Identification and classification of activities
- 13) What is CSIR?
 - A) Council of Sub Industrial Research
 - B) Council of Scientific and Industrial Research
 - C) Council for State Industrial Research
 - D) Commission for State and Industry Review
- 14) The coal reserves in India are sufficient only for
 - A) Approximately next 20 years
 - B) Approximately next 70 years
 - C) Approximately next 130 years
 - D) Approximately next 5 years

Set Q



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	T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT	
•	and Date: Friday, 5-5-2017 Marks e: 10.00 a.m. to 1.00 p.m.	: 56
	SECTION - I	
2.	Write an short note on (any four): A) Micro and Macro economics. B) Science and Technological development in India since independence. C) Features of Indian Economy. D) EOQ E) Advantages and Disadvantages of partnership firm.	:16)
3.	 A) Explain in detail what is make or buy decision? List the factors influencing make or buy decision. B) Distinguish between Private and Public limited company. List the advantage and disadvantages? 	6
	B) Discuss the problems of power sector and suggest the remedies.	6
	SECTION - II	
4.	Write a short note on (any four): A) Functions of Management. B) Factory Act 1948 C) Management Information System D) Entrepreneurship Development E) Industrial safety and its advantages.	16)
5.	Explain in detail PERT and CPM methods with suitable diagram in Project Implementation.	6
6.	List the stages of setting of SSI. OR	6
	Explain Electricity Act, 2003 and suggest measures to reduce theft of Electricity.	

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T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date: Friday, 5-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

14

- Controlling function includes
 Prepare a strategy plan
 - B) Guiding the staff wherever necessary
 - C) Measuring the actual results in relations to the plans made
 - D) Identification and classification of activities
- 2) What is CSIR?
 - A) Council of Sub Industrial Research
 - B) Council of Scientific and Industrial Research
 - C) Council for State Industrial Research
 - D) Commission for State and Industry Review
- 3) The coal reserves in India are sufficient only for
 - A) Approximately next 20 years
 - B) Approximately next 70 years
 - C) Approximately next 130 years
 - D) Approximately next 5 years
- 4) 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
- 5) Short term planning means
 - A) Period upto one year
 - B) More than two year
 - C) More than one year but less than two year
 - D) Period upto three year

6)	Working hours of adults in factory is	
	A) 49 hours in a week	B) 30 hours in a week
	C) 51 hours in a week	D) 48 hours in a week
7)	The Factory Act of 1948 came into	
	A) 26 th Dec. 1948	B) 1 st April 1948
	C) 1 st April 1949	D) 2 nd October 1948
8)	The opportunity cost of factor of pro	oduction with specific use is
	A) Very high B) Infinite	C) Zero D) Constant
9)	High tech industries may find it diffic	cult to set
	A) Short term plans	B) Intermediate plans
	C) Long term plans	D) Co-ordinating plans
10)	Function of Entrepreneur is	
	A) To bear risk and uncertainty	
	B) To control and manage efficien	су
	C) To increase co-ordination	
	D) All of above	
11)	Economics is the science which st	udies
	A) Moral things	
	B) Human behaviour with reference	
	C) Only profits and loss in the bus	iness
	D) Human psychology	
12)	Inventory is nothing but	
	A) Infrastructure in the business	
	B) Shares of the businessman	
	D) Production cost of the product	to produce the product in the factory
10\	,	
13)	In ABC analysis, 'C' items are A) Maximum in value minimum nu	mhore
	B) Medium in value medium in nur	
	C) Low valued and maximum in nu	
	D) None of the above	
14)		
17)	A) Unlimited liability	
	B) Limited liability	
	C) No liability	
	D) None of the above	
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	T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT	
•	wand Date: Friday, 5-5-2017 Marks: e: 10.00 a.m. to 1.00 p.m.	: 56
	SECTION - I	
2.	Write an short note on (any four): A) Micro and Macro economics. B) Science and Technological development in India since independence. C) Features of Indian Economy. D) EOQ E) Adventages and Disadventages of partnership firm	16)
3.	E) Advantages and Disadvantages of partnership firm.A) Explain in detail what is make or buy decision? List the factors influencing make or buy decision.B) Distinguish between Private and Public limited company. List the advantage and disadvantages?	6
	OR	_
	B) Discuss the problems of power sector and suggest the remedies.	6
	SECTION – II	
4.	Write a short note on (any four): A) Functions of Management. B) Factory Act 1948 C) Management Information System D) Entrepreneurship Development E) Industrial safety and its advantages.	16)
5.	Explain in detail PERT and CPM methods with suitable diagram in Project Implementation.	6
6.	List the stages of setting of SSI. OR	6
	Explain Electricity Act, 2003 and suggest measures to reduce theft of Electricity.	

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, ,	t – I) (CGPA) Examination, 2017 CS AND INDUSTRIAL MANAGEMENT
Day and Date : Friday, 5-5-2017 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks: 70
Answer Book 2) Answer MCQ	Property of the solution of th
MCQ/Obi	ective Type Questions
Duration: 30 Minutes	Marks : 14
1. Choose the correct answer:	14
1) Working hours of adults in factory	is
A) 49 hours in a week	B) 30 hours in a week
C) 51 hours in a week	D) 48 hours in a week
2) The Factory Act of 1948 came into	existence on
A) 26 th Dec. 1948	B) 1 st April 1948
C) 1 st April 1949	D) 2 nd October 1948
3) The opportunity cost of factor of pr	oduction with specific use is
A) Very high B) Infinite	C) Zero D) Constant
4) High tech industries may find it diffi	icult to set
A) Short term plans	B) Intermediate plans
C) Long term plans	D) Co-ordinating plans
5) Function of Entrepreneur is	
A) To bear risk and uncertainty	B) To control and manage efficiency
C) To increase co-ordination	D) All of above

- C) To increase co-ordination
- 6) Economics is the science which studies
 - A) Moral things
 - B) Human behaviour with reference to human needs and its means
 - C) Only profits and loss in the business
 - D) Human psychology
- 7) Inventory is nothing but
 - A) Infrastructure in the business
 - B) Shares of the businessman
 - C) List of movable items required to produce the product in the factory
 - D) Production cost of the product

- 8) In ABC analysis, 'C' items are
 - A) Maximum in value minimum numbers
 - B) Medium in value medium in numbers
 - C) Low valued and maximum in numbers
 - D) None of the above
- 9) Joint stock company has
 - A) Unlimited liability
 - B) Limited liability
 - C) No liability
 - D) None of the above
- 10) Controlling function includes
 - A) Prepare a strategy plan
 - B) Guiding the staff wherever necessary
 - C) Measuring the actual results in relations to the plans made
 - D) Identification and classification of activities
- 11) What is CSIR?
 - A) Council of Sub Industrial Research
 - B) Council of Scientific and Industrial Research
 - C) Council for State Industrial Research
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- 12) The coal reserves in India are sufficient only for
 - A) Approximately next 20 years
 - B) Approximately next 70 years
 - C) Approximately next 130 years
 - D) Approximately next 5 years
- 13) 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
- 14) Short term planning means
 - A) Period upto one year
 - B) More than two year
 - C) More than one year but less than two year
 - D) Period upto three year

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	T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT	
•	wand Date: Friday, 5-5-2017 Marks e: 10.00 a.m. to 1.00 p.m.	s : 56
	SECTION - I	
2.	Write an short note on (any four): (4x4	l=16)
	A) Micro and Macro economics.	
	B) Science and Technological development in India since independence.	
	C) Features of Indian Economy.	
	D) EOQ	
	E) Advantages and Disadvantages of partnership firm.	
3.	A) Explain in detail what is make or buy decision? List the factors influencing make or buy decision.	6
	B) Distinguish between Private and Public limited company. List the advantage and disadvantages?	I
	OR	
	B) Discuss the problems of power sector and suggest the remedies.	6
	SECTION - II	
4.	Write a short note on (any four):	l=16)
	A) Functions of Management.	
	B) Factory Act 1948	
	C) Management Information System	
	D) Entrepreneurship Development	
	E) Industrial safety and its advantages.	
5.	Explain in detail PERT and CPM methods with suitable diagram in Project Implementation.	6
6.	List the stages of setting of SSI.	6
	OR	
	Explain Electricity Act, 2003 and suggest measures to reduce theft of Electricity.	



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Seat	Set	D
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T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 **ELECTROMAGNETIC ENGINEERING**

Max. Marks: 70 Day and Date: Saturday, 6-5-2017

Time: 10.00 a.m. to 1.00 p.m.

Instructions: i) **All** questions are **compulsory**.

- ii) Assume suitable data and mention it, if necessary.
- iii) **Use** of no-programmable calculator is **allowed**.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion carries one mark.
- v) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) Two concentric hollow spheres of radii R_1 and R_2 ($R_1 > R_2$) have respective charges Q₁ and Q₂ distributed uniformly over their surfaces, the electric flux density D at the gaussian surface of radius r such that $(R_1 > r > R_2)$ will be

a)
$$\frac{Q_1}{4\pi R_1^2}$$

b)
$$\frac{Q_1}{4\pi r^2}$$

a)
$$\frac{Q_1}{4\pi R_1^2}$$
 b) $\frac{Q_1}{4\pi r^2}$ c) $\frac{Q_2}{4\pi R_2^2}$ d) $\frac{Q_2}{4\pi r^2}$

d)
$$\frac{Q_2}{4\pi r^2}$$

- 2) Usually a collection of positive charges is considered for constructing gaussian surface. If the gaussian surface encloses a collection of negative charges, then for such a surface
 - a) Normal component of D will point inward
 - b) Normal component of D will point outward
 - c) Normal component of D will become zero
 - d) Normal component of D will become infinite
- 3) Electric flux density D is measured in
 - a) c/m
- b) c/m²
 - c) c/m³
- d) c

4) In dot product of unit vector in cylindrical and rectangular coordinate system



	for $a_n \cdot a_{\phi}$ is		
	a) $\cos \phi$ b) $-\sin \phi$	c) sin∳	d) $-\cos\phi$
5)	A field line and an equipoten	tial surface are	
	a) always parallel	b) always at 90°	0
	c) inclined at any angle	d) none	
6)	The unit of capacitance is	b) Caulamba/ya	.14
	a) Volts/coulombc) Ohms	b) Coulombs/vo d) Henry/Wb	oit.
7)	The unit of dipole moment is	•	
')	a) c/m b) c/m ²	c) c/m ³	d) c
8)	Which conceptual notion into		,
,	of magnetic field in an empty	-	3
	a) Displacement current		
۵۱	c) Acceleration current	, ,	
9)	Which of the following staten flux densities?	nent for a divergence of e	electric and magnetic
	a) Both are zero		
	b) It is zero for the electric fl	ux density	
	c) These are zero for static d		me varying densities
	d) It is zero for the magnetic	•	
10)	A magnetic vector potential is		$x = (-\cos x) (\cos y)u_z$.
	The flux density at the origin		d) Su
44\	,	c) - 2u _x	
11)	Which of the statements is n a) It is solenoid	of characteristic of static	magnetic field?
	b) It is conservative		
	c) Magnetic flux lines are al	ways closed	
	d) It has no sinks or sources	;	
12)	The magnetic boundary cond		mponent of magnetic
	flux density across the bound	•	N O 11
	a) Zero b) Unity	,	ous d) Continuous
13)	The force on a charge movin	•	
	and magnetic fields is given a) $q(E + B \times V)$ b) $q(E +$	•	•
111	, ., , , ,	, , , , , , ,	, .,
14)	A 50 cm long and 5 cm diam It carries a current of 10A. TI		ooo turns or wire.
	a) 0.987 J b) 1.0 J	c) 1.02 J	d) 1.56 J
	·	, 	Set



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T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTROMAGNETIC ENGINEERING

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

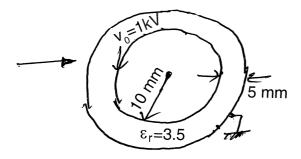
Instructions: i) All questions are compulsory.

- ii) Assume suitable data and mention it, if necessary.
- iii) Use of no-programmable calculator is allowed.

SECTION - I

2. Solve any four : (4×4=16)

- a) For what value of α , A = a_x + $2a_y$ a_z and B = αa_x + a_y + $3a_z$ are perpendicular?
- b) Find E at (0, 0, 5) m due to $Q_1 = .35 \,\mu\text{C}$ at (0, 4, 0) m and $Q_2 = .55 \,\mu\text{C}$ at (3, 0, 0) m ?
- c) Find electric flux density D at $\left(2, \frac{\pi}{2}, 0\right)$, given potential $V = \frac{10}{r^2} sin\theta cos\phi$.
- d) Evaluate the current crossing the spherical shell r = .02 m, when current density $J = 10^3 \sin \theta$ ar in spherical coordinate.
- e) Derive continuity of current equation.
- f) Calculate capacitance for following geometry if cable is 8 km long

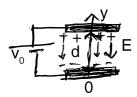




3. Solve any two:

 $(2 \times 6 = 12)$

- a) For region y < 0 consist of a perfect conductor, while region y > 0 is a dielectric medium $\epsilon_r = 2$. If there is surface charge of 2n c/m² on the conductor, determine E and D at
 - a) A (3, -2, 2)
- b) B(-4, 1, 5)
- b) The two plates of parallel plate capacitor are separated by a distance 'd' and maintained at potential 0 and V₀ as shown in fig. Neglect fringing effect at the edge. Determine, the potential at any point between the plate using Laplace equation.



c) Explain the physical interpretation of divergence of a vector in detail?

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) A current filament of 5A in $\overline{a}y$ direction is parallel to y-axis at x = 2, z = -2. Find H at the origin.
- b) State and explain the force acting on a wire carrying a current placed in a magnetic field.
- c) Explain different types of magnetic material with suitable example according to the nature of material.
- d) State and prove Ampere's circuital law.
- e) Derive the Maxwell's equation for harmonically varying fields from Faraday's law in integral and point form.

5. Solve any two:

 $(2\times6=12)$

- a) Evaluate both sides of Stoke's theorem for the portion of the sphere specified by $r=4m,\ 0\leq\theta\leq0.1\pi,\ 0\leq\phi\leq0.3\pi$. Given $H=6r\sin\varphi\overline{a}_r+18r\sin\theta\overline{a}\varphi$.
- b) What do you mean by displacement current and show how it led to the modification of Ampere's law.
- c) State and derive the Maxwell's equation for time varying fields from Gauss's law in integral and differential form for the electric and magnetic field.

Seat No. Set C	
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T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTROMAGNETIC ENGINEERING

Day and Date: Saturday, 6-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: i) All questions are compulsory.

- ii) Assume suitable data and mention it, if necessary.
- iii) Use of no-programmable calculator is allowed.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- v) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) Which conceptual notion introduced by Maxwell, indicates the generation of magnetic field in an empty free space ?
 - a) Displacement current
- b) Velocity vector current
- c) Acceleration current
- d) Projectile current
- 2) Which of the following statement for a divergence of electric and magnetic flux densities ?
 - a) Both are zero
 - b) It is zero for the electric flux density
 - c) These are zero for static densities but non zero for time varying densities
 - d) It is zero for the magnetic flux density
- 3) A magnetic vector potential is given by the expression $A = (-\cos x) (\cos y)u_z$. The flux density at the origin is
 - a) 0
- b) u_y
- c) 2u_x
- d) $2u_x$
- 4) Which of the statements is not characteristic of static magnetic field?
 - a) It is solenoid
 - b) It is conservative
 - c) Magnetic flux lines are always closed
 - d) It has no sinks or sources



5)	The magnetic bour flux density across	the boundary sho	uld	be	•	•
	a) Zero	b) Unity	c)	Non continuou	S	d) Continuous
6)	The force on a cha and magnetic field a) $q(E + B \times V)$	s is given by which	n o	ne of the followi	ng	?
7)	A 50 cm long and lt carries a current				00 t	urns of wire.
	a) 0.987 J	b) 1.0 J	-		d)	1.56 J
8)	Two concentric hol charges Q ₁ and Q ₂ density D at the ga	distributed uniform	nly	over their surfac	es,	the electric flux
	a) $\frac{Q_1}{4\pi R_1^2}$	b) $\frac{Q_1}{4\pi r^2}$	c)	$\frac{Q_2}{4\piR_2^2}$	d)	$\frac{Q_2}{4\pi r^2}$
9)	Usually a collection gaussian surface. It charges, then for so a) Normal comports b) Normal comports of Normal comports of Normal comports.	If the gaussian sur such a surface nent of D will point nent of D will point nent of D will beco	fac inv ou me	e encloses a co vard tward zero		_
10)	Electric flux density a) c/m			a/m3	al\	
4.4.	,	,	•		d)	
11)	In dot product of un	iit vector in cylinario	cai	and rectangular	CO	ordinate system
	for a_n a_{ϕ} is					
	•	b) −sin _∮	-	•	d)	– cos φ
12)	A field line and an a) always parallel c) inclined at any		b)	are always at 90° none		
13)	The unit of capacit a) Volts/coulomb c) Ohms	ance is	•	Coulombs/volt Henry/Wb		
14)	The unit of dipole ra) c/m		c)	c/m ³	d)	С
	•				•	Set
						301



Seat	
No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTROMAGNETIC ENGINEERING

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

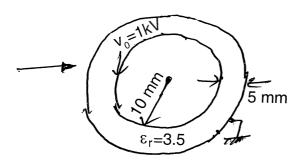
Instructions: i) All questions are compulsory.

- ii) Assume suitable data and mention it, if necessary.
- iii) Use of no-programmable calculator is allowed.

SECTION - I

2. Solve any four : (4×4=16)

- a) For what value of α , A = a_x + $2a_y$ a_z and B = αa_x + a_y + $3a_z$ are perpendicular?
- b) Find E at (0, 0, 5) m due to $Q_1 = .35 \,\mu\text{C}$ at (0, 4, 0) m and $Q_2 = .55 \,\mu\text{C}$ at (3, 0, 0) m ?
- c) Find electric flux density D at $\left(2, \frac{\pi}{2}, 0\right)$, given potential $V = \frac{10}{r^2} sin\theta cos\phi$.
- d) Evaluate the current crossing the spherical shell r = .02 m, when current density $J = 10^3 \sin \theta$ ar in spherical coordinate.
- e) Derive continuity of current equation.
- f) Calculate capacitance for following geometry if cable is 8 km long

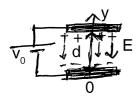




3. Solve any two:

 $(2 \times 6 = 12)$

- a) For region y < 0 consist of a perfect conductor, while region y > 0 is a dielectric medium $\epsilon_r = 2$. If there is surface charge of 2n c/m² on the conductor, determine E and D at
 - a) A (3, -2, 2)
- b) B(-4, 1, 5)
- b) The two plates of parallel plate capacitor are separated by a distance 'd' and maintained at potential 0 and V₀ as shown in fig. Neglect fringing effect at the edge. Determine, the potential at any point between the plate using Laplace equation.



c) Explain the physical interpretation of divergence of a vector in detail?

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) A current filament of 5A in $\overline{a}y$ direction is parallel to y-axis at x = 2, z = -2. Find H at the origin.
- b) State and explain the force acting on a wire carrying a current placed in a magnetic field.
- c) Explain different types of magnetic material with suitable example according to the nature of material.
- d) State and prove Ampere's circuital law.
- e) Derive the Maxwell's equation for harmonically varying fields from Faraday's law in integral and point form.

5. Solve any two:

 $(2 \times 6 = 12)$

- a) Evaluate both sides of Stoke's theorem for the portion of the sphere specified by $r=4m,\ 0\leq\theta\leq0.1\pi,\ 0\leq\phi\leq0.3\pi$. Given $H=6r\sin\varphi\overline{a}_r+18r\sin\theta\overline{a}\varphi$.
- b) What do you mean by displacement current and show how it led to the modification of Ampere's law.
- c) State and derive the Maxwell's equation for time varying fields from Gauss's law in integral and differential form for the electric and magnetic field.

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTROMAGNETIC ENGINEERING

Day and Date: Saturday, 6-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: i) All questions are compulsory.

- ii) Assume suitable data and mention it, if necessary.
- iii) Use of no-programmable calculator is allowed.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- v) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) A field line and an equipotential surface are
 - a) always parallel

b) always at 90°

c) inclined at any angle

- d) none
- 2) The unit of capacitance is
 - a) Volts/coulomb

b) Coulombs/volt

c) Ohms

- d) Henry/Wb
- 3) The unit of dipole moment is
 - a) c/m
- b) c/m²
- c) c/m³
- d) c
- 4) Which conceptual notion introduced by Maxwell, indicates the generation of magnetic field in an empty free space ?
 - a) Displacement current
- b) Velocity vector current
- c) Acceleration current
- d) Projectile current
- 5) Which of the following statement for a divergence of electric and magnetic flux densities ?
 - a) Both are zero
 - b) It is zero for the electric flux density
 - c) These are zero for static densities but non zero for time varying densities
 - d) It is zero for the magnetic flux density



6)	A magnetic vector p The flux density at	the origin is	•	
	a) 0	b) – u _y	c) - 2u _x	d) 2u _x
7)	Which of the states a) It is solenoid b) It is conservativ c) Magnetic flux lin d) It has no sinks	ments is not chara re nes are always clo	cteristic of static n	
8)	The magnetic bour flux density across a) Zero	the boundary sho	ould be	ponent of magnetic s d) Continuous
9)	The force on a cha and magnetic field a) q(E + B × V)	rge moving with ve s is given by whicl	elocity v under the i	influence of electric ing ?
10)	A 50 cm long and strains a current a) 0.987 J	of 10A. The energ		
11)		distributed uniforn	nly over their surfac	R_2) have respective ces, the electric flux $(R_1 > r > R_2)$ will be
	a) $\frac{Q_1}{4\pi R_1^2}$	b) $\frac{Q_1}{4\pi r^2}$	c) $\frac{Q_2}{4\pi R_2^2}$	d) $\frac{Q_2}{4\pi r^2}$
	charges, then for s a) Normal compor b) Normal compor c) Normal compor d) Normal compor	If the gaussian sur uch a surface nent of D will point nent of D will point nent of D will beco nent of D will beco	face encloses a co inward outward me zero me infinite	ed for constructing ollection of negative
13)	Electric flux density a) c/m	_	n c) c/m ³	d) c
14)	In dot product of un	it vector in cylindri	cal and rectangula	coordinate system
	for $a_n \cdot a_{\phi}$ is			
	a) cos \$\phi\$	b) −sinφ	c) $\sin \phi$	d) $-\cos\phi$



Seat	
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T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTROMAGNETIC ENGINEERING

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: i) All questions are compulsory.

ii) Assume suitable data and mention it, if necessary.

iii) Use of no-programmable calculator is allowed.

SECTION - I

2. Solve any four : (4×4=16)

a) For what value of α , A = a_x + $2a_y$ - a_z and B = αa_x + a_y + $3a_z$ are perpendicular?

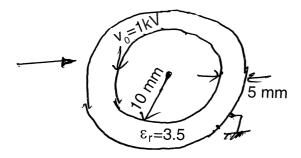
b) Find E at (0, 0, 5) m due to $Q_1 = .35 \,\mu\text{C}$ at (0, 4, 0) m and $Q_2 = - .55 \,\mu\text{C}$ at (3, 0, 0) m ?

c) Find electric flux density D at $\left(2, \frac{\pi}{2}, 0\right)$, given potential $V = \frac{10}{r^2} sin\theta cos\phi$.

d) Evaluate the current crossing the spherical shell r = .02 m, when current density $J = 10^3 \sin \theta$ ar in spherical coordinate.

e) Derive continuity of current equation.

f) Calculate capacitance for following geometry if cable is 8 km long

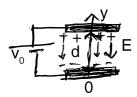




3. Solve any two:

 $(2 \times 6 = 12)$

- a) For region y < 0 consist of a perfect conductor, while region y > 0 is a dielectric medium $\epsilon_r = 2$. If there is surface charge of 2n c/m² on the conductor, determine E and D at
 - a) A (3, -2, 2)
- b) B(-4, 1, 5)
- b) The two plates of parallel plate capacitor are separated by a distance 'd' and maintained at potential 0 and V₀ as shown in fig. Neglect fringing effect at the edge. Determine, the potential at any point between the plate using Laplace equation.



c) Explain the physical interpretation of divergence of a vector in detail?

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) A current filament of 5A in $\overline{a}y$ direction is parallel to y-axis at x = 2, z = -2. Find H at the origin.
- b) State and explain the force acting on a wire carrying a current placed in a magnetic field.
- c) Explain different types of magnetic material with suitable example according to the nature of material.
- d) State and prove Ampere's circuital law.
- e) Derive the Maxwell's equation for harmonically varying fields from Faraday's law in integral and point form.

5. Solve any two:

 $(2 \times 6 = 12)$

- a) Evaluate both sides of Stoke's theorem for the portion of the sphere specified by $r=4m,\ 0\leq\theta\leq0.1\pi,\ 0\leq\phi\leq0.3\pi$. Given $H=6r\sin\varphi\overline{a}_r+18r\sin\theta\overline{a}\varphi$.
- b) What do you mean by displacement current and show how it led to the modification of Ampere's law.
- c) State and derive the Maxwell's equation for time varying fields from Gauss's law in integral and differential form for the electric and magnetic field.

Seat	
No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 **ELECTROMAGNETIC ENGINEERING**

Day and Date: Saturday, 6-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: i) **All** questions are **compulsory**.

- ii) Assume suitable data and mention it, if necessary.
- iii) **Use** of no-programmable calculator is **allowed**.
- iv) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion carries one mark.
- v) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer:
 - 1) A magnetic vector potential is given by the expression $A = (-\cos x)(\cos y)u_z$. The flux density at the origin is
 - a) 0
- b) $-u_v$ c) $-2u_x$
- d) 2u_v
- 2) Which of the statements is not characteristic of static magnetic field?
 - a) It is solenoid
 - b) It is conservative
 - c) Magnetic flux lines are always closed
 - d) It has no sinks or sources
- 3) The magnetic boundary condition is that the normal component of magnetic flux density across the boundary should be
 - a) Zero
- b) Unity
- c) Non continuous
- d) Continuous
- 4) The force on a charge moving with velocity v under the influence of electric and magnetic fields is given by which one of the following?
 - a) $q(E + B \times V)$
- b) $q(E + V \times B)$ c) $q(H + V \times E)$ d) $q(E + V \times H)$

- 5) A 50 cm long and 5 cm diameter solenoid is wound 2000 turns of wire. It carries a current of 10A. The energy stored is
 - a) 0.987 J
- b) 1.0 J
- c) 1.02 J
- d) 1.56 J



-VI	3 – 316	-2-			II	
6)	Two concentric hole charges Q ₁ and Q ₂ density D at the ga	distributed uniforn	nly	over their surfac	es,	the electric flux
	a) $\frac{Q_1}{4\pi R_1^2}$	b) $\frac{Q_1}{4\pi r^2}$	c)	$\frac{Q_2}{4\piR_2^2}$	d)	$\frac{Q_2}{4\pi r^2}$
7)	Usually a collection gaussian surface. charges, then for sometimes a) Normal comports b) Normal comports of Normal comports.	If the gaussian sur such a surface nent of D will point nent of D will point nent of D will beco	fac inv ou me	e encloses a co ward tward zero		_
8)	Electric flux densit	y D is measured ir	า			
	a) c/m	b) c/m ²	c)	c/m ³	d)	С
9)	In dot product of ur	nit vector in cylindri	cal	and rectangular	coc	ordinate system
	for $a_n \cdot a_{\phi}$ is					
	a) cos∮	b) −sinφ	c)	sin∮	d)	- cos ∳
10)	A field line and an a) always parallel c) inclined at any		b)	are always at 90° none		
l 1)	The unit of capacit a) Volts/coulomb c) Ohms	ance is	-	Coulombs/volt Henry/Wb		
12)	The unit of dipole (a) c/m	moment is b) c/m ²	c)	c/m ³	d)	С
13)	Which conceptual	notion introduced	by	Maxwell, indica	tes	the generation

of magnetic field in an empty free space?

a) Displacement current
b) Velocity vector current
c) Acceleration current
d) Projectile current

c) Acceleration current

d) Projectile current

14) Which of the following statement for a divergence of electric and magnetic flux densities?

- a) Both are zero
- b) It is zero for the electric flux density
- c) These are zero for static densities but non zero for time varying densities
- d) It is zero for the magnetic flux density



Seat	
No.	

T.E. (Electrical) (Part – I) (CGPA) Examination, 2017 ELECTROMAGNETIC ENGINEERING

Day and Date: Saturday, 6-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

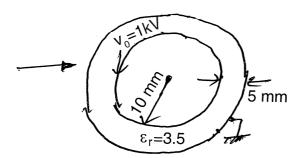
Instructions: i) All questions are compulsory.

- ii) Assume suitable data and mention it, if necessary.
- iii) Use of no-programmable calculator is allowed.

SECTION - I

2. Solve any four: (4×4=16)

- a) For what value of α , A = a_x + $2a_y$ a_z and B = αa_x + a_y + $3a_z$ are perpendicular?
- b) Find E at (0, 0, 5) m due to $Q_1 = .35 \,\mu\text{C}$ at (0, 4, 0) m and $Q_2 = .55 \,\mu\text{C}$ at (3, 0, 0) m ?
- c) Find electric flux density D at $\left(2, \frac{\pi}{2}, 0\right)$, given potential $V = \frac{10}{r^2} sin\theta cos\phi$.
- d) Evaluate the current crossing the spherical shell r = .02 m, when current density $J = 10^3 \sin \theta$ ar in spherical coordinate.
- e) Derive continuity of current equation.
- f) Calculate capacitance for following geometry if cable is 8 km long

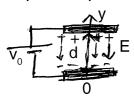




3. Solve any two:

 $(2 \times 6 = 12)$

- a) For region y < 0 consist of a perfect conductor, while region y > 0 is a dielectric medium $\epsilon_r = 2$. If there is surface charge of 2n c/m² on the conductor, determine E and D at
 - a) A (3, -2, 2)
- b) B(-4, 1, 5)
- b) The two plates of parallel plate capacitor are separated by a distance 'd' and maintained at potential 0 and V₀ as shown in fig. Neglect fringing effect at the edge. Determine, the potential at any point between the plate using Laplace equation.



c) Explain the physical interpretation of divergence of a vector in detail?

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) A current filament of 5A in $\overline{a}y$ direction is parallel to y-axis at x = 2, z = -2. Find H at the origin.
- b) State and explain the force acting on a wire carrying a current placed in a magnetic field.
- c) Explain different types of magnetic material with suitable example according to the nature of material.
- d) State and prove Ampere's circuital law.
- e) Derive the Maxwell's equation for harmonically varying fields from Faraday's law in integral and point form.

5. Solve any two:

 $(2 \times 6 = 12)$

- a) Evaluate both sides of Stoke's theorem for the portion of the sphere specified by $r=4m,\ 0\leq\theta\leq0.1\pi,\ 0\leq\phi\leq0.3\pi$. Given $H=6r\sin\varphi\overline{a}_r+18r\sin\theta\overline{a}\varphi$.
- b) What do you mean by displacement current and show how it led to the modification of Ampere's law.
- c) State and derive the Maxwell's equation for time varying fields from Gauss's law in integral and differential form for the electric and magnetic field.

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No.	Set	

T.E. (Electrical Engineering) (Part – I) Examination, 2017 (CGPA) FI FCTRICAL MACHINES – III

Day and Date: Monday, 8-5-2017 Time: 10.00 a.m. to 1.00 p.m. Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark. 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page. MCQ/Objective Type Questions Duration: 30 Minutes Marks: 14 1. Choose the correct answer: (1x14=14) 1) An alternator is also called as generator. a) synchronous b) asynchronous c) rosenberg d) none of these 2) A turbo alternator uses a) salient pole filed structure b) non salient pole field structure c) rotating a.c. armature winding d) none of these
in Answer Book Page No. 3. Each question carries one mark. 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page. MCQ/Objective Type Questions Duration: 30 Minutes Marks: 14 1. Choose the correct answer: (1×14=14) 1) An alternator is also called as generator. a) synchronous b) asynchronous c) rosenberg d) none of these 2) A turbo alternator uses a) salient pole filed structure b) non salient pole field structure c) rotating a.c. armature winding d) none of these
Duration: 30 Minutes 1. Choose the correct answer: 1. An alternator is also called as generator. a) synchronous b) asynchronous c) rosenberg d) none of these 2) A turbo alternator uses a) salient pole filed structure c) rotating a.c. armature winding d) none of these
1) An alternator is also called as generator. a) synchronous b) asynchronous c) rosenberg d) none of these 2) A turbo alternator uses a) salient pole filed structure b) non salient pole field structure c) rotating a.c. armature winding d) none of these
 a) synchronous b) asynchronous c) rosenberg d) none of these 2) A turbo alternator uses a) salient pole filed structure b) non salient pole field structure c) rotating a.c. armature winding d) none of these
 a) salient pole filed structure b) non salient pole field structure c) rotating a.c. armature winding d) none of these
2) High apped alternators are driven by
 3) High speed alternators are driven by a) diesel engines b) hydraulic turbines c) steam turbines d) none of these
 4) Turbo alternators have rotors of a) small diameter and long axial length b) large diameter and long axial length c) large diameter and small axial length d) same diameter and axial length
5) In the armature winding of an alternator, the coil span falls short of full pitch by 60° (electrical). The pitch factor is
a) 0.866 b) 0.5 c) 0.25 d) none of these 6) The regulation of an alternator is given as

a) $\frac{V-Eo}{V}*100$ b) $\frac{Eo-V}{V}*100$ c) $\frac{V}{Eo}*100$ d) none of these

-2-



7)	The short circuit characteristics of an alternator is					
	a) always linear	b)	always nonlinea	r		
	c) either a) or b)	d)	none of these			
8)	The armature current of the synchronous	s m	otor has large val	ues for		
	a) low excitation only	b)	high excitation o	nly		
	c) both high and low excitation	d)	none			
9)	What is the ratio of no load speed to full lo 3 phase, 6Hz Synchronous motor ?	oad	speed of a 200 k	VA, 12 pole, 2200 V,		
	a) 1 b) 1.1	c)	1.21	d) infinite		
10)	Under short-circuit conditions, the power	r fa	ctor of an alternat	or is		
	a) unity	b)	almost zero lagg	ing		
	c) almost zero leading	d)	none of these			
11)	The maximum value of torque that a solution its synchronism, is known as	ync	hronous motor, o	can develop without		
	a) breaking torque	b)	synchronizing to	rque		
	c) pull out torque	d)	slip torque			
12)	In a synchronous motor if the back emf approximately equal to the applied volta	•		mature at no load is		
	a) the torque generated is maximum					
	b) the excitation is said to be zero perce	ent				
	c) the excitation is said to be 100%					
	d) the motor is said to be fully loaded					
13)	Operation of stepping motors at high spe					
	a) fast forward b) slewing	c)	inching	d) jogging		
14)	Which of the following phase switching sof a VR stepper motor?	seq	uence represents	s half-step operation		
	a) A, B, C, A	b)	A, C, B, A			
	c) AB, BC, CA, AB	d)	A, AB, B, BC			



Seat	
No.	

T.E. (Electrical Engineering) (Part – I) Examination, 2017 (CGPA) ELECTRICAL MACHINES – III

Day and Date: Monday, 8-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

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

2. Solve any four.

- 1) Explain the MMF method for voltage regulation.
- 2) Explain necessities and conditions for parallel operation of an alternator.
- 3) A 3000 kVA, 6 pole alternator runs at 1000 r.p.m. in parallel with other machines on 3300 V busbars. The synchronous reactance is 25%. Calculate the synchronizing power for one mechanical degree of displacement and corresponding synchronizing torque.
- 4) A 1200 kVA 3300 V 50 Hz three phase star connected alternator has armature resistance of $0.25\,\Omega$ per phase. A field current of 40A produces a short circuit current of 200A and an open circuit e.m.f. of 1100 V line to line. Find the voltage regulation at
 - a) 0.8 lagging p.f.
 - b) 0.8 leading p.f.
- 5) Explain the methods of synchronization.
- 6) A three phase, 50Hz, 2-pole star connected alternator has 54 slots with 4 conductors per slot. The pith of the coils 2 slots less than the pole pitch. If the machine gives 3300 V between lines on open circuit with sinusoidal flux distribution, determine the useful flux per pole.
- 3. Solve any two.
 - 1) Derive an expression for power developed in
 - a) Salient pole type alternator
 - b) Non salient pole type alternator.
 - 2) A 5000 kVA 6600 V 3-phase star connected alternator has a resistance of 0.75 Ω per phase. Estimate the voltage regulation by ZPF method at p.f. of
 - a) unity
 - b) 0.9 leading



c) 0.71 lagging from following details

Field current	O.C. linevoltage	ZPF voltage
32	3100	0
50	4900	1850
75	6600	4250
100	7500	580
140	8300	7000

3) With neat sketch explain construction, working principle and types of alternator.

4. Solve any four.

16

- 1) Explain switched reluctance motor.
- 2) Explain hybrid stepper motor.
- 3) Explain construction and operation of synchronous motor.
- 4) A three phase synchronous motor has 12 poles and operates from 440V 50Hz supply. Calculate its speed. If it takes a line current of 100A at 0.P.f. lead, what torque motor will be developing? Neglect losses.
- 5) With neat sketch explain AC servomotor.
- 6) With neat sketch explain PMDC motor.

5. Solve any two:

- 1) Explain:
 - a) Hysteresis motor
 - b) Universal motor
- 2) Explain single stack and multistack variable reluctance stepper motor.
- 3) Why synchronous motor is not self starting? How unidirectional torque is obtained? What is the use of damper winding in synchronous motor?

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No.	Set	W

T.E. (Electrical Engineering) (Part – I) Examination, 2017 (CGPA) **ELECTRICAL MACHINES - III**

Day and Date	e : Monday, 8-5-2017	Max. Marks: 70
T: 1000		

Time: 10.00 a.m. to 1.00 p.m.

		instructions :	in Ans 2) Answ	swer Book v er MCQ/C	Page No Dijective	. 3. Eac type q	the solved in first 30 mech question carries one uestions on Page Note (P/Q/R/S) on Top o	e mark. o. 3 only.
			МС	CQ/Object	ive Type	Questi	ons	
Dur	ation	n : 30 Minutes						Marks: 14
1.	Cho	oose the correc	t answer :					(1×14=14)
	1)	The armature	current of	the synchr	onous m	otor has	large values for	
		a) low excitat	ion only		b)	high ex	citation only	
		c) both high a	and low ex	citation	d)	none		
	2)	What is the rat 3 phase, 6Hz \$		•		speed o	of a 200 kVA, 12 pole, 2	2200 V,
		a) 1	b)	1.1	c)	1.21	d) infinite	
	3)	Under short-ci	rcuit cond	itions, the	power fac	ctor of a	n alternator is	
		a) unity			b)	almost	zero lagging	
		c) almost zero	o leading		d)	none of	f these	
	4)	The maximum	value of	torque the	at a avma	bropous	motor can dayalan ı	without

- 4) The maximum value of torque that a synchronous motor, can develop without losing its synchronism, is known as
 - a) breaking torque

b) synchronizing torque

c) pull out torque

- d) slip torque
- 5) In a synchronous motor if the back emf generated in the armature at no load is approximately equal to the applied voltage, then
 - a) the torque generated is maximum
 - b) the excitation is said to be zero percent
 - c) the excitation is said to be 100%
 - d) the motor is said to be fully loaded

6)) Operation of stepping motors at high speeds is referred to as						
	a) fast forward	b) slewing	c)	inching	d)	jogging	
7)	Which of the followin of a VR stepper motor		seq	uence represents	s ha	ulf-step operation	
	a) A, B, C, A		b)	A, C, B, A			
	c) AB, BC, CA, AB		d)	A, AB, B, BC			
8)	An alternator is also a) synchronous				d)	none of these	
9)	A turbo alternator use		٠,		۵,		
σ,	a) salient pole filed sc) rotating a.c. arma	structure	,	non salient pole none of these	fiel	d structure	
10)	High speed alternator a) diesel engines c) steam turbines	ors are driven by	•	hydraulic turbine	es		
11)	Turbo alternators have a) small diameter as b) large diameter as c) large diameter as d) same diameter as	nd long axial length nd long axial length nd small axial length					
12)	In the armature windi (electrical). The pitch	=	the	coil span falls sho	ort c	of full pitch by 60°	
	a) 0.866	b) 0.5	c)	0.25	d)	none of these	
13)	The regulation of an	alternator is given a	as				
	a) $\frac{V - Eo}{V} * 100$	b) $\frac{Eo - V}{V} * 100$	c)	V Eo * 100	d)	none of these	
14)	The short circuit chair	racteristics of an alt	ern	ator is			
	a) always linear		b)	always nonlinea	r		
	c) either a) or b)		d)	none of these			



Seat	
No.	

T.E. (Electrical Engineering) (Part – I) Examination, 2017 (CGPA) ELECTRICAL MACHINES – III

Day and Date: Monday, 8-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to the **right** indicate **full** marks.

3) Assume suitable data if necessary.

2. Solve any four.

16

- 1) Explain the MMF method for voltage regulation.
- 2) Explain necessities and conditions for parallel operation of an alternator.
- 3) A 3000 kVA, 6 pole alternator runs at 1000 r.p.m. in parallel with other machines on 3300 V busbars. The synchronous reactance is 25%. Calculate the synchronizing power for one mechanical degree of displacement and corresponding synchronizing torque.
- 4) A 1200 kVA 3300 V 50 Hz three phase star connected alternator has armature resistance of $0.25\,\Omega$ per phase. A field current of 40A produces a short circuit current of 200A and an open circuit e.m.f. of 1100 V line to line. Find the voltage regulation at
 - a) 0.8 lagging p.f.
 - b) 0.8 leading p.f.
- 5) Explain the methods of synchronization.
- 6) A three phase, 50Hz, 2-pole star connected alternator has 54 slots with 4 conductors per slot. The pith of the coils 2 slots less than the pole pitch. If the machine gives 3300 V between lines on open circuit with sinusoidal flux distribution, determine the useful flux per pole.

3. Solve any two.

- 1) Derive an expression for power developed in
 - a) Salient pole type alternator
 - b) Non salient pole type alternator.
- 2) A 5000 kVA 6600 V 3-phase star connected alternator has a resistance of 0.75 Ω per phase. Estimate the voltage regulation by ZPF method at p.f. of
 - a) unity
 - b) 0.9 leading



c) 0.71 lagging from following details

Field current	O.C. linevoltage	ZPF voltage
32	3100	0
50	4900	1850
75	6600	4250
100	7500	580
140	8300	7000

3) With neat sketch explain construction, working principle and types of alternator.

4. Solve any four.

16

- 1) Explain switched reluctance motor.
- 2) Explain hybrid stepper motor.
- 3) Explain construction and operation of synchronous motor.
- 4) A three phase synchronous motor has 12 poles and operates from 440V 50Hz supply. Calculate its speed. If it takes a line current of 100A at 0.P.f. lead, what torque motor will be developing? Neglect losses.
- 5) With neat sketch explain AC servomotor.
- 6) With neat sketch explain PMDC motor.

5. Solve any two:

- 1) Explain:
 - a) Hysteresis motor
 - b) Universal motor
- 2) Explain single stack and multistack variable reluctance stepper motor.
- 3) Why synchronous motor is not self starting? How unidirectional torque is obtained? What is the use of damper winding in synchronous motor?



	T.E. (Electrical Enginee	ering) (Part – I) Examination, 2017 (CGPA)	
	ELECTRIC	CAL MACHINES - III	
-	d Date : Monday, 8-5-2017 0.00 a.m. to 1.00 p.m.	Max. Marks	: 70
	in Answer Boo 2) Answer MCG	mpulsory. It should be solved in first 30 minutes ok Page No. 3. Each question carries one mark. A/Objective type questions on Page No. 3 onle mention, Q.P. Set (P/Q/R/S) on Top of Page.	ly.
Duratio		ective Type Questions	. 4 1
	n : 30 Minutes	Marks	
	oose the correct answer:	(1×14:	=14)
1)	In the armature winding of an alte (electrical). The pitch factor is	ernator, the coil span falls short of full pitch by 60°	
	a) 0.866 b) 0.5	c) 0.25 d) none of these	
2)	The regulation of an alternator is	s given as	
	a) $\frac{V - Eo}{V} * 100$ b) $\frac{Eo - V}{V} *$	100 c) $\frac{V}{Eo} * 100$ d) none of these	
3)	The short circuit characteristics	of an alternator is	
	a) always linear	b) always nonlinear	
	c) either a) or b)	d) none of these	
4)	The armature current of the sync	chronous motor has large values for	
	a) low excitation only	b) high excitation only	
	c) both high and low excitation	d) none	
5)	What is the ratio of no load speed 3 phase, 6Hz Synchronous motor	d to full load speed of a 200 kVA, 12 pole, 2200 V, or ?	
	a) 1 b) 1.1	c) 1.21 d) infinite	
6)	Under short-circuit conditions, th	ne power factor of an alternator is	
	a) unity	b) almost zero lagging	
	c) almost zero leading	d) none of these	



7)	The maximum value of torque that a s losing its synchronism, is known as	ync	chronous motor, o	can develop without
	a) breaking torque	b)	synchronizing to	rque
	c) pull out torque	d)	slip torque	
8)	In a synchronous motor if the back emf approximately equal to the applied volta a) the torque generated is maximum	_		mature at no load is
	b) the excitation is said to be zero perce	ent		
	c) the excitation is said to be 100%			
	d) the motor is said to be fully loaded			
9)	Operation of stepping motors at high spe	eed	s is referred to as	3
	a) fast forward b) slewing	c)	inching	d) jogging
10)	Which of the following phase switching of a VR stepper motor?	seq	uence represents	s half-step operation
	a) A, B, C, A	b)	A, C, B, A	
	c) AB, BC, CA, AB	d)	A, AB, B, BC	
11)	An alternator is also called as	(generator.	
	a) synchronous b) asynchronous	c)	rosenberg	d) none of these
12)	A turbo alternator uses			
	a) salient pole filed structure	,	non salient pole	field structure
13)	c) rotating a.c. armature winding High speed alternators are driven by	u)	none of these	
10)	a) diesel engines	b)	hydraulic turbine	es
	c) steam turbines	,	none of these	
14)	Turbo alternators have rotors of a) small diameter and long axial length b) large diameter and long axial length c) large diameter and small axial length d) same diameter and axial length			



Seat	
No.	

T.E. (Electrical Engineering) (Part – I) Examination, 2017 (CGPA) ELECTRICAL MACHINES – III

Day and Date: Monday, 8-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to the **right** indicate **full** marks.

3) Assume suitable data if necessary.

2. Solve any four.

16

- 1) Explain the MMF method for voltage regulation.
- 2) Explain necessities and conditions for parallel operation of an alternator.
- 3) A 3000 kVA, 6 pole alternator runs at 1000 r.p.m. in parallel with other machines on 3300 V busbars. The synchronous reactance is 25%. Calculate the synchronizing power for one mechanical degree of displacement and corresponding synchronizing torque.
- 4) A 1200 kVA 3300 V 50 Hz three phase star connected alternator has armature resistance of $0.25\,\Omega$ per phase. A field current of 40A produces a short circuit current of 200A and an open circuit e.m.f. of 1100 V line to line. Find the voltage regulation at
 - a) 0.8 lagging p.f.
 - b) 0.8 leading p.f.
- 5) Explain the methods of synchronization.
- 6) A three phase, 50Hz, 2-pole star connected alternator has 54 slots with 4 conductors per slot. The pith of the coils 2 slots less than the pole pitch. If the machine gives 3300 V between lines on open circuit with sinusoidal flux distribution, determine the useful flux per pole.

3. Solve **any two**.

- 1) Derive an expression for power developed in
 - a) Salient pole type alternator
 - b) Non salient pole type alternator.
- 2) A 5000 kVA 6600 V 3-phase star connected alternator has a resistance of 0.75 Ω per phase. Estimate the voltage regulation by ZPF method at p.f. of
 - a) unity
 - b) 0.9 leading



c) 0.71 lagging from following details

Field current	O.C. linevoltage	ZPF voltage
32	3100	0
50	4900	1850
75	6600	4250
100	7500	580
140	8300	7000

3) With neat sketch explain construction, working principle and types of alternator.

4. Solve any four.

16

- 1) Explain switched reluctance motor.
- 2) Explain hybrid stepper motor.
- 3) Explain construction and operation of synchronous motor.
- 4) A three phase synchronous motor has 12 poles and operates from 440V 50Hz supply. Calculate its speed. If it takes a line current of 100A at 0.P.f. lead, what torque motor will be developing? Neglect losses.
- 5) With neat sketch explain AC servomotor.
- 6) With neat sketch explain PMDC motor.

5. Solve any two:

- 1) Explain:
 - a) Hysteresis motor
 - b) Universal motor
- 2) Explain single stack and multistack variable reluctance stepper motor.
- 3) Why synchronous motor is not self starting? How unidirectional torque is obtained? What is the use of damper winding in synchronous motor?

Seat	Set	9
No.	Set	3

T.E. (Electrical Engineering) (Part – I) Examination, 2017 (CGPA) ELECTRICAL MACHINES – III

Day and Date : Monday, 8-5-2017	Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer: (1×14=14)

- 1) Under short-circuit conditions, the power factor of an alternator is
 - a) unity

b) almost zero lagging

c) almost zero leading

- d) none of these
- 2) The maximum value of torque that a synchronous motor, can develop without losing its synchronism, is known as
 - a) breaking torque

b) synchronizing torque

c) pull out torque

- d) slip torque
- 3) In a synchronous motor if the back emf generated in the armature at no load is approximately equal to the applied voltage, then
 - a) the torque generated is maximum
 - b) the excitation is said to be zero percent
 - c) the excitation is said to be 100%
 - d) the motor is said to be fully loaded
- 4) Operation of stepping motors at high speeds is referred to as
 - a) fast forward
- b) slewing
- c) inching
- d) jogging
- 5) Which of the following phase switching sequence represents half-step operation of a VR stepper motor?
 - a) A, B, C, A

b) A, C, B, A

c) AB, BC, CA, AB

d) A, AB, B, BC



6)	An alternator is also (a) synchronous				d)	none of these
7)	A turbo alternator use a) salient pole filed s c) rotating a.c. arma	tructure	,	non salient pole none of these	field	d structure
8)	High speed alternatoa) diesel enginesc) steam turbines	rs are driven by	•	hydraulic turbine none of these	es	
9)	Turbo alternators have a) small diameter and b) large diameter and c) large diameter and d) same diameter are	d long axial length d long axial length d small axial length	1			
10)	In the armature winding (electrical). The pitch	=		-	ort c	of full pitch by 60°
11)	a) 0.866 The regulation of an a	b) 0.5 alternator is given a	,	0.25	d)	none of these
	a) $\frac{V - Eo}{V} * 100$	b) $\frac{Eo - V}{V} * 100$	c)	V ± 100	d)	none of these
12)	The short circuit char	acteristics of an alte	erna	ator is		
	a) always linear		b)	always nonlinea	r	
	c) either a) or b)		d)	none of these		
13)	The armature current	of the synchronous	s m	otor has large val	lues	s for
	a) low excitation only	У	b)	high excitation o	nly	
	c) both high and low	excitation	d)	none		
14)	What is the ratio of no 3 phase, 6Hz Synchro	•	oad	speed of a 200 k	VA,	12 pole, 2200 V,
	a) 1	b) 1.1	c)	1.21	d)	infinite



Seat	
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T.E. (Electrical Engineering) (Part – I) Examination, 2017 (CGPA) ELECTRICAL MACHINES – III

Day and Date: Monday, 8-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to the **right** indicate **full** marks.

3) Assume suitable data if necessary.

2. Solve any four.

16

- 1) Explain the MMF method for voltage regulation.
- 2) Explain necessities and conditions for parallel operation of an alternator.
- 3) A 3000 kVA, 6 pole alternator runs at 1000 r.p.m. in parallel with other machines on 3300 V busbars. The synchronous reactance is 25%. Calculate the synchronizing power for one mechanical degree of displacement and corresponding synchronizing torque.
- 4) A 1200 kVA 3300 V 50 Hz three phase star connected alternator has armature resistance of $0.25\,\Omega$ per phase. A field current of 40A produces a short circuit current of 200A and an open circuit e.m.f. of 1100 V line to line. Find the voltage regulation at
 - a) 0.8 lagging p.f.
 - b) 0.8 leading p.f.
- 5) Explain the methods of synchronization.
- 6) A three phase, 50Hz, 2-pole star connected alternator has 54 slots with 4 conductors per slot. The pith of the coils 2 slots less than the pole pitch. If the machine gives 3300 V between lines on open circuit with sinusoidal flux distribution, determine the useful flux per pole.

3. Solve any two.

- 1) Derive an expression for power developed in
 - a) Salient pole type alternator
 - b) Non salient pole type alternator.
- 2) A 5000 kVA 6600 V 3-phase star connected alternator has a resistance of 0.75 Ω per phase. Estimate the voltage regulation by ZPF method at p.f. of
 - a) unity
 - b) 0.9 leading



c) 0.71 lagging from following details

Field current	O.C. linevoltage	ZPF voltage
32	3100	0
50	4900	1850
75	6600	4250
100	7500	580
140	8300	7000

3) With neat sketch explain construction, working principle and types of alternator.

4. Solve any four.

16

- 1) Explain switched reluctance motor.
- 2) Explain hybrid stepper motor.
- 3) Explain construction and operation of synchronous motor.
- 4) A three phase synchronous motor has 12 poles and operates from 440V 50Hz supply. Calculate its speed. If it takes a line current of 100A at 0.P.f. lead, what torque motor will be developing? Neglect losses.
- 5) With neat sketch explain AC servomotor.
- 6) With neat sketch explain PMDC motor.

5. Solve any two:

- 1) Explain:
 - a) Hysteresis motor
 - b) Universal motor
- 2) Explain single stack and multistack variable reluctance stepper motor.
- 3) Why synchronous motor is not self starting? How unidirectional torque is obtained? What is the use of damper winding in synchronous motor?

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Seat	
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T.E. (Electrical) (CGPA) (Part – I) Examination, 2017 CONTROL SYSTEMS – I

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

14

1) Open loop control system is one in which the control action

- a) depends on the input signal
- b) is independent of the desired output
- c) depends on system variable
- d) depends on system size
- 2) Feedback control system are
 - a) band-pass filters

b) low pass filters

c) high pass filters

- d) none of the above
- Sensitivity of a closed loop control system to variations in gain and load disturbances depends upon
 - a) loop gain
- b) frequency
- c) forward gain
- d) all of these
- 4) The transfer function of a system is laplace transform of its
 - a) square wave response
- b) step response

c) ramp response

- d) impulse response
- 5) The transfer function of an AC tachometer is

a)
$$Ks = \frac{E(s)}{\theta(s)}$$

b)
$$Ks = \frac{E(s)}{\omega m(s)}$$

c)
$$K = \frac{E(s)}{\theta(s)}$$

d) none of the above



- 6) In F-V analogy Mass is analogous to
 - a) resistance

b) inductance

c) capacitance

- d) none of the above
- 7) Zero initial conditions of a system means
 - a) system at rest with no energy stored in any of its components
 - b) inductance
 - c) system at rest with stored energy
 - d) system without any storage element
- 8) The open loop transfer function of a unity feedback system is given by

$$G(s) = \frac{2(S + \alpha)}{S(S + 2)(S + 10)}$$
 Angles of asymptotes are

a) 60°, 120°, 300°

b) 60°, 180°, 300°

c) 90°, 270°, 360°

- d) 90°, 180°, 270°
- 9) _____ increases the steady state accuracy.
 - a) Integrator

- b) Differentiator
- c) Phase lead compensator
- d) Phase lag compensator
- 10) By which of the following the system response can be tested better?

- b) Sinusoidal input signal
- c) Unit impulse input signal
- d) Exponentially decaying signal
- 11) Regenerative feedback implies feedback with
 - a) oscillations
- b) step input
- c) negative sign d) positive sign
- 12) Which of the following should be done to make an unstable system stable?
 - a) The gain of the system should be decreased
 - b) The gain of the system should be increased
 - c) The number of poles to the loop transfer function should be increased
 - d) The number of zeros to the loop transfer function should be increased
- 13) The second derivative input signals modify which of the following?
 - a) The time constant of the system
 - b) Damping of the system
 - c) The gain of the system
 - d) The time constant and suppress the oscillations
- 14) The open-loop transfer function of a unity feedback system is

$$G(s) = \frac{1+s}{s(1+0.5s)}$$
 The corner frequencies are

- a) 0 and 2

- b) 0 and 1 c) 0 and -1 d) 1 and 2



Seat	
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T.E. (Electrical) (CGPA) (Part – I) Examination, 2017 CONTROL SYSTEMS – I

Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

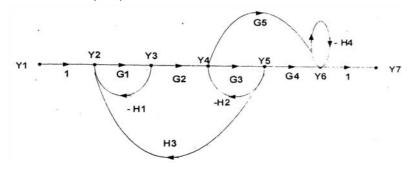
Instruction: Assume suitable data if necessary.

SECTION - I

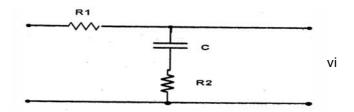
2. Attempt any four:

 $(4 \times 4 = 16)$

- a) Explain linear and non-linear control system.
- b) Explain force to voltage analogy.
- c) Calculate Y_7/Y_1 of the system whose signal flow graph is given below.



- d) Explain any four rules of block diagram reduction techniques.
- e) Find the transfer function of below network.



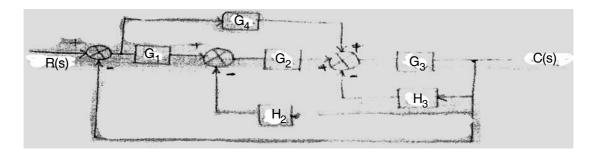
f) Compare open loop and closed loop control system.



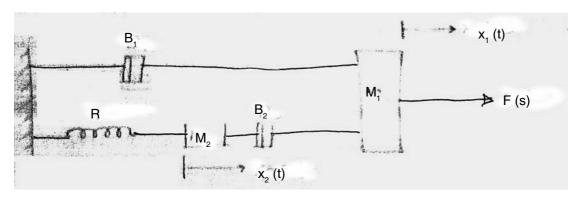
3. Attempt any two:

 $(6 \times 2 = 12)$

a) Find the transfer function of given block diagram.



b) Find the F-V and F-V analogy of a given mechanical system.



c) Explain the Mason's Gain formula.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Explain the standard test signals used in control system.
- b) The characteristic equation of a feedback control system is $s^4 + 4s^3 + 13s^2 + 36s + k = 0$ determine range of k for system to be stable.
- c) Explain the time domain specifications with neat diagram.
- d) How stability is related to location of pole? Explain in detail.
- e) Derive the expression for steady state error.
- f) The closed loop transfer function of unity feedback system is $C(s)/R(s) = 25/s^2 + 8s + 25$. Determine nature of damping in the system.



5. Sove any two: (2×6=12)

- a) Sketch the root locus for the open loop transfer function of unity feedback control system given below: G(S)H(S) = K/S (S + 4) (S + 5).
- b) Plot the Bode diagram for the following transfer function and obtain the gain and phase cross over frequencies: G(S) = 1000/S(1+0.1S)(1+0.001S).
- c) The open loop T/F of a servo system with unity feedback is given as G(S) = 10/(s + 5) (s + 2). Determine the damping ratio, natural frequency of oscillations. What is the percentage overshoot of the response to a unit step input?

T.E. (Electrical) (CGPA) (Part – I) Examination, 2017 **CONTROL SYSTEMS - I**

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Assume suitable data if **necessary**.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

14

1) The open loop transfer function of a unity feedback system is given by

$$G(s) = \frac{2(S + \alpha)}{S(S + 2)(S + 10)}$$
 Angles of asymptotes are

a) 60°, 120°, 300°

b) 60°, 180°, 300°

c) 90°, 270°, 360°

- d) 90°, 180°, 270°
- 2) _____ increases the steady state accuracy.
 - a) Integrator

- b) Differentiator
- c) Phase lead compensator
- d) Phase lag compensator
- 3) By which of the following the system response can be tested better?
 - a) Ramp input signal

- b) Sinusoidal input signal
- c) Unit impulse input signal
- d) Exponentially decaying signal
- 4) Regenerative feedback implies feedback with
 - a) oscillations
- b) step input
- c) negative sign d) positive sign
- 5) Which of the following should be done to make an unstable system stable?
 - a) The gain of the system should be decreased
 - b) The gain of the system should be increased
 - c) The number of poles to the loop transfer function should be increased
 - d) The number of zeros to the loop transfer function should be increased

- 6) The second derivative input signals modify which of the following?
 - a) The time constant of the system
 - b) Damping of the system
 - c) The gain of the system
 - d) The time constant and suppress the oscillations
- 7) The open-loop transfer function of a unity feedback system is

$$G(s) = \frac{1+s}{s(1+0.5s)}$$
 The corner frequencies are

- a) 0 and 2
- b) 0 and 1
- c) 0 and -1
- d) 1 and 2
- 8) Open loop control system is one in which the control action
 - a) depends on the input signal
- b) is independent of the desired output
- c) depends on system variable
- d) depends on system size
- 9) Feedback control system are
 - a) band-pass filters

b) low pass filters

c) high pass filters

- d) none of the above
- Sensitivity of a closed loop control system to variations in gain and load disturbances depends upon
 - a) loop gain
- b) frequency
- c) forward gain
- d) all of these
- 11) The transfer function of a system is laplace transform of its
 - a) square wave response
- b) step response

c) ramp response

- d) impulse response
- 12) The transfer function of an AC tachometer is

a)
$$Ks = \frac{E(s)}{\theta(s)}$$

b)
$$Ks = \frac{E(s)}{\omega m(s)}$$

c)
$$K = \frac{E(s)}{\theta(s)}$$

- d) none of the above
- 13) In F-V analogy Mass is analogous to
 - a) resistance

b) inductance

c) capacitance

- d) none of the above
- 14) Zero initial conditions of a system means
 - a) system at rest with no energy stored in any of its components
 - b) inductance
 - c) system at rest with stored energy
 - d) system without any storage element



Seat	
No.	

T.E. (Electrical) (CGPA) (Part – I) Examination, 2017 CONTROL SYSTEMS – I

Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

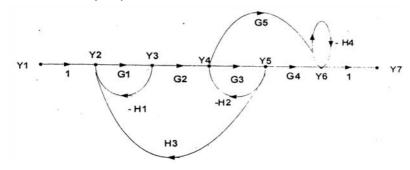
Instruction: Assume suitable data if necessary.

SECTION - I

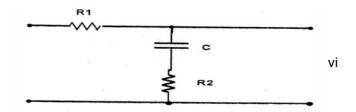
2. Attempt any four:

 $(4 \times 4 = 16)$

- a) Explain linear and non-linear control system.
- b) Explain force to voltage analogy.
- c) Calculate Y_7/Y_1 of the system whose signal flow graph is given below.



- d) Explain any four rules of block diagram reduction techniques.
- e) Find the transfer function of below network.



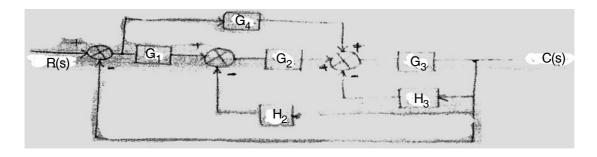
f) Compare open loop and closed loop control system.



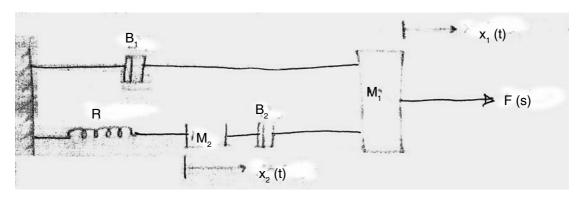
3. Attempt any two:

 $(6 \times 2 = 12)$

a) Find the transfer function of given block diagram.



b) Find the F-V and F-V analogy of a given mechanical system.



c) Explain the Mason's Gain formula.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Explain the standard test signals used in control system.
- b) The characteristic equation of a feedback control system is $s^4 + 4s^3 + 13s^2 + 36s + k = 0$ determine range of k for system to be stable.
- c) Explain the time domain specifications with neat diagram.
- d) How stability is related to location of pole? Explain in detail.
- e) Derive the expression for steady state error.
- f) The closed loop transfer function of unity feedback system is $C(s)/R(s) = 25/s^2 + 8s + 25$. Determine nature of damping in the system.



5. Sove any two: (2×6=12)

- a) Sketch the root locus for the open loop transfer function of unity feedback control system given below: G(S)H(S) = K/S (S + 4) (S + 5).
- b) Plot the Bode diagram for the following transfer function and obtain the gain and phase cross over frequencies: G(S) = 1000/S(1+0.1S)(1+0.001S).
- c) The open loop T/F of a servo system with unity feedback is given as G(S) = 10/(s + 5) (s + 2). Determine the damping ratio, natural frequency of oscillations. What is the percentage overshoot of the response to a unit step input?

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T.E. (Electrical) (CGPA) (Part – I) Examination, 2017 CONTROL SYSTEMS – I

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

14

1) The transfer function of an AC tachometer is

a)
$$Ks = \frac{E(s)}{\theta(s)}$$

b)
$$Ks = \frac{E(s)}{\omega m(s)}$$

c)
$$K = \frac{E(s)}{\theta(s)}$$

- d) none of the above
- 2) In F-V analogy Mass is analogous to
 - a) resistance

b) inductance

c) capacitance

- d) none of the above
- 3) Zero initial conditions of a system means
 - a) system at rest with no energy stored in any of its components
 - b) inductance
 - c) system at rest with stored energy
 - d) system without any storage element
- 4) The open loop transfer function of a unity feedback system is given by

$$G(s) = \frac{2(S + \alpha)}{S(S + 2)(S + 10)}$$
 Angles of asymptotes are



5)	increases the steady state a	
	a) Integratorc) Phase lead compensator	b) Differentiator
- \		
6)	By which of the following the system is	
	a) Ramp input signalc) Unit impulse input signal	d) Exponentially decaying signal
7)	Regenerative feedback implies feedback	
1)	a) oscillations b) step input	
8)	Which of the following should be done a) The gain of the system should be of b) The gain of the system should be if c) The number of poles to the loop tra	decreased ncreased
	d) The number of zeros to the loop tra	
9)	The second derivative input signals m	nodify which of the following?
	a) The time constant of the system	
	b) Damping of the system	
	c) The gain of the systemd) The time constant and suppress the	ne oscillations
10)	The open-loop transfer function	
,	·	
	$G(s) = \frac{1+s}{s(1+0.5s)}$ The corner frequen	
	a) 0 and 2 b) 0 and 1	c) 0 and -1 d) 1 and 2
11)	Open loop control system is one in wl a) depends on the input signal c) depends on system variable	hich the control action b) is independent of the desired output d) depends on system size
12)	Feedback control system are a) band-pass filters c) high pass filters	b) low pass filtersd) none of the above
13)	Sensitivity of a closed loop control s disturbances depends upon a) loop gain b) frequency	system to variations in gain and load c) forward gain d) all of these
14)	The transfer function of a system is la	aplace transform of its
,	a) square wave responsec) ramp response	b) step response d) impulse response



Seat	
No.	

T.E. (Electrical) (CGPA) (Part – I) Examination, 2017 CONTROL SYSTEMS – I

Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

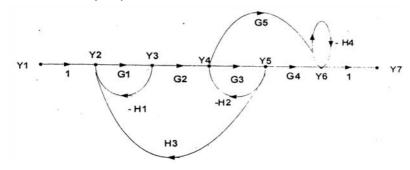
Instruction: Assume suitable data **if** necessary.

SECTION - I

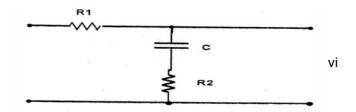
2. Attempt any four:

 $(4 \times 4 = 16)$

- a) Explain linear and non-linear control system.
- b) Explain force to voltage analogy.
- c) Calculate Y_7/Y_1 of the system whose signal flow graph is given below.



- d) Explain any four rules of block diagram reduction techniques.
- e) Find the transfer function of below network.



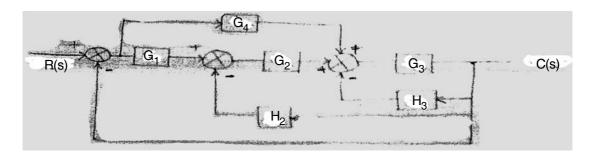
f) Compare open loop and closed loop control system.



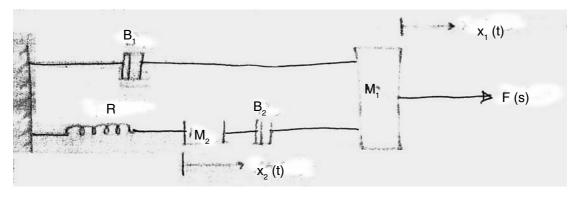
3. Attempt any two:

 $(6 \times 2 = 12)$

a) Find the transfer function of given block diagram.



b) Find the F-V and F-V analogy of a given mechanical system.



c) Explain the Mason's Gain formula.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Explain the standard test signals used in control system.
- b) The characteristic equation of a feedback control system is $s^4 + 4s^3 + 13s^2 + 36s + k = 0$ determine range of k for system to be stable.
- c) Explain the time domain specifications with neat diagram.
- d) How stability is related to location of pole? Explain in detail.
- e) Derive the expression for steady state error.
- f) The closed loop transfer function of unity feedback system is $C(s)/R(s) = 25/s^2 + 8s + 25$. Determine nature of damping in the system.



5. Sove any two: (2×6=12)

- a) Sketch the root locus for the open loop transfer function of unity feedback control system given below: G(S)H(S) = K/S (S + 4) (S + 5).
- b) Plot the Bode diagram for the following transfer function and obtain the gain and phase cross over frequencies: G(S) = 1000/S(1+0.1S)(1+0.001S).
- c) The open loop T/F of a servo system with unity feedback is given as G(S) = 10/(s + 5) (s + 2). Determine the damping ratio, natural frequency of oscillations. What is the percentage overshoot of the response to a unit step input?

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Seat	
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T.E. (Electrical) (CGPA) (Part – I) Examination, 2017 **CONTROL SYSTEMS - I**

Day and Date: Tuesday, 9-5-2017 Max. Marks: 70

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Assume suitable data if **necessary**.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

- 14
- 1) By which of the following the system response can be tested better?
 - a) Ramp input signal

- b) Sinusoidal input signal
- c) Unit impulse input signal
- d) Exponentially decaying signal
- 2) Regenerative feedback implies feedback with
 - a) oscillations
- b) step input
- c) negative sign d) positive sign
- 3) Which of the following should be done to make an unstable system stable?
 - a) The gain of the system should be decreased
 - b) The gain of the system should be increased
 - c) The number of poles to the loop transfer function should be increased
 - d) The number of zeros to the loop transfer function should be increased
- 4) The second derivative input signals modify which of the following?
 - a) The time constant of the system
 - b) Damping of the system
 - c) The gain of the system
 - d) The time constant and suppress the oscillations
- 5) The open-loop transfer function of a unity feedback system is

$$G(s) = \frac{1+s}{s(1+0.5s)}$$
 The corner frequencies are

- a) 0 and 2
- b) 0 and 1 c) 0 and -1 d) 1 and 2



- 6) Open loop control system is one in which the control action
 - a) depends on the input signal
- b) is independent of the desired output
- c) depends on system variable
- d) depends on system size
- 7) Feedback control system are
 - a) band-pass filters

b) low pass filters

c) high pass filters

- d) none of the above
- 8) Sensitivity of a closed loop control system to variations in gain and load disturbances depends upon
 - a) loop gain
- b) frequency
- c) forward gain
- d) all of these
- 9) The transfer function of a system is laplace transform of its
 - a) square wave response
- b) step response

c) ramp response

- d) impulse response
- 10) The transfer function of an AC tachometer is

a)
$$Ks = \frac{E(s)}{\theta(s)}$$

b)
$$Ks = \frac{E(s)}{\omega m(s)}$$

c)
$$K = \frac{E(s)}{\theta(s)}$$

- d) none of the above
- 11) In F-V analogy Mass is analogous to
 - a) resistance

b) inductance

c) capacitance

- d) none of the above
- 12) Zero initial conditions of a system means
 - a) system at rest with no energy stored in any of its components
 - b) inductance
 - c) system at rest with stored energy
 - d) system without any storage element
- 13) The open loop transfer function of a unity feedback system is given by

$$G(s) = \frac{2(S + \alpha)}{S(S + 2) (S + 10)}$$
 Angles of asymptotes are

a) 60°, 120°, 300°

b) 60°, 180°, 300°

c) 90°, 270°, 360°

- d) 90°, 180°, 270°
- 14) _____ increases the steady state accuracy.
 - a) Integrator

- b) Differentiator
- c) Phase lead compensator
- d) Phase lag compensator



Seat	
No.	

T.E. (Electrical) (CGPA) (Part – I) Examination, 2017 CONTROL SYSTEMS – I

Day and Date: Tuesday, 9-5-2017 Marks: 56

Time: 10.00 a.m. to 1.00 p.m.

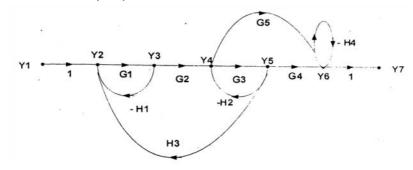
Instruction: Assume suitable data if necessary.

SECTION - I

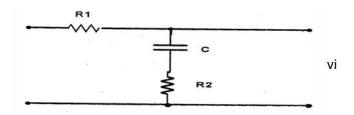
2. Attempt any four:

 $(4 \times 4 = 16)$

- a) Explain linear and non-linear control system.
- b) Explain force to voltage analogy.
- c) Calculate Y_7/Y_1 of the system whose signal flow graph is given below.



- d) Explain any four rules of block diagram reduction techniques.
- e) Find the transfer function of below network.



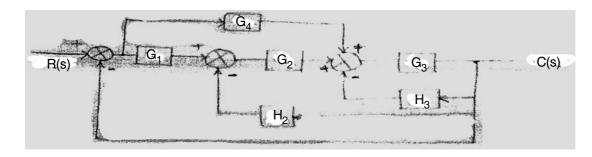
f) Compare open loop and closed loop control system.



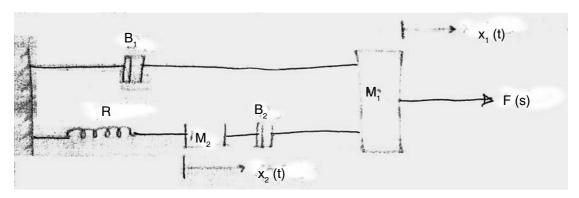
3. Attempt any two:

 $(6 \times 2 = 12)$

a) Find the transfer function of given block diagram.



b) Find the F-V and F-V analogy of a given mechanical system.



c) Explain the Mason's Gain formula.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Explain the standard test signals used in control system.
- b) The characteristic equation of a feedback control system is $s^4 + 4s^3 + 13s^2 + 36s + k = 0$ determine range of k for system to be stable.
- c) Explain the time domain specifications with neat diagram.
- d) How stability is related to location of pole? Explain in detail.
- e) Derive the expression for steady state error.
- f) The closed loop transfer function of unity feedback system is $C(s)/R(s) = 25/s^2 + 8s + 25$. Determine nature of damping in the system.



5. Sove any two: (2×6=12)

- a) Sketch the root locus for the open loop transfer function of unity feedback control system given below: G(S)H(S) = K/S (S + 4) (S + 5).
- b) Plot the Bode diagram for the following transfer function and obtain the gain and phase cross over frequencies: G(S) = 1000/S(1+0.1S)(1+0.001S).
- c) The open loop T/F of a servo system with unity feedback is given as G(S) = 10/(s + 5) (s + 2). Determine the damping ratio, natural frequency of oscillations. What is the percentage overshoot of the response to a unit step input?

		ш

a) Voltage ratio c) Slew rate

				SLR-VB – 3	20
Seat No.				Set F	>
	T.E. (- I) (Old) Examina GRATED CIRCUIT		<u> </u>
•	d Date : Tuesd 3.00 p.m. to 6	lay, 16-5-2017 .00 p.m.		Total Marks :	100
1	Instructions :	in Answer Book 2) Answer MCQ/C	Page No. 3. Each qu Dbjective type questi	solved in first 30 minute lestion carries one mar ons on Page No. 3 onl (Q/R/S) on Top of Pag	k. y.
Duratio	n : 30 Minutes		ve Type Questions	Marks	: 20
	oose the corre An ideal OP-A			(20×1=	=20)
,	a) infinite A_vThe O/P of thea) The RC tinb) The amplit	b) infinite R _i e differentiator is pro ne constant tude of t which the i/p is cha	oportion to	d) all the above	
	a) triangularIn common ma) both i/ps ab) o/p are corc) o/p slgs ar	ode configuration re grounded nnected together	c) square	d) sine	
5)	_	or, the feedback ele b) capacitor	ment is a c) zener diode	d) vtg. divider	
6)	IC 741 is a) 6	pin IC. b) 12	c) 8	d) 10	
7)	$\frac{dv_0}{dt}$ is called	i			

b) Voltage rated) Transient response



8)	In V-I with floated load, load resistant a) grounded c) floating	ce R _L is b) connected to NI terminal d) connected to inverting terminal
9)	In full wave rectifier ckt., regardless (a) negative going c) same as i/p	of the polarity of i/p slg, o/p is always b) positive going d) none
10)	The purpose of comparator is to a) amplify an i/p vtg. b) detect the occurrence of a changin c) maintain a constant o/p when the a d) produce a change in o/p vtg. when	ac i/p vtg. changes
11)	All pass filter passes a) all freq. components c) two band of freq.	b) only particular band of freq.d) none
12)	Square wave generator is also called a) free running multivibrator c) astable multivibrator	b) monostable multivibrator
13)	The freq. oscillation of IC555 astable a) $\frac{1.443}{(R_A + 2R_B)C}$ b) $\frac{1.443}{(R_A + R_B)C}$	
14)	Which of the following is not an i/p or a) control vtg. b) threshold	
15)	The LM7812 produces a regulated o/p a) 3V b) 4V	ovtg. of c) 12V d) 78V
16)	The 79XX series are three terminal IC a) fixed negative c) fixed positive	
17)	The LM337 is a three terminal IC regulary positive variable c) positive fixed	ulator with a o/p vtg. b) negative variable d) variable positive
18)	Oscillators are ckt.s that generates a a) true c) partially true	n o/p vtg. when an i/p slg. is applied b) false d) partially false
19)	The wein bridge oscillator's positive for a) an RC ckt. b) an LC ckt.	eedback is c) vtg. divider d) a lead lag ckt.
20)	A phase shift oscillator has a) 3 RC ckt.s b) 3 LC ckt.s	c) A T type ckt. d) An RC-type ckt



Seat	
No.	

T.E. (Electrical) (Part – I) (Old) Examination, 2017 LINEAR INTEGRATED CIRCUITS

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (4×5=20)

- 1) Explain differential amplifier with neat diagram.
- 2) Explain ideal characteristics of OP-AMP.
- 3) Explain V to I convertor with application.
- 4) Draw and explain precision full wave rectifier.
- 5) Explain differentiator with freq. response.

3. Solve any two: (10×2=20)

- 1) Explain in detail special cases of comparator.
 - i) ZCD

- ii) Window detector
- 2) Explain OP-amp as inverting amplifier and derive the gain in closed loop.
- 3) The 741IC OP-amp having the following parameters is connected as a non-inverting amplifier with R_1 = 1 K Ω and R_F = 10 K Ω .

$$A = 2,00,000, R_i = 2 M\Omega, R_o = 75\Omega$$

$$f_0 = 5 Hz$$

Supply voltages = $\pm 15V$

O/P voltage swing = \pm 13V

Compute the values of, A_F , R_{iF} , R_{oF} , F_F and V_{oot} .



SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Explain 1st order high filter with its freq. response.
- 2) Explain the +ve voltage regulator with diagram.
- 3) Explain the ckt. dia. IC555 as a monostable multivibrator.
- 4) What is phase locked loop? Explain with block diagram.
- 5) Draw and explain square wave generator, also sketch the waveform.

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Design a 2^{nd} order low-pass filter at a high freq. of 1KHz and also draw freq . response of the network.
- 2) Design the phase shift oscillator so that $f_0 = 200 \text{ Hz}$.
- 3) Draw and explain how op-amp is used to produce sawtooth wave and triangular wave with waveforms.

Seat No.		Set	Q	
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		, ,	(Old) Examination	on,	2017
-	d Date : Tuesday, 10 3.00 p.m. to 6.00 p.				Total Marks : 100
1	in 2) A	Answer Book Pag nswer MCQ/Objec	ory. It should be solve ge No. 3. Each ques ctive type question ation, Q.P. Set (P/Q/	tion s o i	carries one mark. n Page No. 3 only.
Duratio	n : 30 Minutes	MCQ/Objective T	ype Questions		Marks : 20
1. Ch	oose the correct an	swer:			(20×1=20)
1)	The 79XX series at a) fixed negative c) fixed positive	re three terminal IC	regulator with b) variable negativ d) variable positiv	vе	o/p vtg.
2)	The LM337 is a threat positive variable c) positive fixed		ulator with a b) negative variab d) variable positiv	le	o/p vtg.
3)	Oscillators are ckt. a) true c) partially true	s that generates a	n o/p vtg. when an b) false d) partially false	i/p s	slg. is applied
4)	The wein bridge os a) an RC ckt.	-	eedback is c) vtg. divider	d)	a lead lag ckt.
5)	A phase shift oscill a) 3 RC ckt.s		c) AT type ckt.	d)	An RC-type ckt.
6)	An ideal OP-AMP ha) infinite A _v	nas b) infinite R _i	c) zero R _o	d)	all the above
7)	The O/P of the differance a) The RC time cob) The amplitude cob) The rate at which d) Both a and c	nstant of			
8)	For step i/p, o/p of a) triangular	an integrator is b) ramp	c) square	d)	sine



9)	In common mode co a) both i/ps are gro b) o/p are connecte c) o/p slgs are in p d) identical signal a	unded ed together hase	ıe i/	ps		
10)	In an integrator, the a) resistor				d)	vtg. divider
11)	IC 741 is	pin IC.				
	a) 6	b) 12	c)	8	d)	10
12)	$\frac{dv_0}{dt}$ is called					
	a) Voltage ratio		b)	Voltage rate		
	c) Slew rate		d)	Transient respo	nse	9
13)	In V-I with floated lo	oad, load resistand				one in a l
	a) groundedc) floating		,	connected to N connected to in		
14)	In full wave rectified	r ckt - regardless o	,			•
,	a) negative going	· om, rogaraioco		positive going	o.g,	o, p io airrayo
	c) same as i/p		d)	none		
15)	The purpose of con	-				
	a) amplify an i/p vtb) detect the occur		ng i	/p vta.		
	c) maintain a cons	tant o/p when the	ac i	p vtg. changes	_	
4.0\	d) produce a chang		n ar	ı i/p vtg. equals t	heı	reference vtg.
16)	All pass filter passe a) all freq. compon		h)	only particular b	าลท	d of frea
	c) two band of freq			none	Juii	a or noq.
17)	Square wave gene					
	a) free running multiviblec) astable multivible			monostable mu both a and c	ltivi	brator
18)	The freq. oscillation		,			
.0)				_		1.5
	a) $\frac{1.443}{(R_A + 2R_B)C}$	b) $\overline{(R_A + R_B)C}$	c)	$\overline{(R_A + 3R_B)C}$	d)	$\overline{(2R_A + R_B)C}$
19)	Which of the follow					
	a) control vtg.	•	•		d)	trigger
20)	The LM7812 produ	_		_	٩/	79\/
	a) 3V	b) 4V	U)	12V	u)	78V



Seat	
No.	

T.E. (Electrical) (Part – I) (Old) Examination, 2017 LINEAR INTEGRATED CIRCUITS

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (4×5=20)

- 1) Explain differential amplifier with neat diagram.
- 2) Explain ideal characteristics of OP-AMP.
- 3) Explain V to I convertor with application.
- 4) Draw and explain precision full wave rectifier.
- 5) Explain differentiator with freq. response.

3. Solve any two: (10×2=20)

- 1) Explain in detail special cases of comparator.
 - i) ZCD

- ii) Window detector
- 2) Explain OP-amp as inverting amplifier and derive the gain in closed loop.
- 3) The 741IC OP-amp having the following parameters is connected as a non-inverting amplifier with R_1 = 1 K Ω and R_F = 10 K Ω .

$$A = 2,00,000, R_i = 2 M\Omega, R_o = 75\Omega$$

$$f_0 = 5 Hz$$

Supply voltages = $\pm 15V$

O/P voltage swing = \pm 13V

Compute the values of, A_F , R_{iF} , R_{oF} , F_F and V_{ooT} .

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Explain 1st order high filter with its freq. response.
- 2) Explain the +ve voltage regulator with diagram.
- 3) Explain the ckt. dia. IC555 as a monostable multivibrator.
- 4) What is phase locked loop? Explain with block diagram.
- 5) Draw and explain square wave generator, also sketch the waveform.

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Design a 2^{nd} order low-pass filter at a high freq. of 1KHz and also draw freq . response of the network.
- 2) Design the phase shift oscillator so that $f_0 = 200 \text{ Hz}$.
- 3) Draw and explain how op-amp is used to produce sawtooth wave and triangular wave with waveforms.

Seat				
No.			Set	R
	T E /I	Flectrical) (Part – I) (Old) Examination 201		

LINEAR INTEGRA	
Day and Date : Tuesday, 16-5-2017 Time : 3.00 p.m. to 6.00 p.m.	Total Marks : 100
in Answer Book Pag 2) Answer MCQ/Obje	sory. It should be solved in first 30 minutes ge No. 3. Each question carries one mark. ective type questions on Page No. 3 only. ention, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective T Duration : 30 Minutes	Г уре Questions Marks : 20
1. Choose the correct answer:	(20×1=20)
 All pass filter passes a) all freq. components two band of freq. 	b) only particular band of freq.d) none
 2) Square wave generator is also called a) free running multivibrator c) astable multivibrator 	b) monostable multivibratord) both a and c
3) The freq. oscillation of IC555 astable a) $\frac{1.443}{(R_A + 2R_B)C}$ b) $\frac{1.443}{(R_A + R_B)C}$	_
4) Which of the following is not an i/p ora) control vtg.b) threshold	
5) The LM7812 produces a regulated of a) 3V b) 4V	
6) The 79XX series are three terminal ICa) fixed negativec) fixed positive	C regulator with o/p vtg. b) variable negative d) variable positive
7) The LM337 is a three terminal IC rega) positive variablec) positive fixed	ulator with a o/p vtg. b) negative variable d) variable positive
8) Oscillators are ckt.s that generates aa) truec) partially true	an o/p vtg. when an i/p slg. is applied b) false d) partially false



9)	The wein bridge os a) an RC ckt.				d)	a lead lag ckt.
10)	A phase shift oscill a) 3 RC ckt.s		c)	A T type ckt.	d)	An RC-type ckt.
11)	An ideal OP-AMP ha) infinite A _V		c)	zero R _o	d)	all the above
12)	The O/P of the differance and The RC time cobbb The amplitude cobbb The rate at which do Both a and c	nstant f		n to		
13)	For step i/p, o/p of a) triangular		c)	square	d)	sine
14)	In common mode ca) both i/ps are grob) o/p are connected o/p slgs are in pd) identical signal.	ounded ed together hase	ıe i/	ps		
·	In an integrator, the a) resistor	b) capacitor	c)	zener diode	d)	vtg. divider
	IC 741 is a) 6	pin iC. b) 12	c)	8	d)	10
17)	$\frac{dv_0}{dt}$ is called					
	a) Voltage ratioc) Slew rate		-	Voltage rate Transient respo	nse	e
18)	In V-I with floated lead grounded c) floating	oad, load resistand	b)	R _L is connected to N connected to in		
19)	In full wave rectifie a) negative going c) same as i/p	r ckt., regardless o	b)	ne polarity of i/p positive going none	slg	, o/p is always
20)	The purpose of cor a) amplify an i/p vt b) detect the occur c) maintain a cons d) produce a chan	g. rrence of a changir tant o/p when the	ac i	/p vtg. changes	he	reference vtg.



Seat	
No.	

T.E. (Electrical) (Part – I) (Old) Examination, 2017 LINEAR INTEGRATED CIRCUITS

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (4×5=20)

- 1) Explain differential amplifier with neat diagram.
- 2) Explain ideal characteristics of OP-AMP.
- 3) Explain V to I convertor with application.
- 4) Draw and explain precision full wave rectifier.
- 5) Explain differentiator with freq. response.

3. Solve any two: (10×2=20)

- 1) Explain in detail special cases of comparator.
 - i) ZCD

- ii) Window detector
- 2) Explain OP-amp as inverting amplifier and derive the gain in closed loop.
- 3) The 741IC OP-amp having the following parameters is connected as a non-inverting amplifier with R_1 = 1 K Ω and R_F = 10 K Ω .

$$A = 2,00,000, R_i = 2 M\Omega, R_o = 75\Omega$$

$$f_0 = 5 Hz$$

Supply voltages = $\pm 15V$

O/P voltage swing = \pm 13V

Compute the values of, A_F , R_{iF} , R_{oF} , F_F and V_{ooT} .

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Explain 1st order high filter with its freq. response.
- 2) Explain the +ve voltage regulator with diagram.
- 3) Explain the ckt. dia. IC555 as a monostable multivibrator.
- 4) What is phase locked loop? Explain with block diagram.
- 5) Draw and explain square wave generator, also sketch the waveform.

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Design a 2^{nd} order low-pass filter at a high freq. of 1KHz and also draw freq . response of the network.
- 2) Design the phase shift oscillator so that $f_0 = 200 \text{ Hz}$.
- 3) Draw and explain how op-amp is used to produce sawtooth wave and triangular wave with waveforms.

Set

	1.6. (6	LINEAR INTE	, .	•	•	
-	d Date : Tuesda 3.00 p.m. to 6.0				Tota	al Marks : 100
ı		() Q. No. 1 is com in Answer Book 2) Answer MCQ/0 Don't forget to	R Page No Objective	o. 3. Each que type questio	estion carries ons on Page	s one mark. No. 3 only.
Duratio	n : 30 Minutes	MCQ/Object	ive Type	Questions		Marks : 20
	oose the correc					(20×1=20)
1)	a) 6	pin IC. b) 12	c)	8	d) 10	
2)	$\frac{dv_0}{dt}$ is called					
	a) Voltage ration)	•	Voltage rate		
۵/	c) Slew rate			Transient resp	oonse	
3)	a) groundedc) floating	ed load, load resi	b)	connected to		minal
4)	In full wave rec a) negative goi c) same as i/p	tifier ckt., regardl ng	b)	e polarity of i/ positive going none		always
5)	a) amplify an ib) detect the oc) maintain a o	f comparator is to /p vtg. ccurrence of a ch constant o/p wher hange in o/p vtg.	the ac i/	p vtg. change		nce vtg.
6)	All pass filter p a) all freq. com c) two band of	ponents		only particula	r band of fre	eq.
7)	Square wave g a) free running c) astable mul		b)	monostable n both a and c	nultivibrator	



8)	The freq. oscillation	n of IC555 astable	ckt	. is given as		
	a) $\frac{1.443}{(R_A + 2R_B)C}$	1.443	٠,١	1.5	-1\	1.5
	$(R_A + 2R_B)C$	$(R_A + R_B)C$	C)	$(R_A + 3R_B)C$	a)	$(2R_A + R_B)C$
9)	Which of the follow					
	a) control vtg.	b) threshold	c)	clock	d)	trigger
10)	The LM7812 produ	ces a regulated o/p	o vt	g. of		
	a) 3V	b) 4V				
11)	The 79XX series ar	re three terminal IC	re	gulator with		o/p vtg.
	a) fixed negative		b)	variable negativ	e ^	
40\	c) fixed positive					- / · - -
12)	The LM337 is a threat a) positive variable	ee terminai IC regu	มลเด กา	or with a		o/p vtg.
	c) positive variable	5	d)	negative variab	6 6	
13)	Oscillators are ckt.					sla is applied
.0,	a) true	o mai gonoratoo a		false	, P	ng. 10 applica
	c) partially true		,	partially false		
14)	The wein bridge os	cillator's positive f	eec	lback is		
	a) an RC ckt.	b) an LC ckt.	c)	vtg. divider	d)	a lead lag ckt.
15)	A phase shift oscill	ator has				
	a) 3 RC ckt.s	b) 3 LC ckt.s	c)	A T type ckt.	d)	An RC-type ckt.
16)	An ideal OP-AMP h					
	a) infinite A _v	b) infinite R _i	c)	zero R _o	d)	all the above
17)	The O/P of the diffe		tior	n to		
	a) The RC time co					
	b) The amplitude oc) The rate at which		20			
	d) Both a and c	in the I/p is changing	ıy			
18)	For step i/p, o/p of	an integrator is				
10)		b) ramp	c)	square	d)	sine
19)	In common mode c	•	-,	- 4	- /	
. • ,	a) both i/ps are gro	_				
	b) o/p are connecte					
	c) o/p slgs are in p	_				
	d) identical signal	appears on both th	e i/	ps		
20)	In an integrator, the	e feedback elemen	ıt is	а		
,	a) resistor	b) capacitor			d)	vtg. divider
	•	•	•		,	-



Seat	
No.	

T.E. (Electrical) (Part – I) (Old) Examination, 2017 LINEAR INTEGRATED CIRCUITS

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION-I

2. Solve any four: (4×5=20)

- 1) Explain differential amplifier with neat diagram.
- 2) Explain ideal characteristics of OP-AMP.
- 3) Explain V to I convertor with application.
- 4) Draw and explain precision full wave rectifier.
- 5) Explain differentiator with freq. response.

3. Solve any two: (10×2=20)

- 1) Explain in detail special cases of comparator.
 - i) ZCD

- ii) Window detector
- 2) Explain OP-amp as inverting amplifier and derive the gain in closed loop.
- 3) The 741IC OP-amp having the following parameters is connected as a non-inverting amplifier with R_1 = 1 K Ω and R_F = 10 K Ω .

$$A = 2,00,000, R_i = 2 M\Omega, R_o = 75\Omega$$

$$f_0 = 5 Hz$$

Supply voltages = $\pm 15V$

O/P voltage swing = \pm 13V

Compute the values of, A_F , R_{iF} , R_{oF} , F_F and V_{ooT} .

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Explain 1st order high filter with its freq. response.
- 2) Explain the +ve voltage regulator with diagram.
- 3) Explain the ckt. dia. IC555 as a monostable multivibrator.
- 4) What is phase locked loop? Explain with block diagram.
- 5) Draw and explain square wave generator, also sketch the waveform.

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Design a 2^{nd} order low-pass filter at a high freq. of 1KHz and also draw freq . response of the network.
- 2) Design the phase shift oscillator so that $f_0 = 200 \text{ Hz}$.
- 3) Draw and explain how op-amp is used to produce sawtooth wave and triangular wave with waveforms.

No. Set P	Seat No.		Set	Р
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T.E. (Part – II) (Electrical) Examination, 2017 ELECTRICAL MACHINE DESIGN (New CGPA)

Day and Date: Monday, 15-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

Don't forget to me	ention, Q.P. Set (P/Q/R/S) on Top of Page.	
MCQ/Objective Duration: 30 Minutes	e Type Questions Marks : 1	4
Choose the correct answer :	(14×1=14	4)
CRGO has permeability i A) Nil B) Maximum	in the direction of grain orientation. C) Minimum D) None of these	
laminations are likely to cause	B) Decrease in core loss D) Increase in copper loss	
3) Multi stepped core is used in a transformationA) Increase outputC) Decrease cost of copper	B) Decrease cost of core material	
 4) The major consideration to evolve a g A) Durability B) Cost C) Compliance with performance laid D) All of the above 		
5) Power factor impose limitation on A) Dc B) Synchronous	motors. S C) Induction D) None of these	
6) The action of electromagnetic machinA) InductionC) Alignment	nes is based on the principle of B) Interaction D) All of the above	
 7) In a dc machines "contraction coefficier A) Air-gap area due to armature slots B) Iron losses in the teeth due to low C) Armature mmf due to armature slot D) Torque due to ventilating duct 	ver tooth density	

SLR-VB - 321	-2-
3E11-VD - 321	-2-

R-VB	3 – 321	-2-				
8)	Specific electric loading A) Heating or temper C) Magnetizing curre	ature rise	B)	Speed of machine Machine size	ne	
9)	In dc machine increas A) Increase in size ar B) Decrease in size a C) Excessive sparkin D) None of these	nd cost of the mach	nine	es .		
10)	If the stator winding of winding	of a 3 phase induc	ction	n motor is delta d	conr	nected, the rotor
	A) Should be delta coC) Should not be delta			Should be star or de		
11)	A) Starting current C) Maximum torque	on leakage reacta	B)	in an induction n Starting torque All of the above	notc	or.
12)	A machine with large A) Poor power factor B) Poor efficiency C) Poor maximum po D) Both A) and B)	·		•		
13)	Synchronous comper of power supply netwo	ork with rating upto	ab	out		,
	A) 100 MVAR	B) 50 MVAR	C)	25 MVAR	D)	10 MVAR
14)	Multiple inlet system of rating upto A) 250 MW	f air cooling of turbo 3) 20 MW		ternator can be er 100 MW		oyed for machine 60 MW
	7.9 200 IVIVV	J) LO IVIVV	\cup_j	I GG IVI V V	ر ح	OO IVIVV



Seat	
No.	

T.E. (Part – II) (Electrical) Examination, 2017 ELECTRICAL MACHINE DESIGN (New CGPA)

Day and Date: Monday, 15-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

- 1) Explain the principles of design of rotating machines.
- 2) For a transformer, show that $E_t = K\sqrt{S}$ where, $E_t = \text{emf per turn}$, S = KVA rating of transformer, what are the factors on which value of K depends.
- 3) A 350 Kw, 500 V, 540 r.p.m., 6 pole D.C. generator is built with an armature diameter of 0.87 m and a core length of 0.32 m. The lap wound armature has 660 conductors. Calculate the specific magnetic and electric loadings.
- 4) Calculate approximate overall dimension for 200 KVA, 6600/440 V, 50 Hz, 3 phase core type transformer. The following data may be assumed: emf per turn = 10 V, maximum flux density = 1.3 Wb/m², current density = 2.5 A/mm², window space factor = 0.3, overall height = overall width, stacking factor = 0.9, use 3 stepped cores.
- 5) A 5 Kw, 250 V, 4 pole, 1500 r.p.m. shunt generator is designed to have a square pole face. The loadings are: average flux density in the gap = 0.42 Wb/m² and ampere conductor per meter = 15000. Find the dimension of the machine. Assume full load efficiency = 0.87 and ratio of pole arc to pole pitch = 0.66.
- 6) For square core transformer show that $Ai = 0.45 d^2$.

3. Solve any two:

 $(6 \times 2 = 12)$

- 1) A 250 KVA 6600/400 V, 3 phase core type transformer has a total loss of 4800 W at full load. The transformer tank is 1.25 m in height and 1 m × 0.5 m in plain. Design a suitable scheme for tubes if the average temp rise is to be limited to 35° C. The diameter of tube is 50 mm and is spaced 75 mm from each other. The average height of tube is 1.05 m. Specific heat dissipation due to radiation and convection is respectively 6 and 6.5 W/m²-°C. Assume that convection is improved by 35 per cent due to provision of tubes.
- 2) Find the main dimensions, number of poles and length of air gap of a 1000 Kw, 500 V, 300 r.p.m. D.C. generator. Assume the specific magnetic loading $B_{av} = 0.7$ Wb/m², 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.

-4-

3) A 250 Kw, 500 V, 600 r.p.m. dc generator is built with an armature diameter of 0.75 m and core length of 0.3 m. The Lap connected armature has 720 conductors. Using the data obtained by this machine, determine the armature diameter, core length, number of armature slots, armature conductors for 350 Kw, 440 V, 720 r.p.m., 6 pole d.c. generator. Assume a square pole face with ratio of pole arc to pole pitch equal to 0.66. The full load efficiency is 0.91 and internal voltage drop is 4% of rated voltage. The voltage between adjacent segments should not exceed 15 V at no load.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- 1) A 11 Kw, 3 φ, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductor. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machines has an efficiency of 0.86 and power factor of 0.85. The rotor mmf may assume as 85% of stator mmf. Also find bar and the end ring section if the current density is 5A/mm².
- 2) Calculate the length of air gap of a 15 Kw, 400 V, 50 Hz, delta connected 1440 r.p.m. induction motor having both full load efficiency and power factor as 0.88 each. Assume $B_{av} = 0.45$ Tesla, ac = 23000 amp. Cond. per meter, ratio of pole arc to pole pitch = 0.85.
- 3) Design suitable value of diameter and length of a 75 MVA, 11 KV, 50 Hz, 3000 r.p.m., $3 \oplus$, star connected alternator. Also determine the value of flux, conductor per slot, number of turns per phase and size of armature conductor.
- 4) Derive the output equation of single phase induction motor.
- 5) Discuss the choice of specific electric loading and specific magnetic loading of synchronous generator.

5. Solve any two:

 $(2 \times 6 = 12)$

- 1) Find the main dimensions, no of stator turns, size of conductors and number of stator slots for a 5 H.P., 400 V, 3 phase, 50 Hz, 1500 syn. r.p.m. sq. cage induction motor. Star Delta starting is used. Use the following data: average flux density in air gap = 0.46 Wb/m², amp. Cond. per meter of arm. periphery = 22000, full load efficiency = 83%, full load power factor = 0.84 lagg. Appropriate values for additional data required may be assumed.
- 2) Determine the main dimension of 3000 KVA, 6.6 KV, 50 Hz, 187.5 r.p.m., 3ϕ star connected alternator. Also find number of stator slots, conductor per slots and winding details. Assume average gap density = 0.58 Wb/m², ampere conductor per meter = 35000. Assume L/ τ = 1.5.
- 3) In the design of 30 H.P., 3Φ , 440 V, 960 r.p.m., 50 Hz, delta connected induction motor. Assume the specific electric loading of 25000 A/m, specific magnetic loading of 0.46 Wb/m². Full load efficiency 86%, pf = 0.87 and estimate the following :
 - i) Stator core dimensions
 - ii) Number of stator slots and winding turns.

Set P

				SLF	K-AR —	321
Seat No.					Set	Q
	E	T.E. (Part – II) (Electri LECTRICAL MACHIN	•	•		
-	nd Date : Monday 3.00 p.m. to 6.00				Max. Mark	ks : 70
	Instructions :	in Answer Book Pa 2) Answer MCQ/Obj	ge No ective	It should be solved in firs b. 3. Each question carrie c type questions on Pag g, Q.P. Set (P/Q/R/S) on	es one mari ge No. 3 o	k. nly.
Duratio	on : 30 Minutes	MCQ/Objective	Туре	Questions	Marl	ks : 14
_	noose the correc				(14×	:1=14)
1)	•	c loading is not govern temperature rise g current	B)	Speed of machine Machine size		
2)	A) Increase in	. •	achine	es		
3)	winding			n motor is delta connect		or
	,	delta connected be delta connected	,	Should be star connected May be star or delta con		
4)	A) Starting cur C) Maximum t	rent	B)	in an induction motor. Starting torque All of the above		
5)	A) Poor powe B) Poor efficie	ncy num power output and	_	ū		

6) Synchronous compensator are used for controlling the reactive power (KVAR)

C) 25 MVAR

of power supply network with rating upto about

A) 100 MVAR

B) 50 MVAR

D) 10 MVAR

7)	Multiple inlet system of rating upto A) 250 MW	· ·			·	oyed for machine 60 MW
8)	CRGO hasA) Nil	•	he	direction of grain	orie	entation.
9)	While punching silic laminations are likely A) Increase in core C) Decrease in copp	y to cause loss	B)	ransformer core Decrease in cop Increase in cop	re lo	SS
10)	Multi stepped core is A) Increase output C) Decrease cost of		B)	Decrease cost of		ore material
11)	The major considerate A) Durability B) Cost C) Compliance with D) All of the above	_		-	I	
12)	Power factor impose A) Dc	limitation on B) Synchronous			D)	None of these
13)	The action of electro A) Induction C) Alignment	magnetic machines	B)	based on the pri Interaction All of the above		le of
14)	In a dc machines "cor A) Air-gap area due B) Iron losses in the C) Armature mmf du D) Torque due to ve	to armature slots teeth due to lower te to armature slots			coui	nt the reduction of



Seat	
No.	

T.E. (Part – II) (Electrical) Examination, 2017 ELECTRICAL MACHINE DESIGN (New CGPA)

Day and Date: Monday, 15-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

- 1) Explain the principles of design of rotating machines.
- 2) For a transformer, show that $E_t = K\sqrt{S}$ where, $E_t = \text{emf per turn}$, S = KVA rating of transformer, what are the factors on which value of K depends.
- 3) A 350 Kw, 500 V, 540 r.p.m., 6 pole D.C. generator is built with an armature diameter of 0.87 m and a core length of 0.32 m. The lap wound armature has 660 conductors. Calculate the specific magnetic and electric loadings.
- 4) Calculate approximate overall dimension for 200 KVA, 6600/440 V, 50 Hz, 3 phase core type transformer. The following data may be assumed: emf per turn = 10 V, maximum flux density = 1.3 Wb/m², current density = 2.5 A/mm², window space factor = 0.3, overall height = overall width, stacking factor = 0.9, use 3 stepped cores.
- 5) A 5 Kw, 250 V, 4 pole, 1500 r.p.m. shunt generator is designed to have a square pole face. The loadings are: average flux density in the gap = 0.42 Wb/m² and ampere conductor per meter = 15000. Find the dimension of the machine. Assume full load efficiency = 0.87 and ratio of pole arc to pole pitch = 0.66.
- 6) For square core transformer show that $Ai = 0.45 d^2$.

3. Solve any two:

 $(6 \times 2 = 12)$

- 1) A 250 KVA 6600/400 V, 3 phase core type transformer has a total loss of 4800 W at full load. The transformer tank is 1.25 m in height and 1 m × 0.5 m in plain. Design a suitable scheme for tubes if the average temp rise is to be limited to 35° C. The diameter of tube is 50 mm and is spaced 75 mm from each other. The average height of tube is 1.05 m. Specific heat dissipation due to radiation and convection is respectively 6 and 6.5 W/m²-°C. Assume that convection is improved by 35 per cent due to provision of tubes.
- 2) Find the main dimensions, number of poles and length of air gap of a 1000 Kw, 500 V, 300 r.p.m. D.C. generator. Assume the specific magnetic loading $B_{av} = 0.7$ Wb/m², 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.



3) A 250 Kw, 500 V, 600 r.p.m. dc generator is built with an armature diameter of 0.75 m and core length of 0.3 m. The Lap connected armature has 720 conductors. Using the data obtained by this machine, determine the armature diameter, core length, number of armature slots, armature conductors for 350 Kw, 440 V, 720 r.p.m., 6 pole d.c. generator. Assume a square pole face with ratio of pole arc to pole pitch equal to 0.66. The full load efficiency is 0.91 and internal voltage drop is 4% of rated voltage. The voltage between adjacent segments should not exceed 15 V at no load.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- 1) A 11 Kw, 3 φ, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductor. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machines has an efficiency of 0.86 and power factor of 0.85. The rotor mmf may assume as 85% of stator mmf. Also find bar and the end ring section if the current density is 5A/mm².
- 2) Calculate the length of air gap of a 15 Kw, $400 \, \text{V}$, $50 \, \text{Hz}$, delta connected 1440 r.p.m. induction motor having both full load efficiency and power factor as 0.88 each. Assume $B_{\text{av}} = 0.45 \, \text{Tesla}$, ac = 23000 amp. Cond. per meter, ratio of pole arc to pole pitch = 0.85.
- 3) Design suitable value of diameter and length of a 75 MVA, 11 KV, 50 Hz, 3000 r.p.m., $3 \oplus$, star connected alternator. Also determine the value of flux, conductor per slot, number of turns per phase and size of armature conductor.
- 4) Derive the output equation of single phase induction motor.
- 5) Discuss the choice of specific electric loading and specific magnetic loading of synchronous generator.

5. Solve any two:

 $(2 \times 6 = 12)$

- 1) Find the main dimensions, no of stator turns, size of conductors and number of stator slots for a 5 H.P., 400 V, 3 phase, 50 Hz, 1500 syn. r.p.m. sq. cage induction motor. Star Delta starting is used. Use the following data: average flux density in air gap = 0.46 Wb/m², amp. Cond. per meter of arm. periphery = 22000, full load efficiency = 83%, full load power factor = 0.84 lagg. Appropriate values for additional data required may be assumed.
- 2) Determine the main dimension of 3000 KVA, 6.6 KV, 50 Hz, 187.5 r.p.m., 3ϕ star connected alternator. Also find number of stator slots, conductor per slots and winding details. Assume average gap density = 0.58 Wb/m², ampere conductor per meter = 35000. Assume L/ τ = 1.5.
- 3) In the design of 30 H.P., 3Φ , 440 V, 960 r.p.m., 50 Hz, delta connected induction motor. Assume the specific electric loading of 25000 A/m, specific magnetic loading of 0.46 Wb/m². Full load efficiency 86%, pf = 0.87 and estimate the following :
 - i) Stator core dimensions
 - ii) Number of stator slots and winding turns.

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					5LF	K-VB —	32	İ
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	E	T.E. (Part – II) (Electrica ELECTRICAL MACHINE	•	•				
•	Date : Monday 00 p.m. to 6.00					Max. Mar	ks : 70	0
,	Instructions :	 Q. No. 1 is compulse in Answer Book Page Answer MCQ/Object Don't forget to men 	e No ctive	. 3. Each ques type question	tion carrie ns on Pa	es one mar ge No. 3 o	k. nly.	
Duration	: 30 Minutes	MCQ/Objective T	уре	Questions		Mar	ks : 14	1
	ose the correc			_		(14×	:1=14	.)
•	Power factor in A) Dc	npose limitation on B) Synchronous			D) No	ne of these		
,	The action of e A) Induction C) Alignment	electromagnetic machine	B)	pased on the pa Interaction All of the abov	•	f		
,	A) Air-gap areB) Iron lossesC) Armature n	es "contraction coefficient" a due to armature slots in the teeth due to lower amf due to armature slots e to ventilating duct	toot		ccount the	e reduction	of	
,	•	ic loading is not governed temperature rise g current	B)	Speed of mack Machine size	nine			
,	A) Increase in	. •	hine	es				
-	If the stator wi	inding of a 3 phase indu	ctior	n motor is delta	connect	ed, the rote	or	

_____ depend on leakage reactance in an induction motor.

A) Should be delta connected

A) Starting current

C) Maximum torque

C) Should not be delta connected

B) Should be star connected

D) May be star or delta connected

-2-



8)	A machine with larg A) Poor power facto B) Poor efficiency C) Poor maximum p D) Both A) and B)	or ·	J			
9)	Synchronous composition of power supply networks	work with rating upt	o ab	out		
	A) 100 MVAR	B) 50 MVAR	C)	25 MVAR	D)	10 MVAR
10)	Multiple inlet system of rating upto	of air cooling of turb	o-al	ternator can be e	mple	oyed for machine
	A) 250 MW	B) 20 MW	C)	100 MW	D)	60 MW
11)	CRGO has	permeability in to B) Maximum		direction of grain Minimum		
12)	While punching sili laminations are likel A) Increase in core	y to cause		ransformer core Decrease in cor		·
	C) Decrease in cop		,	Increase in copp		
13)	Multi stepped core is	s used in a transforr	ner	to		
,	A) Increase output			Decrease cost of	f co	re material
	C) Decrease cost of			Increase efficier	су	
14)	The major consideration A) Durability B) Cost C) Compliance with D) All of the above	·		Ū		



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T.E. (Part – II) (Electrical) Examination, 2017 ELECTRICAL MACHINE DESIGN (New CGPA)

Day and Date: Monday, 15-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

- 1) Explain the principles of design of rotating machines.
- 2) For a transformer, show that $E_t = K\sqrt{S}$ where, $E_t = \text{emf per turn}$, S = KVA rating of transformer, what are the factors on which value of K depends.
- 3) A 350 Kw, 500 V, 540 r.p.m., 6 pole D.C. generator is built with an armature diameter of 0.87 m and a core length of 0.32 m. The lap wound armature has 660 conductors. Calculate the specific magnetic and electric loadings.
- 4) Calculate approximate overall dimension for 200 KVA, 6600/440 V, 50 Hz, 3 phase core type transformer. The following data may be assumed: emf per turn = 10 V, maximum flux density = 1.3 Wb/m², current density = 2.5 A/mm², window space factor = 0.3, overall height = overall width, stacking factor = 0.9, use 3 stepped cores.
- 5) A 5 Kw, 250 V, 4 pole, 1500 r.p.m. shunt generator is designed to have a square pole face. The loadings are : average flux density in the gap = 0.42 Wb/m^2 and ampere conductor per meter = 15000. Find the dimension of the machine. Assume full load efficiency = 0.87 and ratio of pole arc to pole pitch = 0.66.
- 6) For square core transformer show that $Ai = 0.45 d^2$.

3. Solve any two:

 $(6 \times 2 = 12)$

- 1) A 250 KVA 6600/400 V, 3 phase core type transformer has a total loss of 4800 W at full load. The transformer tank is 1.25 m in height and 1 m × 0.5 m in plain. Design a suitable scheme for tubes if the average temp rise is to be limited to 35° C. The diameter of tube is 50 mm and is spaced 75 mm from each other. The average height of tube is 1.05 m. Specific heat dissipation due to radiation and convection is respectively 6 and 6.5 W/m²-°C. Assume that convection is improved by 35 per cent due to provision of tubes.
- 2) Find the main dimensions, number of poles and length of air gap of a 1000 Kw, 500 V, 300 r.p.m. D.C. generator. Assume the specific magnetic loading $B_{av} = 0.7$ Wb/m², 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.



3) A 250 Kw, 500 V, 600 r.p.m. dc generator is built with an armature diameter of 0.75 m and core length of 0.3 m. The Lap connected armature has 720 conductors. Using the data obtained by this machine, determine the armature diameter, core length, number of armature slots, armature conductors for 350 Kw, 440 V, 720 r.p.m., 6 pole d.c. generator. Assume a square pole face with ratio of pole arc to pole pitch equal to 0.66. The full load efficiency is 0.91 and internal voltage drop is 4% of rated voltage. The voltage between adjacent segments should not exceed 15 V at no load.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- 1) A 11 Kw, 3 φ, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductor. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machines has an efficiency of 0.86 and power factor of 0.85. The rotor mmf may assume as 85% of stator mmf. Also find bar and the end ring section if the current density is 5A/mm².
- 2) Calculate the length of air gap of a 15 Kw, 400 V, 50 Hz, delta connected 1440 r.p.m. induction motor having both full load efficiency and power factor as 0.88 each. Assume $B_{av} = 0.45$ Tesla, ac = 23000 amp. Cond. per meter, ratio of pole arc to pole pitch = 0.85.
- 3) Design suitable value of diameter and length of a 75 MVA, 11 KV, 50 Hz, 3000 r.p.m., $3 \oplus$, star connected alternator. Also determine the value of flux, conductor per slot, number of turns per phase and size of armature conductor.
- 4) Derive the output equation of single phase induction motor.
- 5) Discuss the choice of specific electric loading and specific magnetic loading of synchronous generator.

5. Solve any two:

 $(2 \times 6 = 12)$

- 1) Find the main dimensions, no of stator turns, size of conductors and number of stator slots for a 5 H.P., 400 V, 3 phase, 50 Hz, 1500 syn. r.p.m. sq. cage induction motor. Star Delta starting is used. Use the following data: average flux density in air gap = 0.46 Wb/m², amp. Cond. per meter of arm. periphery = 22000, full load efficiency = 83%, full load power factor = 0.84 lagg. Appropriate values for additional data required may be assumed.
- 2) Determine the main dimension of 3000 KVA, 6.6 KV, 50 Hz, 187.5 r.p.m., 3ϕ star connected alternator. Also find number of stator slots, conductor per slots and winding details. Assume average gap density = 0.58 Wb/m², ampere conductor per meter = 35000. Assume L/ τ = 1.5.
- 3) In the design of 30 H.P., 3Φ , 440 V, 960 r.p.m., 50 Hz, delta connected induction motor. Assume the specific electric loading of 25000 A/m, specific magnetic loading of 0.46 Wb/m². Full load efficiency 86%, pf = 0.87 and estimate the following :
 - i) Stator core dimensions
 - ii) Number of stator slots and winding turns.

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T.E. (Part – II) (Electrical) Examination, 2017 **ELECTRICAL MACHINE DESIGN (New CGPA)**

Day and Date: Monday, 15-5-2017	Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

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

		2) A i	Answer Book Pagenswer MCQ/Objecton't forget to ment	tive	type questions	on	Page No.	3 only.
Dur	otior	n : 30 Minutes	MCQ/Objective T	ype	Questions		,	Marks : 14
Dui	aliOi	1.30 Militates					'	viaiks. 14
1.	Cho	oose the correct answ	ver:				((14×1=14)
1) If the stator winding of a 3 phase induction motor is of windingA) Should be delta connectedB) Should be			Should be star of	onn	ected	rotor		
	2)	C) Should not be de		,	•			
2) depend on leakage reactance in an induction motor. A) Starting current B) Starting torque C) Maximum torque D) All of the above				л.				
 3) A machine with large value of specific magnetic loading has A) Poor power factor B) Poor efficiency C) Poor maximum power output and poor overload capacity D) Both A) and B) 								
	4)	Synchronous competer of power supply networks 100 MVAR	vork with rating upto	o ab	out			AR)
	E \	,	,	,	25 MVAR	,	10 MVAR	ماناه
 Multiple inlet system of air cooling of turbo-alternator can be employed for mage of rating upto A) 250 MW B) 20 MW C) 100 MW D) 60 MW 				crime				
	6)	CRGO has	permeability in t	the o		orie		ese
7) While punching silicon steel for use in transformer core, I laminations are likely to cause A) Increase in core loss B) Decrease in core C) Decrease in copper loss D) Increase in coppe			, bu	rrs produc				

-VE	3 – 321			
8)	Multi stepped core is used in a transform A) Increase output C) Decrease cost of copper	B) Decr	rease cost o ease efficier	of core material
9)	The major consideration to evolve a good A) Durability B) Cost C) Compliance with performance laid d D) All of the above	_		
10)	Power factor impose limitation onA) Dc B) Synchronous			D) None of these
11)	The action of electromagnetic machines A) Induction C) Alignment	B) Inter		nciple of
12)	In a dc machines "contraction coefficient" i A) Air-gap area due to armature slots B) Iron losses in the teeth due to lower C) Armature mmf due to armature slots D) Torque due to ventilating duct			count the reduction of
13)	Specific electric loading is not governed A) Heating or temperature rise C) Magnetizing current	B) Spee	ed of machi hine size	ne
14)	In dc machine increase in field mmf cau A) Increase in size and cost of the mach B) Decrease in size and cost of the mach C) Excessive sparking D) None of these	nines		



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T.E. (Part – II) (Electrical) Examination, 2017 ELECTRICAL MACHINE DESIGN (New CGPA)

Day and Date: Monday, 15-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

- 1) Explain the principles of design of rotating machines.
- 2) For a transformer, show that $E_t = K\sqrt{S}$ where, $E_t = \text{emf per turn}$, S = KVA rating of transformer, what are the factors on which value of K depends.
- 3) A 350 Kw, 500 V, 540 r.p.m., 6 pole D.C. generator is built with an armature diameter of 0.87 m and a core length of 0.32 m. The lap wound armature has 660 conductors. Calculate the specific magnetic and electric loadings.
- 4) Calculate approximate overall dimension for 200 KVA, 6600/440 V, 50 Hz, 3 phase core type transformer. The following data may be assumed: emf per turn = 10 V, maximum flux density = 1.3 Wb/m², current density = 2.5 A/mm², window space factor = 0.3, overall height = overall width, stacking factor = 0.9, use 3 stepped cores.
- 5) A 5 Kw, 250 V, 4 pole, 1500 r.p.m. shunt generator is designed to have a square pole face. The loadings are: average flux density in the gap = 0.42 Wb/m² and ampere conductor per meter = 15000. Find the dimension of the machine. Assume full load efficiency = 0.87 and ratio of pole arc to pole pitch = 0.66.
- 6) For square core transformer show that $Ai = 0.45 d^2$.

3. Solve any two:

 $(6 \times 2 = 12)$

- 1) A 250 KVA 6600/400 V, 3 phase core type transformer has a total loss of 4800 W at full load. The transformer tank is 1.25 m in height and 1 m × 0.5 m in plain. Design a suitable scheme for tubes if the average temp rise is to be limited to 35° C. The diameter of tube is 50 mm and is spaced 75 mm from each other. The average height of tube is 1.05 m. Specific heat dissipation due to radiation and convection is respectively 6 and 6.5 W/m²-°C. Assume that convection is improved by 35 per cent due to provision of tubes.
- 2) Find the main dimensions, number of poles and length of air gap of a 1000 Kw, 500 V, 300 r.p.m. D.C. generator. Assume the specific magnetic loading $B_{av} = 0.7$ Wb/m², 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.



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SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

- 1) A 11 Kw, 3 φ, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductor. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machines has an efficiency of 0.86 and power factor of 0.85. The rotor mmf may assume as 85% of stator mmf. Also find bar and the end ring section if the current density is 5A/mm².
- 2) Calculate the length of air gap of a 15 Kw, 400 V, 50 Hz, delta connected 1440 r.p.m. induction motor having both full load efficiency and power factor as 0.88 each. Assume $B_{av} = 0.45$ Tesla, ac = 23000 amp. Cond. per meter, ratio of pole arc to pole pitch = 0.85.
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- 4) Derive the output equation of single phase induction motor.
- 5) Discuss the choice of specific electric loading and specific magnetic loading of synchronous generator.

5. Solve any two:

 $(2 \times 6 = 12)$

- 1) Find the main dimensions, no of stator turns, size of conductors and number of stator slots for a 5 H.P., 400 V, 3 phase, 50 Hz, 1500 syn. r.p.m. sq. cage induction motor. Star Delta starting is used. Use the following data: average flux density in air gap = 0.46 Wb/m², amp. Cond. per meter of arm. periphery = 22000, full load efficiency = 83%, full load power factor = 0.84 lagg. Appropriate values for additional data required may be assumed.
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 - i) Stator core dimensions
 - ii) Number of stator slots and winding turns.

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Max. Marks: 70

 $(1 \times 14 = 14)$

T.E. Electrical Engineering (Part – II) (New CGPA) Examination, 2017 CONTROL SYSTEMS – II

Day and Date: Wednesday, 17-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

- 1. Choose the correct answer.
 - 1) Root locus diagram can be used to determine
 - a) Absolute stability

b) Relative stability

c) Conditional stability

- d) None of these
- 2) The phase lag produced by transportation relays
 - a) is independent of frequency
- b) is inverse proportional to frequency
- c) increases linearly with frequency
- d) decreases linearly with frequency
- 3) The steady state error can be minimized
 - a) by increasing damped frequency
- b) by decreasing damped frequency
- c) by decreasing natural frequency
- d) by increasing system gain constant
- 4) The frequency range of control response is specified by
 - a) Resonance

b) Bandwidth

c) Modulation index

- d) Peak value
- 5) A lead compensator in frequency response form is given by the following
 - a) $C(s) = \frac{1 + aTs}{1 + Ts} [a > 1]$

b) $C(s) = \frac{1 + Ts}{1 + aTs} [a > 1]$

c) $C(s) = \frac{1 - aTs}{1 + Ts} [a > 1]$

- d) $C(s) = \frac{1 Ts}{1 2Ts} [a > 1]$
- 6) For the system $\dot{X} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and $Y = \begin{bmatrix} 1 & 1 \end{bmatrix} x$ then the
 - a) System is controllable but unstable
- b) System is uncontrollable but unstable
- c) System is controllable but stable
- d) System is uncontrollable but stable



- 7) With the knowledge of state space representation the transfer function of the system
 - a) Can be determined partly
- b) Can be determined completely

c) Cannot be determined

- d) None of these
- 8) The state model of a linear time invariant system is given by X(t) = AX(t) + BU(t) and Y(t) = CX(t) + DU(t). The expression for transfer function of the system is
 - a) $C(sI A)^{-1} BU(s) + D$
- b) $(sI A)^{-1} BU(s) + D$

c) $(sI - A)^{-1} BU(s)$

- d) $C(sI A)^{-1} B$
- 9) Which of the following properties are associated with the state transition matrix ϕ (t) ?
 - 1. $\phi(-t) = \phi^{-1}(t)$
 - 2. $\phi(t_1/t_2) = \phi(t_1).\phi^{-1}(t_2)$
 - 3. $\phi(t_1 t_2) = \phi(-t_2) \cdot \phi(t_1)$

Select the correct answer using codes given below:

Codes:

- a) 1, 2 and 3
- b) 1 and 2
- c) 2 and 3
- d) 1 and 3
- 10) The describing function N of a nonlinear control system is a function of
 - a) Amplitude of the input
- b) Frequency of the input
- c) Initial conditions of the output
- d) Both a and b
- 11) Phase plane method of analyzing the nonlinear control system is a
 - a) Time domain method

- b) Frequency domain method
- c) Optimal control method
- d) Digital control method
- 12) The transfer function of zero order hold is

- a) $1 e^{Ts}$ b) $1 e^{-Ts}$ c) $\frac{1 e^{Ts}}{s}$ d) $\frac{1 e^{-Ts}}{s}$
- 13) If u(t) is the unit step and $\delta(t)$ is the unit impulse function, the inverse z-transform of the

$$F(z) = \frac{1}{z+1}$$
 for k > 0 is

- a) $(-1)^k \delta(k)$

- b) $\delta(k) (-1)^k$ c) $(-1)^k u(k)$ d) $u(k) (-1)^k$
- 14) Small co-efficient of friction
 - a) Gives less steady state error
- b) Gives more steady state error
- c) Has no effect on steady state error
- d) None of the above



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T.E. Electrical Engineering (Part – II) (New CGPA) Examination, 2017 CONTROL SYSTEMS – II

Day and Date: Wednesday, 17-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (4×4=16)

- a) Explain the design procedure for designing the lead compensator by frequency response method.
- b) Design suitable compensator for a system whose open loop transfer function is $G(s) = \frac{16}{s(s+4)}$. So that the static error constant Kv is 20 sec -1 without change in original location of poles.
- c) For the system shown in Fig. 1 write down the state equations.

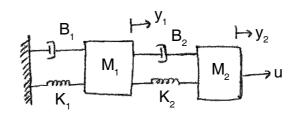


Fig. 1

- d) The state equations of a LTI system are as given below $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ u(t); t > 0. Is the system controllable?
- e) Derive the realization of lag compensator using electrical network.
- 3. a) Design lag-lead compensator for the system whose open loop transfer function is $G(s) = \frac{5}{s(0.5s+1)}$. So that the damping ratio of the dominant closed loop pole is equal to 0.5 and to increase the undamped natural frequency to 5 rad/sec and static velocity error constant to 50 sec⁻¹.
 - b) Design a phase lag compensator so the system $G(s)H(s) = \frac{100}{s(s+1)}$ will have phase margin of 15°.

OR

6

6



b) A linear time invariant system is characterized by the state equation.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u \text{ where } u \text{ is a unit step function. Compute the solution of } u \text{ where } u \text{ is a unit step function.}$$

these equations assuming initial condition $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. Use inverse Laplace transform technique.

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Obtain the observer error equation by full order state observer.
- b) Obtain the inverse z-transform of $X(z) = \frac{\frac{1}{4}z^{-1}}{\left(1 \frac{1}{2}z^{-1}\right)\left(1 \frac{1}{4}z^{-1}\right)}$; ROC: $|z| > \frac{1}{2}$.
- c) Derive the transfer function of zero order hold.
- d) Explain the delta method for construction of phase trajectories.
- e) Explain in short jump resonance.

5. Solve any two:

 $(2 \times 6 = 12)$

- a) A system defined by $\dot{x}=Ax+Bu$ and y=Cx. Where $A=\begin{bmatrix}0&20.6\\1&0\end{bmatrix}, B=\begin{bmatrix}0\\1\end{bmatrix}$ and $C=[0\ 1]$. It is desired to have eigenvalues of the observer matrix are $\mu 1=-10$ and $\mu 2=-10$ by using the observed state feedback control $u=-K\widetilde{x}$. Determine the observer gain matrix K_e .
- b) Examine the stability of the following characteristic equation.

$$P(z) = z^4 - 1.7z^3 + 1.04z^2 - 0.268z + 0.024 = 0.$$

c) Derive the describing function of dead zone nonlinearity.

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T.E. Electrical Engineering (Part – II) (New CGPA) Examination, 2017 CONTROL SYSTEMS - II

Day and Date: Wednesday, 17-5-2017

Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

> 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer.

 $(1 \times 14 = 14)$

1) The state model of a linear time invariant system is given by X(t) = AX(t) + BU(t) and Y(t) = CX(t) + DU(t). The expression for transfer function of the system is

a)
$$C(sI - A)^{-1} BU(s) + D$$

b)
$$(sI - A)^{-1} BU(s) + D$$

c)
$$(sI - A)^{-1} BU(s)$$

d)
$$C(sI - A)^{-1} B$$

2) Which of the following properties are associated with the state transition matrix ϕ (t) ?

1.
$$\phi(-t) = \phi^{-1}(t)$$

2.
$$\phi(t_1/t_2) = \phi(t_1).\phi^{-1}(t_2)$$

3.
$$\phi(t_1 - t_2) = \phi(-t_2)$$
. $\phi(t_1)$

Select the correct answer using codes given below:

Codes:

d) 1 and 3

3) The describing function N of a nonlinear control system is a function of

a) Amplitude of the input

b) Frequency of the input

c) Initial conditions of the output

d) Both a and b

4) Phase plane method of analyzing the nonlinear control system is a

a) Time domain method

b) Frequency domain method

c) Optimal control method

d) Digital control method

5) The transfer function of zero order hold is

a)
$$1 - e^{Ts}$$

b)
$$1 - e^{-Ts}$$

b)
$$1 - e^{-Ts}$$
 c) $\frac{1 - e^{Ts}}{s}$

d)
$$\frac{1-e^{-Ts}}{s}$$



6) If u(t) is the unit step and $\delta(t)$ is the unit impulse function, the inverse z-transform of the

$$F(z) = \frac{1}{z+1}$$
 for k > 0 is

- a) $(-1)^{k} \delta(k)$

- b) $\delta(k) (-1)^k$ c) $(-1)^k u(k)$ d) $u(k) (-1)^k$
- 7) Small co-efficient of friction
 - a) Gives less steady state error
- b) Gives more steady state error
- c) Has no effect on steady state error
- d) None of the above
- 8) Root locus diagram can be used to determine
 - a) Absolute stability

b) Relative stability

c) Conditional stability

- d) None of these
- 9) The phase lag produced by transportation relays
 - a) is independent of frequency
- b) is inverse proportional to frequency
- c) increases linearly with frequency
- d) decreases linearly with frequency
- 10) The steady state error can be minimized
 - a) by increasing damped frequency
- b) by decreasing damped frequency
- c) by decreasing natural frequency
- d) by increasing system gain constant
- 11) The frequency range of control response is specified by
 - a) Resonance

b) Bandwidth

c) Modulation index

- d) Peak value
- 12) A lead compensator in frequency response form is given by the following

a)
$$C(s) = \frac{1 + aTs}{1 + Ts} [a > 1]$$

b)
$$C(s) = \frac{1 + Ts}{1 + aTs} [a > 1]$$

c)
$$C(s) = \frac{1 - aTs}{1 + Ts} [a > 1]$$

d)
$$C(s) = \frac{1 - Ts}{1 - aTs} [a > 1]$$

- 13) For the system $\dot{X} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and $Y = \begin{bmatrix} 1 & 1 \end{bmatrix} x$ then the
 - a) System is controllable but unstable
- b) System is uncontrollable but unstable
- c) System is controllable but stable
- d) System is uncontrollable but stable
- 14) With the knowledge of state space representation the transfer function of the system
 - a) Can be determined partly
- b) Can be determined completely

c) Cannot be determined

d) None of these



Seat	
No.	

T.E. Electrical Engineering (Part – II) (New CGPA) Examination, 2017 CONTROL SYSTEMS – II

Day and Date: Wednesday, 17-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (4×4=16)

- a) Explain the design procedure for designing the lead compensator by frequency response method.
- b) Design suitable compensator for a system whose open loop transfer function is $G(s) = \frac{16}{s(s+4)}$. So that the static error constant Kv is 20 sec -1 without change in original location of poles.
- c) For the system shown in Fig. 1 write down the state equations.

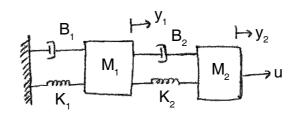


Fig. 1

- d) The state equations of a LTI system are as given below $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ u(t); t > 0. Is the system controllable?
- e) Derive the realization of lag compensator using electrical network.
- 3. a) Design lag-lead compensator for the system whose open loop transfer function is $G(s) = \frac{5}{s(0.5s+1)}$. So that the damping ratio of the dominant closed loop pole is equal to 0.5 and to increase the undamped natural frequency to 5 rad/sec and static velocity error constant to 50 sec⁻¹.
 - b) Design a phase lag compensator so the system $G(s)H(s) = \frac{100}{s(s+1)}$ will have phase margin of 15°.

OR

6

6



b) A linear time invariant system is characterized by the state equation.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u \text{ where } u \text{ is a unit step function. Compute the solution of } u \text{ where } u \text{ is a unit step function.}$$

these equations assuming initial condition $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. Use inverse Laplace transform technique.

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Obtain the observer error equation by full order state observer.
- b) Obtain the inverse z-transform of $X(z) = \frac{\frac{1}{4}z^{-1}}{\left(1 \frac{1}{2}z^{-1}\right)\left(1 \frac{1}{4}z^{-1}\right)}$; ROC: $|z| > \frac{1}{2}$.
- c) Derive the transfer function of zero order hold.
- d) Explain the delta method for construction of phase trajectories.
- e) Explain in short jump resonance.

5. Solve any two:

 $(2 \times 6 = 12)$

- a) A system defined by $\dot{x}=Ax+Bu$ and y=Cx. Where $A=\begin{bmatrix}0&20.6\\1&0\end{bmatrix}, B=\begin{bmatrix}0\\1\end{bmatrix}$ and $C=[0\ 1]$. It is desired to have eigenvalues of the observer matrix are $\mu 1=-10$ and $\mu 2=-10$ by using the observed state feedback control $u=-K\widetilde{x}$. Determine the observer gain matrix K_e .
- b) Examine the stability of the following characteristic equation.

$$P(z) = z^4 - 1.7z^3 + 1.04z^2 - 0.268z + 0.024 = 0.$$

c) Derive the describing function of dead zone nonlinearity.

Seat	
No.	

Set R

T.E. Electrical Engineering (Part – II) (New CGPA) Examination, 2017 CONTROL SYSTEMS – II

Day and Date: Wednesday, 17-5-2017

Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer.

(1×14=14)

1) A lead compensator in frequency response form is given by the following

a)
$$C(s) = \frac{1 + aTs}{1 + Ts} [a > 1]$$

b)
$$C(s) = \frac{1 + Ts}{1 + aTs} [a > 1]$$

c)
$$C(s) = \frac{1 - aTs}{1 + Ts} [a > 1]$$

d)
$$C(s) = \frac{1 - Ts}{1 - aTs} [a > 1]$$

2) For the system $\dot{X} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and $Y = \begin{bmatrix} 1 & 1 \end{bmatrix} x$ then the

- a) System is controllable but unstable
- b) System is uncontrollable but unstable
- c) System is controllable but stable
- d) System is uncontrollable but stable

3) With the knowledge of state space representation the transfer function of the system

- a) Can be determined partly
- b) Can be determined completely

c) Cannot be determined

d) None of these

4) The state model of a linear time invariant system is given by X(t) = AX(t) + BU(t) and Y(t) = CX(t) + DU(t). The expression for transfer function of the system is

a)
$$C(sI - A)^{-1} BU(s) + D$$

b)
$$(sI - A)^{-1} BU(s) + D$$

c)
$$(sI - A)^{-1} BU(s)$$

d)
$$C(sI - A)^{-1} B$$



- 5) Which of the following properties are associated with the state transition matrix $\phi(t)$?
 - 1. $\phi(-t) = \phi^{-1}(t)$
 - 2. $\phi(t_1/t_2) = \phi(t_1).\phi^{-1}(t_2)$
 - 3. $\phi(t_1 t_2) = \phi(-t_2) \cdot \phi(t_1)$

Select the correct answer using codes given below:

Codes:

- a) 1, 2 and 3
- b) 1 and 2
- c) 2 and 3
- d) 1 and 3
- 6) The describing function N of a nonlinear control system is a function of
 - a) Amplitude of the input

- b) Frequency of the input
- c) Initial conditions of the output
- d) Both a and b
- 7) Phase plane method of analyzing the nonlinear control system is a
 - a) Time domain method

- b) Frequency domain method
- c) Optimal control method
- d) Digital control method
- 8) The transfer function of zero order hold is
 - a) $1 e^{Ts}$
- b) 1 e^{-Ts}
- c) $\frac{1-e^{Ts}}{s}$
- d) $\frac{1 e^{-Ts}}{2}$
- 9) If u(t) is the unit step and δ (t) is the unit impulse function, the inverse z-transform of the

$$F(z) = \frac{1}{z+1}$$
 for k > 0 is

- a) $(-1)^k \delta(k)$
- b) $\delta(k) (-1)^k$ c) $(-1)^k u(k)$ d) $u(k) (-1)^k$

- 10) Small co-efficient of friction
 - a) Gives less steady state error
- b) Gives more steady state error
- c) Has no effect on steady state error
- d) None of the above
- 11) Root locus diagram can be used to determine
 - a) Absolute stability

b) Relative stability

c) Conditional stability

- d) None of these
- 12) The phase lag produced by transportation relays
 - a) is independent of frequency
- b) is inverse proportional to frequency
- c) increases linearly with frequency
- d) decreases linearly with frequency
- 13) The steady state error can be minimized
 - a) by increasing damped frequency
- b) by decreasing damped frequency
- c) by decreasing natural frequency
- d) by increasing system gain constant
- 14) The frequency range of control response is specified by
 - a) Resonance

b) Bandwidth

c) Modulation index

d) Peak value



Seat	
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T.E. Electrical Engineering (Part – II) (New CGPA) Examination, 2017 CONTROL SYSTEMS – II

Day and Date: Wednesday, 17-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (4×4=16)

- a) Explain the design procedure for designing the lead compensator by frequency response method.
- b) Design suitable compensator for a system whose open loop transfer function is $G(s) = \frac{16}{s(s+4)}$. So that the static error constant Kv is 20 sec -1 without change in original location of poles.
- c) For the system shown in Fig. 1 write down the state equations.

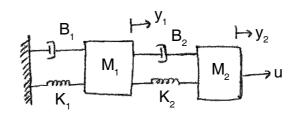


Fig. 1

- d) The state equations of a LTI system are as given below $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ u(t); t > 0. Is the system controllable?
- e) Derive the realization of lag compensator using electrical network.
- 3. a) Design lag-lead compensator for the system whose open loop transfer function is $G(s) = \frac{5}{s(0.5s+1)}$. So that the damping ratio of the dominant closed loop pole is equal to 0.5 and to increase the undamped natural frequency to 5 rad/sec and static velocity error constant to 50 sec⁻¹.
 - b) Design a phase lag compensator so the system $G(s)H(s) = \frac{100}{s(s+1)}$ will have phase margin of 15°.

OR

6

6



b) A linear time invariant system is characterized by the state equation.

 $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u \text{ where } u \text{ is a unit step function. Compute the solution of } u \text{ where } u \text{ is a unit step function.}$

these equations assuming initial condition $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. Use inverse Laplace transform technique.

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Obtain the observer error equation by full order state observer.
- b) Obtain the inverse z-transform of $X(z) = \frac{\frac{1}{4}z^{-1}}{\left(1 \frac{1}{2}z^{-1}\right)\left(1 \frac{1}{4}z^{-1}\right)}$; ROC: $|z| > \frac{1}{2}$.
- c) Derive the transfer function of zero order hold.
- d) Explain the delta method for construction of phase trajectories.
- e) Explain in short jump resonance.
- 5. Solve any two:

 $(2 \times 6 = 12)$

- a) A system defined by $\dot{x}=Ax+Bu$ and y=Cx. Where $A=\begin{bmatrix}0&20.6\\1&0\end{bmatrix}, B=\begin{bmatrix}0\\1\end{bmatrix}$ and $C=[0\ 1]$. It is desired to have eigenvalues of the observer matrix are $\mu 1=-10$ and $\mu 2=-10$ by using the observed state feedback control $u=-K\widetilde{x}$. Determine the observer gain matrix K_e .
- b) Examine the stability of the following characteristic equation.

$$P(z) = z^4 - 1.7z^3 + 1.04z^2 - 0.268z + 0.024 = 0.$$

c) Derive the describing function of dead zone nonlinearity.

Seat	
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T.E. Electrical Engineering (Part – II) (New CGPA) Examination, 2017 CONTROL SYSTEMS - II

Day and Date: Wednesday, 17-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

> 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14 1. Choose the correct answer. $(1 \times 14 = 14)$

- 1) The describing function N of a nonlinear control system is a function of
 - a) Amplitude of the input

- b) Frequency of the input
- c) Initial conditions of the output
- d) Both a and b
- 2) Phase plane method of analyzing the nonlinear control system is a
 - a) Time domain method

- b) Frequency domain method
- c) Optimal control method
- d) Digital control method
- 3) The transfer function of zero order hold is

c)
$$\frac{1-e^{Ts}}{s}$$

b)
$$1 - e^{-Ts}$$
 c) $\frac{1 - e^{Ts}}{s}$ d) $\frac{1 - e^{-Ts}}{s}$

4) If u(t) is the unit step and $\delta(t)$ is the unit impulse function, the inverse z-transform of the

$$F(z) = \frac{1}{z+1}$$
 for k > 0 is

a)
$$(-1)^k \delta(k)$$

b)
$$\delta(k) - (-1)^k$$

b)
$$\delta(k) - (-1)^k$$
 c) $(-1)^k u(k)$ d) $u(k) - (-1)^k$

- 5) Small co-efficient of friction
 - a) Gives less steady state error
- b) Gives more steady state error
- c) Has no effect on steady state error
- d) None of the above
- 6) Root locus diagram can be used to determine
 - a) Absolute stability

b) Relative stability

c) Conditional stability

- d) None of these
- 7) The phase lag produced by transportation relays
 - a) is independent of frequency
- b) is inverse proportional to frequency
- c) increases linearly with frequency
- d) decreases linearly with frequency



- 8) The steady state error can be minimized
 - a) by increasing damped frequency

 - c) by decreasing natural frequency
- b) by decreasing damped frequency
- d) by increasing system gain constant
- 9) The frequency range of control response is specified by
 - a) Resonance

b) Bandwidth

c) Modulation index

- d) Peak value
- 10) A lead compensator in frequency response form is given by the following

a)
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c)
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$$C(s) = \frac{1 - Ts}{1 - aTs} [a > 1]$$

- 11) For the system $\dot{X} = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$ and $Y = \begin{bmatrix} 1 & 1 \end{bmatrix} x$ then the
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c)
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d)
$$C(sI - A)^{-1} B$$

14) Which of the following properties are associated with the state transition matrix ϕ (t) ?

1.
$$\phi(-t) = \phi^{-1}(t)$$

2.
$$\phi(t_1/t_2) = \phi(t_1).\phi^{-1}(t_2)$$

3.
$$\phi(t_1 - t_2) = \phi(-t_2) \cdot \phi(t_1)$$

Select the correct answer using codes given below:

Codes:

- a) 1, 2 and 3
- b) 1 and 2
- c) 2 and 3
- d) 1 and 3



Seat	
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T.E. Electrical Engineering (Part – II) (New CGPA) Examination, 2017 CONTROL SYSTEMS – II

Day and Date: Wednesday, 17-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (4×4=16)

- a) Explain the design procedure for designing the lead compensator by frequency response method.
- b) Design suitable compensator for a system whose open loop transfer function is $G(s) = \frac{16}{s(s+4)}$. So that the static error constant Kv is 20 sec -1 without change in original location of poles.
- c) For the system shown in Fig. 1 write down the state equations.

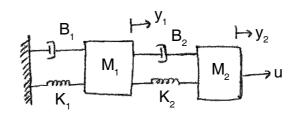


Fig. 1

- d) The state equations of a LTI system are as given below $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -2 & 0 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ u(t); t > 0. Is the system controllable?
- e) Derive the realization of lag compensator using electrical network.
- 3. a) Design lag-lead compensator for the system whose open loop transfer function is $G(s) = \frac{5}{s(0.5s+1)}$. So that the damping ratio of the dominant closed loop pole is equal to 0.5 and to increase the undamped natural frequency to 5 rad/sec and static velocity error constant to 50 sec⁻¹.
 - b) Design a phase lag compensator so the system $G(s)H(s) = \frac{100}{s(s+1)}$ will have phase margin of 15°.

OR

6

6



b) A linear time invariant system is characterized by the state equation.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 0 \end{bmatrix} u \text{ where } u \text{ is a unit step function. Compute the solution of } u \text{ where } u \text{ is a unit step function.}$$

these equations assuming initial condition $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. Use inverse Laplace transform technique.

4. Solve any four:

 $(4 \times 4 = 16)$

- a) Obtain the observer error equation by full order state observer.
- b) Obtain the inverse z-transform of $X(z) = \frac{\frac{1}{4}z^{-1}}{\left(1 \frac{1}{2}z^{-1}\right)\left(1 \frac{1}{4}z^{-1}\right)}$; ROC: $|z| > \frac{1}{2}$.
- c) Derive the transfer function of zero order hold.
- d) Explain the delta method for construction of phase trajectories.
- e) Explain in short jump resonance.

5. Solve any two:

 $(2 \times 6 = 12)$

- a) A system defined by $\dot{x}=Ax+Bu$ and y=Cx. Where $A=\begin{bmatrix}0&20.6\\1&0\end{bmatrix}, B=\begin{bmatrix}0\\1\end{bmatrix}$ and $C=[0\ 1]$. It is desired to have eigenvalues of the observer matrix are $\mu 1=-10$ and $\mu 2=-10$ by using the observed state feedback control $u=-K\widetilde{x}$. Determine the observer gain matrix K_e .
- b) Examine the stability of the following characteristic equation.

$$P(z) = z^4 - 1.7z^3 + 1.04z^2 - 0.268z + 0.024 = 0.$$

c) Derive the describing function of dead zone nonlinearity.

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-		d Date : Friday 3.00 p.m. to 6.0)17				Max. Mark	s:70)
		Instructions :	2) Assu 3) Figur 4) Q. No in An 5) Ansu	me suitable re to right in o. 1 is compu swer Book F ver MCQ/Ob	data it dicate Ilsory Page N ijectiv	nulsory. i necessary. s full marks. It should be solv lo. 3. Each question n, Q.P. Set (P/Q)	tion s o i	n carries one m n Page No. 3 o	ark. nly.	
Dura	tio	n : 30 Minutes	MC	Q/Objective	е Туре	Questions		Mark	s : 14	ļ
1. (Ch	oose the corre	ct alterna	ative :				(14×	1=14))
	1)	The bits of SII	M format	required to	genera	ate square wave	at	SOD pins are		
		a) D7	b)	D6	c)	D4 and D3	d)	Both a) and c)	
	2)		s the mic	roprocesso	r to im	mediately termi	inat	e its present		
		activity? a) RESET sig c) Both a) an			•	Interrupt signal None of these				
	3)	The act of acca) Fetching		n instruction Fetch cycle		rred as the Both a) and b)				
	4)	Which bus tracarry singles a) Address B	from exte	•	to the			and others that	at	
	5)	The internal F a) 32 Bytes		nory of the 8 64 Bytes			d)	256 Bytes		
	6)	The 8051 has	,	•	,	•	,	•		
		a) 1	b)	2	c)	3	d)	4		
	7)	When the 805 to the first pro a) Internal co c) Internal da	gram ins de mem	struction in th	ne b)	External code r External data n	men	nory	ts	



8)	Lowest priority inte	rrupt in 8051 is			
	a) INT1	b) TF0	c) TI	d) TF1	
9)	To change the trigg	ering level of the ir	nterrupt, SFR used		
	a) IE and TCON	b) TCON only	c) TMOD	d) IE	
10)	If an 8051 based sy clock frequency an		•	equency, then time	r
	a) 1.6 MHz, 1 μs		b) 1.6 MHz, 0.6 μ	ıS	
	c) 1.5 MHz, 0.6 μs	3	d) 1.5 MHz, 1 μs		
11)	While interfacing 80 operation	051 with 16 × 2 LCI	D, what is status of	enable line for read	t
	a) High	b) Low	c) High to Low	d) Low to High	
12)	Memory size = 8 Kl address.	B, If starting addre	ss is 1000 H, then	is the end	k
	a) 1FFFH	b) 2FFFH	c) 3FFFH	d) None	
13)	The memory which blocks instead of o			I programmed in	
	a) PROM	b) Flash memory	c) ROM	d) RAM	
14)	What is direction of a) Input c) Both input and o	·	0809 ? b) Output d) None		



Seat	
No.	

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLERS

Day and Date: Friday, 19-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Assume suitable data if necessary.
- 3) Figure to **right** indicates **full** marks.

SECTION - I

2. Solve any four: (4×3.5=14)

- 1) With the help of a schematic diagram, explain how the bus AD7-AD0 is demultiplexed.
- 2) Describe the execution of PUSH and POP instructions.
- 3) What is the purpose of PSW register?
- 4) Differentiate between 8085 and 8051.
- 5) Describe internal memory structure of RAM in 8051.

3. Solve any two: (2×7=14)

- 1) Explain Bus architecture of 8085.
- 2) Explain in brief all the registers used in 8051 microcontroller.
- 3) Explain the following pins of 8085.
 - a) ALE.
 - b) READY.
 - c) HOLD and HLDA.

SECTION - II

4. Solve any four: (4×4=16)

- 1) Draw and explain the Port 1 structure of 8051.
- 2) Draw the interfacing diagram of relay with 8051. Write an ALP to ON/OFF the relay continuously every 1 sec.
- 3) Draw and explain interfacing of RTC DS12887 to 8051.
- 4) Draw the interfacing diagram of 8051 with 8 KB RAM.
- 5) Write an ALP to generate Sine wave using DAC 0808.

5. Solve any two: (2×6=12)

- 1) Draw the interfacing diagram for 16 × 2 LCD display with 8051 and write an ALP to display "INDIA" on LCD display.
- 2) Draw and explain IE SFR.
 - Assume that the INT1 pin is connected to a switch that is normally high and LED is connected to PI.3 and is normally off. Write an assembly language program for when INT1 pin goes low, then turn on an LED.
- 3) Draw temperature indicator and controller system. Write an assembly language program to turn ON Heater when temperature below 20 degree centigrade and turn ON Fan when temperature above 30 degree centigrade.

Set P

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Sea No.							Set	Q
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•	and Date : Friday : 3.00 p.m. to 6.					Max	. Mark	s:70
	Instructions :	2) Assume 33) Figure to4) Q. No. 1 in Answer5) Answer I	suitable da right indi s compuls r Book Pa MCQ/Obje	ata if neces: cates full m sory . It shoul ge No. 3 . Ea	sary. Parks. Id be solv Pach quest Puestions	ion carries o s on Page N	o ne ma lo. 3 o	ark. nly.
		MCQ/C) Diective	Гуре Questi	ions			
Dura	tion : 30 Minutes		,	, p = 			Mark	s:14
1. (Choose the corre	ct alternative	e :				(14×	1=14)
	1) Lowest priorit a) INT1	y interrupt in b) TF0		c) TI		d) TF1		
	2) To change the a) IE and TC	00 0	evel of the ON only	•	FR used	d) IE		
	3) If an 8051 bas	•			rystal fre	quency, the	n time	er

a) High

a) 1.6 MHz, 1 μs

c) 1.5 MHz, 0.6 μs

b) Low

c) High to Low

b) 1.6 MHz, 0.6 μs

d) 1.5 MHz, 1 μs

d) Low to High

5) Memory size = 8 KB, If starting address is 1000 H, then _____ is the end address.

a) 1FFFH

b) 2FFFH

c) 3FFFH

d) None

6) The memory which is similar to EEPROM ed erased and programmed in blocks instead of one byte at a time is called as

a) PROM

b) Flash memory

c) ROM

d) RAM



7)	What is direction of	EOC pin in ADC (080	9 ?		
	a) Input		b)	Output		
	c) Both input and o	utput	d)	None		
8)	The bits of SIM form	nat required to ger	nera	ate square wave	at	SOD pins are
	a) D7	b) D6	c)	D4 and D3	d)	Both a) and c)
9)	Which causes the activity?	microprocessor to	im	mediately termi	nat	e its present
	a) RESET signalc) Both a) and b)		,	Interrupt signal None of these		
10)	The act of acquiring a) Fetching					
11)	Which bus transfer carry singles from (a) Address Bus	external device to	the	CPU?		
12)	The internal RAM n	,	,		- .,	, or arooc
12)	a) 32 Bytes	•			d)	256 Bytes
13)	The 8051 has	16-bit cour	nte	r/timers.		
	a) 1	b) 2	c)	3	d)	4
14)	When the 8051 is reto the first program		ne is	s HIGH, the prog	ıran	n counter points
	a) Internal code me	emory	b)	External code n	nen	nory
	c) Internal data me	emory	d)	External data m	em	nory

Set Q



Seat	
No.	

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLERS

Day and Date: Friday, 19-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Assume suitable data if necessary.
- 3) Figure to right indicates full marks.

SECTION-I

2. Solve any four: (4×3.5=14)

- 1) With the help of a schematic diagram, explain how the bus AD7-AD0 is demultiplexed.
- 2) Describe the execution of PUSH and POP instructions.
- 3) What is the purpose of PSW register?
- 4) Differentiate between 8085 and 8051.
- 5) Describe internal memory structure of RAM in 8051.

3. Solve any two: (2×7=14)

- 1) Explain Bus architecture of 8085.
- 2) Explain in brief all the registers used in 8051 microcontroller.
- 3) Explain the following pins of 8085.
 - a) ALE.
 - b) READY.
 - c) HOLD and HLDA.

SECTION - II

4. Solve any four: (4×4=16)

- 1) Draw and explain the Port 1 structure of 8051.
- 2) Draw the interfacing diagram of relay with 8051. Write an ALP to ON/OFF the relay continuously every 1 sec.
- 3) Draw and explain interfacing of RTC DS12887 to 8051.
- 4) Draw the interfacing diagram of 8051 with 8 KB RAM.
- 5) Write an ALP to generate Sine wave using DAC 0808.

5. Solve any two: (2×6=12)

- 1) Draw the interfacing diagram for 16 × 2 LCD display with 8051 and write an ALP to display "INDIA" on LCD display.
- 2) Draw and explain IE SFR.
 - Assume that the INT1 pin is connected to a switch that is normally high and LED is connected to PI.3 and is normally off. Write an assembly language program for when INT1 pin goes low, then turn on an LED.
- 3) Draw temperature indicator and controller system. Write an assembly language program to turn ON Heater when temperature below 20 degree centigrade and turn ON Fan when temperature above 30 degree centigrade.

Set Q

	88 8 8 8 8 1888			3LN-VD - 323
Sea No.				Set R
T.E	•	• • • • •	t - II) (New CGP/ AND MICROCON	A) Examination, 2017 TROLLERS
-	and Date : Friday : 3.00 p.m. to 6.			Max. Marks : 70
	Instructions :	3) Figure to right4) Q. No. 1 is compound in Answer Book5) Answer MCQ/C	e data if necessary . indicates full marks. pulsory . It should be Page No. 3 . Each qu Dbjective type quest	
Dura	tion : 30 Minutes	_	ve Type Questions	Marks : 14
1. (Choose the corre	ect alternative :		(14×1=14)
	1) The internal F	RAM memory of the	8051 is	
	a) 32 Bytes	b) 64 Bytes	c) 128 Bytes	d) 256 Bytes
		s16-bit		
	a) 1	b) 2	c) 3	d) 4
	to the first pro a) Internal co	ogram instruction in	the b) External coo	-
	4) Lowest priorit a) INT1	ty interrupt in 8051 i b) TF0	s c) TI	d) TF1
	5) To change the a) IE and TC		the interrupt, SFR us ly c) TMOD	sed d) IE
	6) If an 8051 ba	sed system is contr icy and period respe 1 μs		•
	operation			of enable line for read
	a) High	b) Low	c) High to Low	d) Low to High



8)	Memory size = 8 KI address.	B, If starting addre	ss is 1000 H, then _		is the end
	a) 1FFFH	b) 2FFFH	c) 3FFFH	d)	None
9)	The memory which blocks instead of or a) PROM		s called as	•	grammed in
10)	What is direction of a) Input c) Both input and o	EOC pin in ADC 0	,	u)	T V UVI
11)	The bits of SIM form a) D7	nat required to ger b) D6			•
12)	Which causes the activity?	microprocessor to	-	nat	e its present
	a) RESET signalc) Both a) and b)		b) Interrupt signald) None of these		
13)	The act of acquiring a) Fetching		eferred as the c) Both a) and b)		
14)	Which bus transfer carry singles from 6	•		rice	and others that
	a) Address Bus	b) Control Bus	c) Data Bus	d)	All of these

Set R



Seat	
No.	

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLERS

Day and Date: Friday, 19-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Assume suitable data if necessary.
- 3) Figure to **right** indicates **full** marks.

SECTION-I

2. Solve any four: (4×3.5=14)

- 1) With the help of a schematic diagram, explain how the bus AD7-AD0 is demultiplexed.
- 2) Describe the execution of PUSH and POP instructions.
- 3) What is the purpose of PSW register?
- 4) Differentiate between 8085 and 8051.
- 5) Describe internal memory structure of RAM in 8051.

3. Solve any two: (2×7=14)

- 1) Explain Bus architecture of 8085.
- 2) Explain in brief all the registers used in 8051 microcontroller.
- 3) Explain the following pins of 8085.
 - a) ALE.
 - b) READY.
 - c) HOLD and HLDA.

SECTION - II

4. Solve any four: (4×4=16)

- 1) Draw and explain the Port 1 structure of 8051.
- 2) Draw the interfacing diagram of relay with 8051. Write an ALP to ON/OFF the relay continuously every 1 sec.
- 3) Draw and explain interfacing of RTC DS12887 to 8051.
- 4) Draw the interfacing diagram of 8051 with 8 KB RAM.
- 5) Write an ALP to generate Sine wave using DAC 0808.

5. Solve any two: (2×6=12)

- 1) Draw the interfacing diagram for 16 × 2 LCD display with 8051 and write an ALP to display "INDIA" on LCD display.
- 2) Draw and explain IE SFR.
 - Assume that the INT1 pin is connected to a switch that is normally high and LED is connected to PI.3 and is normally off. Write an assembly language program for when INT1 pin goes low, then turn on an LED.
- 3) Draw temperature indicator and controller system. Write an assembly language program to turn ON Heater when temperature below 20 degree centigrade and turn ON Fan when temperature above 30 degree centigrade.

Set R

Seat No.	Set	S

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLERS

Day and Date : Friday, 19-5-2017	Max. Marks: 70
Time: 2.00 n m to 6.00 n m	

Time: 3.00 p.m. to 6.00 p.m.

- **Instructions**: 1) **All** questions are **compulsory**.
 - 2) Assume suitable data if necessary.
 - 3) Figure to right indicates full marks.
 - 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

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Dur	atio	n : 30 Minutes	MCQ/Objective T	уре	e Questions		I	Marks : 14
1.	Ch	oose the correct alt	ernative :					(14×1=14)
	1)	If an 8051 based s clock frequency an			•	que	ency, then	timer
		a) 1.6 MHz, 1 μs		b)	1.6 MHz, 0.6 μ	s		
		c) 1.5 MHz, 0.6 µs	3	d)	1.5 MHz, 1 μs			
	2)	While interfacing 8 operation	051 with 16 × 2 LC	D, v	vhat is status of	ena	ıble line fo	r read
		a) High	b) Low	c)	High to Low	d)	Low to H	igh
	3)	Memory size = 8 K address.	B, If starting addre	ess	is 1000 H, then $_{ ext{.}}$		is th	ne end
		a) 1FFFH	b) 2FFFH	c)	3FFFH	d)	None	
	4)	The memory which blocks instead of o				pro	grammed	d in
		a) PROM	b) Flash memory	/ C)	ROM	d)	RAM	
	5)	What is direction o	f EOC pin in ADC (
		a) Inputc) Both input and of	output	,	Output None			
	6)	The bits of SIM forma) D7	mat required to ger b) D6		ate square wave D4 and D3		SOD pins Both a) a	



7)	Which causes the activity? a) RESET signal c) Both a) and b)	microprocessor to	b)	Interrupt signal None of these	nat	e its present
8)	The act of acquiring a) Fetching					
9)	Which bus transfer carry singles from e	external device to	the	CPU?		
	a) Address Bus	b) Control Bus	C)	Data Bus	d)	All of these
10)	The internal RAM n	nemory of the 805	1 is			
	a) 32 Bytes	b) 64 Bytes	c)	128 Bytes	d)	256 Bytes
11)	The 8051 has	16-bit cou	nte	r/timers.		
·	a) 1	b) 2	c)		d)	4
12)	When the 8051 is reto the first program		ne is	s HIGH, the prog	ran	n counter points
	a) Internal code me		b)	External code n	nen	nory
	c) Internal data me		-	External data m		-
13)	Lowest priority inte	rrupt in 8051 is				•
,	a) INT1	•	c)	TI	d)	TF1
14)	To change the trigg	ering level of the in	nte	rupt, SFR used		
,	a) IE and TCON	•		•	d)	IE

Set S



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T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 MICROPROCESSORS AND MICROCONTROLLERS

Day and Date: Friday, 19-5-2017 Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Assume suitable data if necessary.
- 3) Figure to **right** indicates **full** marks.

SECTION-I

2. Solve any four: (4×3.5=14)

- 1) With the help of a schematic diagram, explain how the bus AD7-AD0 is demultiplexed.
- 2) Describe the execution of PUSH and POP instructions.
- 3) What is the purpose of PSW register?
- 4) Differentiate between 8085 and 8051.
- 5) Describe internal memory structure of RAM in 8051.

3. Solve any two: (2×7=14)

- 1) Explain Bus architecture of 8085.
- 2) Explain in brief all the registers used in 8051 microcontroller.
- 3) Explain the following pins of 8085.
 - a) ALE.
 - b) READY.
 - c) HOLD and HLDA.

SECTION - II

4. Solve any four: (4×4=16)

- 1) Draw and explain the Port 1 structure of 8051.
- 2) Draw the interfacing diagram of relay with 8051. Write an ALP to ON/OFF the relay continuously every 1 sec.
- 3) Draw and explain interfacing of RTC DS12887 to 8051.
- 4) Draw the interfacing diagram of 8051 with 8 KB RAM.
- 5) Write an ALP to generate Sine wave using DAC 0808.

5. Solve any two: (2×6=12)

- 1) Draw the interfacing diagram for 16 × 2 LCD display with 8051 and write an ALP to display "INDIA" on LCD display.
- 2) Draw and explain IE SFR.
 - Assume that the INT1 pin is connected to a switch that is normally high and LED is connected to PI.3 and is normally off. Write an assembly language program for when INT1 pin goes low, then turn on an LED.
- 3) Draw temperature indicator and controller system. Write an assembly language program to turn ON Heater when temperature below 20 degree centigrade and turn ON Fan when temperature above 30 degree centigrade.

Set S

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Seat	Set	P
No.		

T.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER ELECTRONICS (New CGPA)

Day and Date: Monday, 22-5-2017	Max. Marks : 70
Time: 3.00 p.m. to 6.00 p.m.	

Time: 3	.00 p.m. to 6.00 p.m.					
	 Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark. 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page. 3) Figures to the right indicate full marks. 4) Assume data, if necessary. 					
Duration	n : 30 Minutes	MCQ/Objective T	уре	Questions		Marks: 14
Daration	1.00 Milliatos					Marko . 14
1. Cho	oose the correct answ	ver:				(14×1=14)
1)	The SCR is turned-oranged A) Forward current C) Holding current		B)	ent falls below Breakover volta Latching current	•	
2)	A TRIAC has	semiconduc B) Three		ayers. Four	D) Five	
3)	For continuous conconducts for	duction, in a single	pha	ase full converte	r each pair of	SCRs
	A) $(\pi - \alpha)$ radians		B)	π radians		
	C) α radians		D)	$(\pi + \alpha)$ radians		
4)	A TRIAC is effective A) Antiparallel conn B) Antiparallel conn C) Antiparallel conn D) Two thyristor, in	nection of two thyris nection of a thyristor nection of two diode	r and		of the device	
5)	The SCR is a A) Two-directional C) Three-directiona		,	Uni-directional Four-directional		
6)	In a single phase ful 325 V and 133 V res A) 40°		firin	•	nd average val D) 130°	ues of



hoose	the	correct	stater	nent
	choose	choose the	Choose the correct	Choose the correct stater

- A) MOSFET is a uncontrolled device.
- B) MOSFET is a current controlled device.
- C) MOSFET is a voltage controlled device.
- D) MOSFET is a temperature controlled device.
- 8) A full wave rectifier with resistive load produces

A) Second harmonic

B) Third harmonic

C) Fifth harmonic

D) Do not produce harmonics

9) Switched mode regulator is a

A) AC – DC converters

B) AC – AC converters

C) DC - AC converters

D) DC - DC converters

- 10) Advantages of HVDC transmission over AC system is/are
 - A) Reversal of power can be controlled by firing angle
 - B) Very good dynamic behavior
 - C) They can link two AC system operating unsynchronized
 - D) All of these
- 11) A boost converter has Vs as the source voltage and ' α ' as the duty cycle. The output voltage for this converter is given by

A)
$$Vs \cdot (1 + \alpha)$$

B)
$$\frac{Vs}{(1+\alpha)}$$
 C) $Vs \cdot (1-\alpha)$ D) $\frac{Vs}{(1-\alpha)}$

C)
$$Vs \cdot (1-\alpha)$$

D)
$$Vs/(1-\alpha)$$

- 12) Which one of the following is the most suitable device for dc-to-dc converter?
 - A) BJT
- B) GTO
- C) MOSFET
- D) Thyristor
- 13) The maximum firing angle in the half wave controlled regulator is
 - A) 180 degree
- B) 190 degree
- C) 200 degree
- D) 210 degree
- 14) The dc-dc control for DC motor provides variation in
 - A) Input voltage

B) Frequency

C) Both A and B

D) None of the above



Seat	
No.	

T.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER ELECTRONICS (New CGPA)

Day and Date: Monday, 22-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the right indicate full marks.

2) Assume data, **if necessary**.

3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following.

 $(4 \times 4 = 16)$

Marks: 56

- a) What is a SCR? Describe the turn-on and turn-off characteristics of a SCR.
- b) Explain Principle of operation, characteristics, rating and applications of power BJT.
- c) What is meant by commutation? Discuss class 'C' commutation with the necessary circuit diagram and waveforms.
- d) Explain circuit operation of single phase half wave controlled rectifier with resistive load and draw output waveforms at an firing angle of 0°, 45° and 90°.
- e) A single phase 230 V, 1 KW heater is connected across a single phase, 230 V, 50 Hz, supply through an SCR. For firing angle delay of 90°, calculate the power absorbed in the element.
- f) i) Explain different modes of operation of TRIAC with neat schematic diagram.
 - ii) Give few applications of TRIAC.

3. Attempt **any two** of the following.

 $(2 \times 6 = 12)$

- a) What is free-wheeling diode? Draw the circuit diagram of an SCR full wave rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.
- b) A single phase, semiconverter operates with 230 V, 50 Hz ac input and supplies level current of 10 A and operated at firing angle of 60°.

 Compute i) RMS supply current ii) output voltage iii) supply power factor.
- c) Explain three phase fully controlled bridge rectifier with R-L load and draw output voltage waveforms at an firing angle of 30° and 60°.

Set P



		SECII	ON – II		
4.	4. Attempt any four of the following.				(4×4=16)
	a) Explain principle of phase control of AC voltage controller with			with neat sketche	s.
	b) A single-phase full bridge inverter has a resistive load of $R = 2.4$ ohms and the DC input voltage $V = 48 \text{ V}$. Determine:				e DC
		i) RMS output voltage at the fundamen	ntal frequency		
		ii) The output power			
		iii) The average and peak currents of e	ach transistor.		
	c)	Explain the following performance para	ameters of an inverte	ers:	
		i) HF ii) THD	iii) DF	iv) LOH.	
	d)	Explain principle of buck-boost converte in terms of input voltage and duty cycle	•	ssion for output vo	ltage
	e)	Explain the principle of On-Off control of	of ac voltage control	lers.	
	f)	Explain role of power electronics conve	erters in speed contr	ol of dc motor.	
5.	Atte	empt any two of the following.			(2×6=12)
	a)	Explain principle of single phase full w $R = 10 \Omega$ and $L = 1 mH$ and draw the rele	•		
	,	A dc-dc converter has resistive load of When the converter switch remains ON, is 1 KHz. If the duty cycle is 35%, deter	its voltage drop is 3 \	. •	
		i) the average load voltage	ii) rms load voltag	9	
		iii) FF	iv) RF.		
	•	Explain three phase 120 degree mode star connected resistive load and draw the waveforms.			

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T.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER ELECTRONICS (New CGPA)

Day and Date: Monday, 22-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only.

•	to mention, Q.P. Set (P/Q/R/S) on Top e right indicate full marks. , if necessary.	of Page.
MCQ/Objection : 30 Minutes	ective Type Questions	Marks : 14
1. Choose the correct answer:		(14×1=14)
 A full wave rectifier with resistive A) Second harmonic C) Fifth harmonic 	e load produces B) Third harmonic D) Do not produce harmonics	
2) Switched mode regulator is aA) AC – DC convertersC) DC – AC converters	B) AC – AC convertersD) DC – DC converters	
3) Advantages of HVDC transmissA) Reversal of power can be contained.	•	

- B) Very good dynamic behavior
- C) They can link two AC system operating unsynchronized
- D) All of these
- 4) A boost converter has Vs as the source voltage and ' α ' as the duty cycle. The output voltage for this converter is given by

- A) $Vs \cdot (1 + \alpha)$ B) $Vs/(1+\alpha)$ C) $Vs \cdot (1-\alpha)$ D) $Vs/(1-\alpha)$
- 5) Which one of the following is the most suitable device for dc-to-dc converter?
 - A) BJT
- B) GTO
- C) MOSFET
- D) Thyristor



6)	The maximum firing angle in the half	wave controlled regulator is	
	A) 180 degree B) 190 degree	C) 200 degree D) 210 degree	
7)	The dc-dc control for DC motor provid	des variation in	
	A) Input voltage	B) Frequency	
	C) Both A and B	D) None of the above	
8)	The SCR is turned-off when the anod	le current falls below	
	A) Forward current rating	B) Breakover voltage	
	C) Holding current	D) Latching current	
9)	A TRIAC has semicondu	uctor layers.	
	A) Two B) Three	C) Four D) Five	
10)	For continuous conduction, in a sing	le phase full converter each pair of SCF	₹s
	conducts for		
	A) $(\pi - \alpha)$ radians	B) π radians	
	C) α radians	D) $(\pi + \alpha)$ radians	
11)	A TRIAC is effectively		
	A) Antiparallel connection of two thyr		
	B) Antiparallel connection of a thyrist		
	C) Antiparallel connection of two dioc		
4.0\	D) Two thyristor, in parallel to increas	se the current capacity of the device	
12)	The SCR is a switch.	D) Uni directional	
	A) Two-directionalC) Three-directional	B) Uni-directional D) Four-directional	
4.0\	,	•	,
13)		out voltage has peak and average values	ot
	325 V and 133 V respectively, then th A) 40° B) 50°	C) 70° D) 130°	
4 4\	,	C) 70 D) 130	
14)	Choose the correct statement. A) MOSFET is a uncontrolled device.		
	B) MOSFET is a current controlled de		
	C) MOSFET is a voltage controlled d		
	D) MOSFET is a temperature controll		



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T.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER ELECTRONICS (New CGPA)

Day and Date: Monday, 22-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the **right** indicate **full** marks.

2) Assume data, if necessary.

3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following.

 $(4 \times 4 = 16)$

Marks: 56

- a) What is a SCR? Describe the turn-on and turn-off characteristics of a SCR.
- b) Explain Principle of operation, characteristics, rating and applications of power BJT.
- c) What is meant by commutation? Discuss class 'C' commutation with the necessary circuit diagram and waveforms.
- d) Explain circuit operation of single phase half wave controlled rectifier with resistive load and draw output waveforms at an firing angle of 0°, 45° and 90°.
- e) A single phase 230 V, 1 KW heater is connected across a single phase, 230 V, 50 Hz, supply through an SCR. For firing angle delay of 90°, calculate the power absorbed in the element.
- f) i) Explain different modes of operation of TRIAC with neat schematic diagram.
 - ii) Give few applications of TRIAC.

3. Attempt **any two** of the following.

 $(2 \times 6 = 12)$

Set Q

- a) What is free-wheeling diode? Draw the circuit diagram of an SCR full wave rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.
- b) A single phase, semiconverter operates with 230 V, 50 Hz ac input and supplies level current of 10 A and operated at firing angle of 60°.

 Compute i) RMS supply current ii) output voltage iii) supply power factor.
- c) Explain three phase fully controlled bridge rectifier with R-L load and draw output voltage waveforms at an firing angle of 30° and 60°.



		SI	ECTION – II		
4.	Attempt any four of the	(4	4×4=16)		
	a) Explain principle of phase control of AC voltage controller wit			roller with neat sketches	į
	b) A single-phase full input voltage V = 48	•		d of $R = 2.4$ ohms and the	DC
	i) RMS output voltii) The output power	•	amental frequency	,	
	iii) The average and	d peak currents	of each transistor		
	c) Explain the following	g performance	parameters of an	inverters :	
	i) HF	ii) THD	iii) DF	iv) LOH.	
	d) Explain principle of in terms of input vo			expression for output volt	age
	e) Explain the principl	e of On-Off cor	ntrol of ac voltage o	controllers.	
	f) Explain role of pow	er electronics o	converters in speed	d control of dc motor.	
5.	Attempt any two of the	e following.		(2	2×6=12)
	, , , ,	•		ge controller with the loa ltage and current wavefor	
	,	switch remains	ON, its voltage dro	d the input dc voltage 230 p is 3 Volts and the freque	
	i) the average load iii) FF	d voltage	ii) rms load iv) RF.	voltage	
	, .	•	•	rce inverter with a balan output phase and line volta	

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T.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER ELECTRONICS (New CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

_	o mention, Q.P. Set (P/Q/R/S) on Top of Page. right indicate full marks. if necessary.	
MCQ/Obj	tive Type Questions	
Duration: 30 Minutes	Marks: 1	4
1. Choose the correct answer:	(14×1=14	4)
1) The SCR is a switch.A) Two-directionalC) Three-directional	B) Uni-directional D) Four-directional	
2) In a single phase full converter,325 V and 133 V respectively, tA) 40°B) 50°	output voltage has peak and average values of en the firing angle is C) 70° D) 130°	
 3) Choose the correct statement. A) MOSFET is a uncontrolled of B) MOSFET is a current controlled of C) MOSFET is a voltage controlled of C) MOSFET is a temperature of C 	ed device. ed device.	
4) A full wave rectifier with resistivA) Second harmonicC) Fifth harmonic	load produces B) Third harmonic D) Do not produce harmonics	
5) Switched mode regulator is aA) AC – DC convertersC) DC – AC converters	B) AC – AC convertersD) DC – DC converters	
 6) Advantages of HVDC transmiss A) Reversal of power can be composed by the /li>	trolled by firing angle	



7)	A boost converter has Vs as the source voltage and ' α ' as the duty cycle. The output voltage for this converter is given by					
	A) $Vs \cdot (1 + \alpha)$	B) $\sqrt[Vs]{(1+\alpha)}$	C)	$Vs \cdot (1-\alpha)$	D)	$\frac{Vs}{(1-\alpha)}$
8)	Which one of the foll A) BJT	lowing is the most s B) GTO		ble device for do MOSFET		dc converter ? Thyristor
9)	The maximum firing A) 180 degree	•		•		
10)	The dc-dc control fo A) Input voltage C) Both A and B	r DC motor provides	B)	riation in Frequency None of the abo	ve	
11)	The SCR is turned-on A) Forward current (C) Holding current		B)	ent falls below Breakover volta Latching current	_	
12)	A TRIAC has A) Two			ayers. Four	D)	Five
13)	For continuous conducts for	duction, in a single	pha	ase full converte	r ea	ch pair of SCRs
	A) $(\pi - \alpha)$ radians C) α radians		•	π radians $(\pi + \alpha)$ radians		
14)	A TRIAC is effective A) Antiparallel conn B) Antiparallel conn C) Antiparallel conn D) Two thyristor, in	ection of two thyrist ection of a thyristor ection of two diode	and s		of th	ne device



Seat	
No.	

T.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER ELECTRONICS (New CGPA)

Day and Date: Monday, 22-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the right indicate full marks.

2) Assume data, if necessary.

3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following.

 $(4 \times 4 = 16)$

Marks: 56

- a) What is a SCR? Describe the turn-on and turn-off characteristics of a SCR.
- b) Explain Principle of operation, characteristics, rating and applications of power BJT.
- c) What is meant by commutation? Discuss class 'C' commutation with the necessary circuit diagram and waveforms.
- d) Explain circuit operation of single phase half wave controlled rectifier with resistive load and draw output waveforms at an firing angle of 0°, 45° and 90°.
- e) A single phase 230 V, 1 KW heater is connected across a single phase, 230 V, 50 Hz, supply through an SCR. For firing angle delay of 90°, calculate the power absorbed in the element.
- f) i) Explain different modes of operation of TRIAC with neat schematic diagram.
 - ii) Give few applications of TRIAC.

3. Attempt **any two** of the following.

 $(2 \times 6 = 12)$

- a) What is free-wheeling diode? Draw the circuit diagram of an SCR full wave rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.
- b) A single phase, semiconverter operates with 230 V, 50 Hz ac input and supplies level current of 10 A and operated at firing angle of 60°.

 Compute i) RMS supply current ii) output voltage iii) supply power factor.
- c) Explain three phase fully controlled bridge rectifier with R-L load and draw output voltage waveforms at an firing angle of 30° and 60°.

Set R



	8	ECTION – II				
4.	Attempt any four of the following.	(4×4=16)				
	a) Explain principle of phase control	oller with neat sketches.				
	b) A single-phase full bridge inverter has a resistive load of $R = 2.4$ ohms and the DC input voltage $V = 48 \text{ V}$. Determine:					
	i) RMS output voltage at the fund	lamental frequency				
	ii) The output power	f la la				
	iii) The average and peak currents					
	c) Explain the following performance	•				
	i) HF ii) THD	iii) DF	iv) LOH.			
	 d) Explain principle of buck-boost converter and derive expression for output voltage in terms of input voltage and duty cycle. 					
	e) Explain the principle of On-Off control of ac voltage controllers.					
	f) Explain role of power electronics of	converters in speed	control of dc motor.			
5.	Attempt any two of the following.		(2×6=12)			
	a) Explain principle of single phase full wave AC voltage controller with the load of $R=10\Omega$ and $L=1$ mH and draw the relevant output voltage and current waveforms.					
	b) A dc-dc converter has resistive load of R = 10Ω and the input dc voltage 230 V. When the converter switch remains ON, its voltage drop is 3 Volts and the frequency is 1 KHz. If the duty cycle is 35%, determine :					
	i) the average load voltage iii) FF	ii) rms load v iv) RF.	oltage			
	c) Explain three phase 120 degree star connected resistive load and dwaveforms.	•				

Seat	
No.	

C) Holding current

Set S

	•		•	•	t – II) Examina S (New CGPA)		, 2017
•	d Date : Monday, 22- 3.00 p.m. to 6.00 p.m.						Max. Marks: 70
	2) A D 3) F	Answer Inswer Ion't fo	er Book Pag MCQ/Objed r get to me n	e No ctive tion ndica	o. 3. Each quest type question , Q.P. Set (P/Q, ate full marks.	tion c is on	first 30 minutes arries one mark. Page No. 3 only. on Top of Page.
		MCQ/	Objective 1	Гуре	Questions		
Duratio	n : 30 Minutes						Marks : 14
1. Ch	oose the correct ans	wer:					(14×1=14)
1)	Advantages of HVD A) Reversal of pow B) Very good dyna C) They can link tw D) All of these	er can I mic beh	oe controlle avior	d by	firing angle	t	
2)	A boost converter houtput voltage for the				ltage and ' $lpha$ ' a	s the	duty cycle. The
	A) $Vs \cdot (1 + \alpha)$	B) Vs	$(1+\alpha)$	C)	$Vs \cdot (1-\alpha)$	D)	$Vs/(1-\alpha)$
3)	Which one of the fol A) BJT	_	is the most : O		ble device for d MOSFET		dc converter ? Thyristor
4)	The maximum firing A) 180 degree	•	in the half w 0 degree		controlled regul 200 degree		s 210 degree
5)	The dc-dc control for A) Input voltage C) Both A and B	r DC m	otor provide	B)	riation in Frequency None of the ab	ove	
6)	The SCR is turned-A) Forward current		n the anode		ent falls below Breakover volt	age	

D) Latching current



7)	A TRIAC hass	emiconductor l	ayers.	
	A) Two B) Three	ee C)	Four	D) Five
8)	For continuous conduction, conducts for	in a single pha	ase full converte	each pair of SCRs
	A) $(\pi - \alpha)$ radians	B)	π radians	
	C) α radians	D)	$(\pi + \alpha)$ radians	
9)	A TRIAC is effectively A) Antiparallel connection of B) Antiparallel connection of C) Antiparallel connection of D) Two thyristor, in parallel to	a thyristor and two diodes		of the device
10)	The SCR is a switch			
	A) Two-directional	,	Uni-directional	
	C) Three-directional	,	Four-directional	
11)	In a single phase full convert 325 V and 133 V respectivel A) 40° B) 50°	y, then the firin	•	nd average values of D) 130°
12)	Choose the correct statement A) MOSFET is a uncontrolled B) MOSFET is a current correct C) MOSFET is a voltage correct by MOSFET is a temperature	ed device. atrolled device. atrolled device		
13)	A full wave rectifier with resis	stive load prod	uces	
,	A) Second harmonic	B)	Third harmonic	
	C) Fifth harmonic	D)	Do not produce	harmonics
14)	Switched mode regulator is a	3		
,	A) AC – DC converters		AC – AC conver	ters
	C) DC – AC converters	,	DC – DC convei	
	,	,		



Seat	
No.	

T.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER ELECTRONICS (New CGPA)

Day and Date: Monday, 22-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the **right** indicate **full** marks.

2) Assume data, if necessary.

3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following.

 $(4 \times 4 = 16)$

Marks: 56

- a) What is a SCR? Describe the turn-on and turn-off characteristics of a SCR.
- b) Explain Principle of operation, characteristics, rating and applications of power BJT.
- c) What is meant by commutation? Discuss class 'C' commutation with the necessary circuit diagram and waveforms.
- d) Explain circuit operation of single phase half wave controlled rectifier with resistive load and draw output waveforms at an firing angle of 0°, 45° and 90°.
- e) A single phase 230 V, 1 KW heater is connected across a single phase, 230 V, 50 Hz, supply through an SCR. For firing angle delay of 90°, calculate the power absorbed in the element.
- f) i) Explain different modes of operation of TRIAC with neat schematic diagram.
 - ii) Give few applications of TRIAC.

3. Attempt **any two** of the following.

 $(2 \times 6 = 12)$

- a) What is free-wheeling diode? Draw the circuit diagram of an SCR full wave rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.
- b) A single phase, semiconverter operates with 230 V, 50 Hz ac input and supplies level current of 10 A and operated at firing angle of 60°.

 Compute i) RMS supply current ii) output voltage iii) supply power factor.
- c) Explain three phase fully controlled bridge rectifier with R-L load and draw output voltage waveforms at an firing angle of 30° and 60°.

Set S



		SI	ECTION – II			
4.	Attempt any four of the	e following.		(4	4×4=16)	
	a) Explain principle of	roller with neat sketches	į			
	b) A single-phase full bridge inverter has a resistive load of $R = 2.4$ ohms and the DC input voltage $V = 48 \text{ V}$. Determine:					
	i) RMS output voltii) The output power	•	amental frequency	,		
	iii) The average and	d peak currents	of each transistor			
	c) Explain the following	g performance	parameters of an	inverters :		
	i) HF	ii) THD	iii) DF	iv) LOH.		
	 d) Explain principle of buck-boost converter and derive expression for output voltage in terms of input voltage and duty cycle. 					
	e) Explain the principl	e of On-Off cor	ntrol of ac voltage o	controllers.		
	f) Explain role of pow	er electronics o	converters in speed	d control of dc motor.		
5.	Attempt any two of the	e following.		(2	2×6=12)	
	a) Explain principle of single phase full wave AC voltage controller with the load of $R = 10\Omega$ and $L = 1$ mH and draw the relevant output voltage and current waveforms.					
	b) A dc-dc converter has resistive load of R = 10Ω and the input dc voltage 230 V. When the converter switch remains ON, its voltage drop is 3 Volts and the frequency is 1 KHz. If the duty cycle is 35%, determine :					
	i) the average load iii) FF	d voltage	ii) rms load iv) RF.	voltage		
	, .	•	•	rce inverter with a balan output phase and line volta		

Seat No.	Set	Ъ

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Wednesday, 24-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion carries one mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top

		C	f Pa	age.					
Dur	atio	n : 30 Minutes	МС	Q/Objective 1	урє	Questions			Marks: 14
1.	Ch	oose the correct ar	ารพ	er:					(1×14=14)
	1)	y(t) = x(t-1) + x(t-1) a) Linear	,	Time-invariar	ıt c)	Non-linear	d)	Causal	
	2)	The power signal average power. a) finite, infinite					-		
	3)	In exponential Fou	ırier	series, c _n is g	iver	n as			
		a) $A_n e^{j\theta n}$	b)	$\boldsymbol{A}_{n}e^{-j\theta n}$	c)	$A_{n/2}e^{-j\theta n}$	d)	$A_{n/2}e^{j\theta n}$	
 4) The discrete time system described by y(n) = x(n²) is a) causal, linear and time variant b) causal, linear and time invariant c) non-causal, linear and time-invariant d) non-causal, linear and time variant 									
	5)	The DT signal cos	(27	$(12)^{12}$ is period	lic w	vith period			

a) $2\pi/12$ b) 6 c) 12 d) A periodic



S) The Fourier series expansion of an odd periodic function contains					
a) For cosine terms	b) Only sine terms				
c) Both cosine and sine	d)	Only sine term with constant			
nverse Fourier transform of $sgn(\omega)$ i	is				
a) $-\frac{j}{\pi t}$ b) $\frac{j}{\pi t}$	c)	$\frac{1}{\pi t}$ d) $-\frac{1}{\pi t}$			
n DIF FFT algorithm output sequenc	e is	8			
a) In natural order	b)	Bit reversed order			
c) In ascending order	d)	Descending order			
$f x(z) = \{1, 2, 1, 2, 3.\} ROC is$					
\$					
a) Entire z-plane					
o) Entire z-plane except $z = \infty$					
c) Entire z-plane except $z = 0$, $z = \infty$)				
d) Entire z-plane except $z = 0$					
n DTFT, if F $\{x(n)\} = X(e^{j\omega})$ then F(x	(n -	- k)} is =			
a) $e^{-j\omega k}X(e^{j\omega})$	b)	$e^{j\omega k}X(e^{j\omega})$			
c) $e^{-j\omega k}X(e^{-j\omega})$	d)	X(e ^{j_o})			
n DIF FFT algorithm, the number of	cor	nplex additions is given by			
a) Nlog ₂ (N/2)	b)	$Nlog_2(N/3)$			
c) Nlog ₂ N	d)	Any of the above			
ROC cannot contain any					
a) Zero	b)	Pole			
c) Either a) or b)	d)	Both a) and b)			
$f X(Z) = Z \{x(n)\} \text{ then } Z \{x(n-m)\} \text{ is } \$. (considering zero initial conditions)			
a) $Z^{-m}X(Z)$	b)	$Z^{m}X(Z)$			
c) ZX(Z)	d)	$Z^{-2m}X(Z)$			
$Z\{e^{-anT}u(n)\}$ is ('a' is real)					
a) $1/(Z - e^{-aT})$	b)	1/(Z-e ^{aT})			
c) $Z/(Z-e^{aT})$	d)	$Z/(Z-e^{-aT})$			
	· · · _ ·	_			

Seat No.

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Wednesday, 24-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

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

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

Marks: 56

a) Find whether following signals are periodic or not:

$$x(t) = 2\cos(10t + 1) - \sin(4t - 1)$$

- b) Determine the energy and power of the following signals : x(t) = tu(t).
- c) Check linearity and causality of the following system:

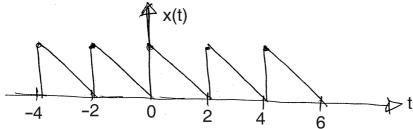
$$y(n) = \sum_{k=-\infty}^{n+1} x(k) .$$

- d) Find Fourier Transform of $x(t) = e^{-2t}u(t-1)$.
- e) Derive the frequency shifting property of Fourier transform.

3. Solve any two:

 $(6 \times 2 = 12)$

a) Find the exponential series of the following signal:



b) Find the Fourier transform of the following signal:

$$x(t) = Arect(t/\tau) \text{ for } |t| \le t/2$$

= 0 otherwise

c) Determine the convolution of the following sequences :

$$x(n) = b^n u(n)$$
 and $h(n) = a^n u(n)$ when $a \neq b$.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

a) Find Z transform and sketch R.O.C. for following sequence:

$$X[n] = -b^n u(-n-1)$$

b) Determine the signal x(n) whose Z transform is given by

$$X(Z) = log(1 - az^{-1}); |Z| > |a|$$

c) Find $X(\infty)$, if i) $X(Z) = (Z + 2)/(Z - 0.8)^2$

ii)
$$X(Z) = (Z + 1)/3 (Z - 1) (Z + 0.9)$$

- d) Derive the time shifting property of DTFT.
- e) Find the DFT of the following sequences:

i)
$$x(n) = \partial (n - n_0)$$
 ii) $x(n) = a^n$.

5. Solve any two:

 $(6 \times 2 = 12)$

a) Find 8 point DFT of following sequence:

$$x(n) = \{1, 1, 1, 1\}.$$

b) Determine the sequence x[n] associated with Z transform given using Partial Fraction Expansion [P.F.E.] method.

$$X[Z] = 2Z^2/(Z + 1) (Z + 2)^2$$
; Right sided sequence.

c) Compute 8 point IDFT of the sequence using DIT FFT algorithm

$$X(K) = \{7, -0.707 - j0.707, -j, 0.707 - j0.707, 1, 0.707 + j0.707, j, -0.707 + j0.707\}.$$

Seat	
No.	

Set

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Wednesday, 24-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) **Assume** suitable data **if necessary** and mention **it clearly**.
- 3) Figures to the **right** indicate **full** marks.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 14 **Duration: 30 Minutes**

1. Choose the correct answer:

 $(1 \times 14 = 14)$

- 1) In DIF FFT algorithm output sequence is
 - a) In natural order

- b) Bit reversed order
- c) In ascending order
- d) Descending order

2) If
$$x(z) = \{1, 2, 1, 2, 3.\}$$
 ROC is

- a) Entire z-plane
- b) Entire z-plane except $z = \infty$
- c) Entire z-plane except z = 0, $z = \infty$
- d) Entire z-plane except z = 0
- 3) In DTFT, if F $\{x(n)\} = X(e^{j\omega})$ then F(x(n-k)) is =
 - a) $e^{-j\omega k}X(e^{j\omega})$

b) $e^{j\omega k} X(e^{j\omega})$

c) $e^{-j\omega k}X(e^{-j\omega})$

- d) $X(e^{j\omega})$
- 4) In DIF FFT algorithm, the number of complex additions is given by
 - a) $Nlog_2(N/2)$ b) $Nlog_2(N/3)$

- c) Nlog₂N d) Any of the above

5)	5) ROC cannot contain any						
	a) Zero		b)	Pole			
	c) Either a) or b)		d)	Both a) and b)			
6)	If $X(Z) = Z\{x(n)\}$ the	n Z {x(n – m)} is		. (considering ze	ro i	nitial conditions)	
	a) $Z^{-m}X(Z)$		b)	$Z^{m}X(Z)$			
	c) ZX(Z)		d)	$Z^{-2m}X(Z)$			
7)	Z{e ^{-anT} u(n)} is	('a' is real)					
	a) $1/(Z - e^{-aT})$,	b)	$1/(Z-e^{aT})$			
	c) $Z/(Z-e^{aT})$		d)	$Z/(Z-e^{-aT})$			
8)	y(t) = x(t-1) + x(t)	is					
	a) Linear	b) Time-invariant	tc)	Non-linear	d)	Causal	
9)	The power signal is	s one which has _		energy	an	d	
	average power.a) finite, infinite	b) zero, infinite	c)	infinite, zero	d)	infinite, infinite	
10)	In exponential Fou	•	•		_	,	
		b) $A_n e^{-j\theta n}$			d)	$A_{n/2}e^{j\theta n}$	
11)	The discrete time s a) causal, linear a b) causal, linear a c) non-causal, line d) non-causal, line	nd time variant nd time invariant ear and time-invari	ant				
12)	The DT signal cos	$\left(2\pi n/12\right)$ is periodic	ic v	vith period			
	a) $\frac{2\pi}{12}$	b) 6	c)	12	d)	A periodic	
13)	The Fourier series	expansion of an o	dd	periodic functio	n c	ontains	
	a) For cosine term	IS	b)	Only sine terms	S		
	c) Both cosine and	d sine	d)	Only sine term	wit	h constant	
14)	Inverse Fourier tra	nsform of $sgn(\omega)$	is				
	a) $-\frac{j}{\pi t}$	b) $\int_{\pi t}^{j}$	c)	$\frac{1}{\pi t}$	d)	$-\frac{1}{\pi}$ t	

Seat No.

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Wednesday, 24-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

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

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

Marks: 56

a) Find whether following signals are periodic or not:

$$x(t) = 2\cos(10t + 1) - \sin(4t - 1)$$

- b) Determine the energy and power of the following signals : x(t) = tu(t).
- c) Check linearity and causality of the following system:

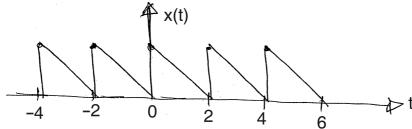
$$y(n) = \sum_{k=-\infty}^{n+1} x(k) .$$

- d) Find Fourier Transform of $x(t) = e^{-2t}u(t-1)$.
- e) Derive the frequency shifting property of Fourier transform.

3. Solve any two:

 $(6 \times 2 = 12)$

a) Find the exponential series of the following signal:



b) Find the Fourier transform of the following signal:

$$x(t) = Arect(t/\tau) \text{ for } |t| \le t/2$$

= 0 otherwise

c) Determine the convolution of the following sequences :

$$x(n) = b^n u(n)$$
 and $h(n) = a^n u(n)$ when $a \neq b$.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

a) Find Z transform and sketch R.O.C. for following sequence:

$$X[n] = -b^n u(-n-1)$$

b) Determine the signal x(n) whose Z transform is given by

$$X(Z) = log(1 - az^{-1}); |Z| > |a|$$

c) Find $X(\infty)$, if i) $X(Z) = (Z + 2)/(Z - 0.8)^2$

ii)
$$X(Z) = (Z + 1)/3 (Z - 1) (Z + 0.9)$$

- d) Derive the time shifting property of DTFT.
- e) Find the DFT of the following sequences:

i)
$$x(n) = \partial (n - n_0)$$
 ii) $x(n) = a^n$.

5. Solve any two:

 $(6 \times 2 = 12)$

a) Find 8 point DFT of following sequence :

$$x(n) = \{1, 1, 1, 1\}.$$

b) Determine the sequence x[n] associated with Z transform given using Partial Fraction Expansion [P.F.E.] method.

$$X[Z] = 2Z^2/(Z + 1) (Z + 2)^2$$
; Right sided sequence.

c) Compute 8 point IDFT of the sequence using DIT FFT algorithm

$$X(K) = \{7, -0.707 - j0.707, -j, 0.707 - j0.707, 1, 0.707 + j0.707, j, -0.707 + j0.707\}.$$

	_	
Seat No.	Set	R

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Wednesday, 24-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) **Assume** suitable data **if necessary** and mention **it clearly**.
- 3) Figures to the **right** indicate **full** marks.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each guestion carries one mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14

1. Choose the correct answer:

- 1) The DT signal $\cos \left(\frac{2\pi n}{12} \right)$ is periodic with period
 - a) $2\pi/12$
- b) 6
- c) 12
- d) A periodic

 $(1 \times 14 = 14)$

2) The Fourier series expansion of an odd periodic function contains

a) For cosine terms

- b) Only sine terms
- c) Both cosine and sine
- d) Only sine term with constant

3) Inverse Fourier transform of $sgn(\omega)$ is

- a) $-j/_{\pi t}$ b) $j/_{\pi t}$ c) $1/_{\pi t}$ d) $-1/_{\pi t}$

4) In DIF FFT algorithm output sequence is

- a) In natural order
- b) Bit reversed order
- c) In ascending order
- d) Descending order

5)	If $x(z) = \{1, 2,$	1, 2,	3 .}	ROC	is
	\updownarrow				

- a) Entire z-plane
- b) Entire z-plane except $z = \infty$
- c) Entire z-plane except z = 0, $z = \infty$
- d) Entire z-plane except z = 0

^ \) \// - i0	\/	/ 1/2:
6)	In DTFT, if F	{x(n)	} = X(6,) then F(x	(n – k)}

a) $e^{-j\omega k}X(e^{j\omega})$

b) $e^{j\omega k} X(e^{j\omega})$

c) $e^{-j\omega k}X(e^{-j\omega})$

d) $X(e^{j\omega})$

7) In DIF FFT algorithm, the number of complex additions is given by

a) Nlog₂ (N/2)

b) $Nlog_2(N/3)$

c) Nlog₂N

d) Any of the above

8) ROC cannot contain any

a) Zero

b) Pole

c) Either a) or b)

d) Both a) and b)

9) If $X(Z) = Z\{x(n)\}$ then $Z\{x(n-m)\}$ is _____. (considering zero initial conditions)

a) $Z^{-m}X(Z)$

b) $Z^mX(Z)$

c) ZX(Z)

d) $Z^{-2m}X(Z)$

10) Z{e^{-anT}u(n)} is _____. ('a' is real)

a) $1/(Z - e^{-aT})$

b) $1/(Z-e^{aT})$

c) $Z/(Z-e^{aT})$

d) $Z/(Z - e^{-aT})$

11) y(t) = x(t-1) + x(t) is

- a) Linear
- b) Time-invariant c) Non-linear
- d) Causal

12) The power signal is one which has _____ energy and _____ average power.

- a) finite, infinite

- b) zero, infinite c) infinite, zero d) infinite, infinite

13) In exponential Fourier series, c_n is given as _

- a) A_ne^{jθn}

- b) $A_n e^{-j\theta n}$ c) $A_{n/2} e^{-j\theta n}$ d) $A_{n/2} e^{j\theta n}$

14) The discrete time system described by $y(n) = x(n^2)$ is

- a) causal, linear and time variant
- b) causal, linear and time invariant
- c) non-causal, linear and time-invariant
- d) non-causal, linear and time variant

Seat No.

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Wednesday, 24-5-2017

Marks: 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

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

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

a) Find whether following signals are periodic or not:

$$x(t) = 2\cos(10t + 1) - \sin(4t - 1)$$

- b) Determine the energy and power of the following signals : x(t) = tu(t).
- c) Check linearity and causality of the following system:

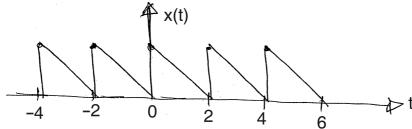
$$y(n) = \sum_{k=-\infty}^{n+1} x(k) .$$

- d) Find Fourier Transform of $x(t) = e^{-2t}u(t-1)$.
- e) Derive the frequency shifting property of Fourier transform.

3. Solve any two:

 $(6 \times 2 = 12)$

a) Find the exponential series of the following signal:



b) Find the Fourier transform of the following signal:

$$x(t) = Arect(t/\tau) \text{ for } |t| \le t/2$$

= 0 otherwise

c) Determine the convolution of the following sequences :

$$x(n) = b^n u(n)$$
 and $h(n) = a^n u(n)$ when $a \neq b$.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

a) Find Z transform and sketch R.O.C. for following sequence:

$$X[n] = -b^n u(-n-1)$$

b) Determine the signal x(n) whose Z transform is given by

$$X(Z) = log(1 - az^{-1}); |Z| > |a|$$

c) Find $X(\infty)$, if i) $X(Z) = (Z + 2)/(Z - 0.8)^2$

ii)
$$X(Z) = (Z + 1)/3 (Z - 1) (Z + 0.9)$$

- d) Derive the time shifting property of DTFT.
- e) Find the DFT of the following sequences:

i)
$$x(n) = \partial (n - n_0)$$
 ii) $x(n) = a^n$.

5. Solve any two:

 $(6 \times 2 = 12)$

a) Find 8 point DFT of following sequence:

$$x(n) = \{1, 1, 1, 1\}.$$

b) Determine the sequence x[n] associated with Z transform given using Partial Fraction Expansion [P.F.E.] method.

$$X[Z] = 2Z^2/(Z + 1) (Z + 2)^2$$
; Right sided sequence.

c) Compute 8 point IDFT of the sequence using DIT FFT algorithm

$$X(K) = \{7, -0.707 - j0.707, -j, 0.707 - j0.707, 1, 0.707 + j0.707, j, -0.707 + j0.707\}.$$

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Seat No.	Set	S

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Wednesday, 24-5-2017 Max. Marks: 70

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 14 $(1 \times 14 = 14)$

1)	In DTFT, if F $\{x(n)\} = X(e^{j\omega})$ th	en F(x(n-k)) is =
	a) $e^{-j\omega k}X(e^{j\omega})$	b) $e^{j\omega k}X(e^{j\omega})$

d) X(e^{j_o}) c) $e^{-j\omega k}X(e^{-j\omega})$

2) In DIF FFT algorithm, the number of complex additions is given by

a) $Nlog_2$ (N/2) b) $Nlog_2(N/3)$

c) Nlog₂N d) Any of the above

3) ROC cannot contain any

1. Choose the correct answer:

a) Zero b) Pole

d) Both a) and b) c) Either a) or b)

4) If $X(Z) = Z\{x(n)\}$ then $Z\{x(n-m)\}$ is _____. (considering zero initial conditions)

a) $Z^{-m}X(Z)$ b) $Z^{m}X(Z)$

d) $Z^{-2m}X(Z)$ c) ZX(Z)



-VI	B – 325	-2-			ı	
5)	$Z\{e^{-anT}u(n)\}$ is	('a' is real)				
	a) $1/(Z - e^{-aT})$	b) 1/(Z-e ^{aT})	c)	$Z/(Z-e^{aT})$	d)	$Z/(Z-e^{-aT})$
6)	y(t) = x(t-1) + x(t) a) Linear		t c)	Non-linear	d)	Causal
7)	The power signal is average power.	s one which has _		energy	/ an	d
	a) finite, infinite	b) zero, infinite	c)	infinite, zero	d)	infinite, infinite
8)	In exponential Fou					
	a) $A_n e^{j\theta n}$	b) $A_n e^{-j\theta n}$	c)	$A_{n/2}e^{-j\theta n}$	d)	$A_{n/2}e^{j\theta n}$
	The discrete time s a) causal, linear a b) causal, linear a c) non-causal, line d) non-causal, line	nd time variant nd time invariant ear and time-invari ear and time varian	iant nt			
10)	The DT signal cos	$\left(2\pi n/12\right)$ is period	ic w	vith period		
	a) $\frac{2\pi}{12}$	b) 6	c)	12	d)	A periodic
11)	The Fourier series	expansion of an o	odd	periodic function	n c	ontains
	a) For cosine term	IS	b)	Only sine term	S	
	c) Both cosine and	d sine	d)	Only sine term	wit	h constant
12)	Inverse Fourier tra	nsform of $sgn(\omega)$	is			
	a) $-j/\pi t$	b) $\int_{\pi t}^{j}$	c)	$\frac{1}{\pi t}$	d)	$-\frac{1}{\pi t}$
13)	In DIF FFT algorith	nm output sequend	ce i	S		
	a) In natural order		b)	Bit reversed or	der	
	c) In ascending or	der	d)	Descending or	der	

- 14) If $x(z) = \{1, 2, 1, 2, 3 .\}$ ROC is **\$**
 - a) Entire z-plane
 - b) Entire z-plane except $z = \infty$
 - c) Entire z-plane except z = 0, $z = \infty$
 - d) Entire z-plane except z = 0

Seat No.

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 SIGNALS AND SYSTEMS

Day and Date: Wednesday, 24-5-2017

Marks : 56

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

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

SECTION - I

2. Solve any four:

 $(4 \times 4 = 16)$

a) Find whether following signals are periodic or not:

$$x(t) = 2\cos(10t + 1) - \sin(4t - 1)$$

- b) Determine the energy and power of the following signals : x(t) = tu(t).
- c) Check linearity and causality of the following system:

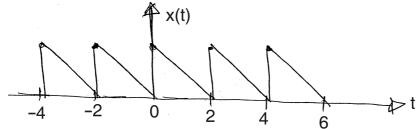
$$y(n) = \sum_{k=-\infty}^{n+1} x(k) .$$

- d) Find Fourier Transform of $x(t) = e^{-2t}u(t-1)$.
- e) Derive the frequency shifting property of Fourier transform.

3. Solve any two:

 $(6 \times 2 = 12)$

a) Find the exponential series of the following signal:



b) Find the Fourier transform of the following signal:

$$x(t) = Arect(t/\tau) \text{ for } |t| \le t/2$$

= 0 otherwise

c) Determine the convolution of the following sequences :

$$x(n) = b^n u(n)$$
 and $h(n) = a^n u(n)$ when $a \neq b$.

SECTION - II

4. Solve any four:

 $(4 \times 4 = 16)$

a) Find Z transform and sketch R.O.C. for following sequence :

$$X[n] = -b^n u(-n-1)$$

b) Determine the signal x(n) whose Z transform is given by

$$X(Z) = log(1 - az^{-1}); |Z| > |a|$$

c) Find $X(\infty)$, if i) $X(Z) = (Z + 2)/(Z - 0.8)^2$

ii)
$$X(Z) = (Z + 1)/3 (Z - 1) (Z + 0.9)$$

- d) Derive the time shifting property of DTFT.
- e) Find the DFT of the following sequences:

i)
$$x(n) = \partial (n - n_0)$$
 ii) $x(n) = a^n$.

5. Solve any two:

 $(6 \times 2 = 12)$

a) Find 8 point DFT of following sequence:

$$x(n) = \{1, 1, 1, 1\}.$$

b) Determine the sequence x[n] associated with Z transform given using Partial Fraction Expansion [P.F.E.] method.

$$X[Z] = 2Z^2/(Z + 1) (Z + 2)^2$$
; Right sided sequence.

c) Compute 8 point IDFT of the sequence using DIT FFT algorithm

$$X(K) = \{7, -0.707 - j0.707, -j, 0.707 - j0.707, 1, 0.707 + j0.707, j, -0.707 + j0.707\}.$$

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Seat	Set	D
No.	Jet	

T.E. (Electrical) (Part – II) (New – CGPA) Examination, 2017 VALUE ENGINEERING Self Learning

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) **All** the questions are **compulsory**.

- 2) Figures to the right indicate full marks.
- 3) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. **Each** question carries **one** mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose the correct answer:

 $(10 \times 1 = 10)$

- 1) Value is equal to
 - a) Utility

b) Cost

c) Utility/cost

- d) Cost/utility
- 2) Extension in demand is due to
 - a) Extension in price
 - b) Extension in supply
 - c) Fall on price of commodity
 - d) Increase in the price of the commodity
- 3) Semi variable cost is one which is
 - a) Fixed cost
 - b) Variable cost
 - c) Partly variable and partly fixed cost
 - d) Direct cost
- 4) Strategic planning is primarily carried out by
 - a) Top management

- b) Middle management
- c) Knowledge management
- d) Operational management



5)	In value engineering important consid	lera	tion is given to
	a) Cost control	b)	Customer satisfaction
	c) Function concept	d)	Profit maximization
6)	A manager who acts as Crises manager	_	
	a) Resources allocator	b)	Disturbance handler
	c) Entrepreneur	d)	Negotiator
7)	Long term planning means		
	a) A period of 5 to 15 years	b)	One to five years
	c) Up to one year	d)	Period of 15 to 25 years
8)	Function of staffing includes		
	a) Development of persons	b)	Placement
	c) Compensation	d)	All of the above
9)	Managing change is an integral part of	f	
	a) Every manager's job	b)	The first line manager job
	c) Middle level managers job	d)	Top level management job
10)	The nature of value engineering is		
,	a) Micro	b)	Macro
	c) Normative and Micro	,	Only normative
	,	,	•



Seat	
No.	

T.E. (Electrical) (Part – II) (New – CGPA) Examination, 2017 VALUE ENGINEERING Self Learning

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) **All** the questions are **compulsory**.

2) Figures to the right indicate full marks.

2. Write short notes on any four:

 $(5 \times 4 = 20)$

- 1) Value addition.
- 2) Reasons for poor value.
- 3) Implementation phase of value engineering.
- 4) Value engineering applications in maintenance.
- 5) Training for value engineering.

3. Solve any two:

 $(2\times10=20)$

- 1) Define "Value Engineering". "How it is useful from engineering economics point of view?
- 2) Explain different techniques of value engineering.
- 3) Describe application methodology of value engineering projects.

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Seat	Cot	
No.	Set	$\mid \mathbf{Q} \mid$

T.E. (Electrical) (Part – II) (New – CGPA) Examination, 2017 **VALUE ENGINEERING** Self Learning

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) **All** the questions are **compulsory**.

- 2) Figures to the **right** indicate **full** marks.
- 3) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1.	Choose the correct answer

 $(10 \times 1 = 10)$

- 1) Managing change is an integral part of
 - a) Every manager's job
- b) The first line manager job
- c) Middle level managers job
- d) Top level management job
- 2) The nature of value engineering is
 - a) Micro

- b) Macro
- c) Normative and Micro
- d) Only normative
- 3) Long term planning means
 - a) A period of 5 to 15 years
- b) One to five years

c) Up to one year

- d) Period of 15 to 25 years
- 4) Function of staffing includes
 - a) Development of persons
- b) Placement

c) Compensation

d) All of the above

- 5) Value is equal to
 - a) Utility

b) Cost

c) Utility/cost

d) Cost/utility

-2-



- 6) Extension in demand is due to
 - a) Extension in price
 - b) Extension in supply
 - c) Fall on price of commodity
 - d) Increase in the price of the commodity
- 7) Semi variable cost is one which is
 - a) Fixed cost
 - b) Variable cost
 - c) Partly variable and partly fixed cost
 - d) Direct cost
- 8) Strategic planning is primarily carried out by
 - a) Top management

- b) Middle management
- c) Knowledge management
- d) Operational management
- 9) In value engineering important consideration is given to
 - a) Cost control

b) Customer satisfaction

c) Function concept

- d) Profit maximization
- 10) A manager who acts as Crises manager is playing which of the role
 - a) Resources allocator
- b) Disturbance handler

c) Entrepreneur

d) Negotiator



Seat	
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T.E. (Electrical) (Part – II) (New – CGPA) Examination, 2017 VALUE ENGINEERING Self Learning

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) **All** the questions are **compulsory**.

2) Figures to the **right** indicate **full** marks.

2. Write short notes on any four:

 $(5 \times 4 = 20)$

- 1) Value addition.
- 2) Reasons for poor value.
- 3) Implementation phase of value engineering.
- 4) Value engineering applications in maintenance.
- 5) Training for value engineering.

3. Solve any two: (2×10=20)

- 1) Define "Value Engineering". "How it is useful from engineering economics point of view?
- 2) Explain different techniques of value engineering.
- 3) Describe application methodology of value engineering projects.

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Seat	Cat	D
No.	Set	K

T.E. (Electrical) (Part – II) (New – CGPA) Examination, 2017 VALUE ENGINEERING Self Learning

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) **All** the questions are **compulsory**.

- 2) Figures to the **right** indicate **full** marks.
- 3) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. **Each** question carries **one** mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose the correct answer:

(10×1=10)

- 1) In value engineering important consideration is given to
 - a) Cost control

b) Customer satisfaction

c) Function concept

- d) Profit maximization
- 2) A manager who acts as Crises manager is playing which of the role
 - a) Resources allocator

b) Disturbance handler

c) Entrepreneur

- d) Negotiator
- Managing change is an integral part of
 - a) Every manager's job

b) The first line manager job

c) Middle level managers job

- d) Top level management job
- 4) The nature of value engineering is
 - a) Micro

b) Macro

c) Normative and Micro

- d) Only normative
- 5) Semi variable cost is one which is
 - a) Fixed cost
 - b) Variable cost
 - c) Partly variable and partly fixed cost
 - d) Direct cost



- 6) Strategic planning is primarily carried out by
 - a) Top management

- b) Middle management
- c) Knowledge management
- d) Operational management

- 7) Value is equal to
 - a) Utility

b) Cost

c) Utility/cost

- d) Cost/utility
- 8) Extension in demand is due to
 - a) Extension in price
 - b) Extension in supply
 - c) Fall on price of commodity
 - d) Increase in the price of the commodity
- 9) Long term planning means
 - a) A period of 5 to 15 years
- b) One to five years

c) Up to one year

- d) Period of 15 to 25 years
- 10) Function of staffing includes
 - a) Development of persons
 - c) Compensation

- b) Placement
- d) All of the above



Seat	
No.	

T.E. (Electrical) (Part – II) (New – CGPA) Examination, 2017 VALUE ENGINEERING Self Learning

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) **All** the questions are **compulsory**.

2) Figures to the **right** indicate **full** marks.

2. Write short notes on any four:

 $(5 \times 4 = 20)$

- 1) Value addition.
- 2) Reasons for poor value.
- 3) Implementation phase of value engineering.
- 4) Value engineering applications in maintenance.
- 5) Training for value engineering.

3. Solve any two: (2×10=20)

- 1) Define "Value Engineering". "How it is useful from engineering economics point of view?
- 2) Explain different techniques of value engineering.
- 3) Describe application methodology of value engineering projects.

Seat	Set	
No.	Set	5

T.E. (Electrical) (Part – II) (New – CGPA) Examination, 2017 VALUE ENGINEERING Self Learning

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) **All** the questions are **compulsory**.

- 2) Figures to the right indicate full marks.
- 3) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. **Each** question carries **one** mark.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose the correct answer:

 $(10 \times 1 = 10)$

- 1) Semi variable cost is one which is
 - a) Fixed cost
 - b) Variable cost
 - c) Partly variable and partly fixed cost
 - d) Direct cost
- 2) Strategic planning is primarily carried out by
 - a) Top management

b) Middle management

c) Knowledge management

- d) Operational management
- 3) In value engineering important consideration is given to
 - a) Cost control

b) Customer satisfaction

c) Function concept

- d) Profit maximization
- 4) A manager who acts as Crises manager is playing which of the role
 - a) Resources allocator

b) Disturbance handler

c) Entrepreneur

d) Negotiator

- 5) Long term planning means
 - a) A period of 5 to 15 years

b) One to five years

c) Up to one year

d) Period of 15 to 25 years

P.T.O.



- 6) Function of staffing includes
 - a) Development of persons
 - b) Placement
 - c) Compensation

- d) All of the above
- 7) Managing change is an integral part of
 - a) Every manager's job
- b) The first line manager job
- c) Middle level managers job
- d) Top level management job
- 8) The nature of value engineering is
 - a) Micro

- b) Macro
- c) Normative and Micro
- d) Only normative

- 9) Value is equal to
 - a) Utility

b) Cost

c) Utility/cost

- d) Cost/utility
- 10) Extension in demand is due to
 - a) Extension in price
 - b) Extension in supply
 - c) Fall on price of commodity
 - d) Increase in the price of the commodity

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T.E. (Electrical) (Part – II) (New – CGPA) Examination, 2017 VALUE ENGINEERING Self Learning

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) **All** the questions are **compulsory**.

2) Figures to the **right** indicate **full** marks.

2. Write short notes on any four:

 $(5 \times 4 = 20)$

 $(2\times10=20)$

- 1) Value addition.
- 2) Reasons for poor value.
- 3) Implementation phase of value engineering.
- 4) Value engineering applications in maintenance.
- 5) Training for value engineering.

3. Solve **any two**:

1) Define "Value Engineering". "How it is useful from engineering economics point of view?

- 2) Explain different techniques of value engineering.
- 3) Describe application methodology of value engineering projects.

Seat	Set	P
No.	Jet i	•

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 Self Learning SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book
Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose the correct answer:

 $(10 \times 1 = 10)$

- 1) All of the following are TRUE about disasters EXCEPT
 - a) A disaster may be domestic or international
 - b) A disaster may be caused by nature or have human origins
 - c) A disaster always receives widespread media coverage
 - d) A disaster may have a known and gradual onset
- 2) Disasters frequently result in all of the following EXCEPT
 - a) Damage to the ecological environment
 - b) Displacement of populations
 - c) Destruction of a population's homeland
 - d) Sustained public attention during the recovery phase
- 3) There are nine tasks in the of *disaster management*. All of the following are tasks of this model EXCEPT
 - a) Assess secondary social problems such as heath epidemics, displaced persons
 - b) Counsel those who have suffered trauma and bereavement
 - c) Control rumors, provide accurate information
 - d) Provide security; prevent looting, protect person and property

P.T.O.



4)	organizational readiness and respons a) Hobfoll's theory of conservation ofb) The problem solving "task model"c) Structure functional theoryd) Theory of traumatogenic forces	se in a disaster ?
5)	Ensuring the safety, health and welfar purpose of the a) Factories Act, 1948 a) Equal Remuneration Act, 1976	b) Payment of Wages Act, 1936
	c) Equal Remuneration Act, 1976	d) Industrial Disputes Act, 1947
6)	A workplace emergency evacuation pa) Company Managementc) The Health and Safety Committee	b) The Government
7)	Which is the most effective method of a) PPE c) Fans	f reducing contamination to workers? b) Administration controls d) Engineering controls
8)	Which of the following is a major cont a) Low pay c) Reasonable work pressures	ribution to workplace stress? b) Poor working conditions d) Social isolation
9)	The work place hazard excessive nois a) Air conditioningc) Shift work	se may be controlled by b) Ventilation d) PPE
10)	An emergency that could arise and ca a) Fire c) Chemical spill	ause a risk to H & S could include b) Explosion d) All of the above
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T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 Self Learning

SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

2. Solve any four: (4×5=20)

- a) Discuss in detail about Hazards, their nature.
- b) Discuss various hazard analysis techniques. Also discuss hazard prevention strategies.
- c) What are various types of fires? What are the strategies to be adopted for fire prevention?
- d) As an engineer how would you describe safety as an essential parameter in designing industrial production system?
- e) Discuss safety engineering analysis.

3. Solve any two: (2×10=20)

- a) What are the impacts of most damaging hazards occurring in the country, on communities, infrastructure, environment etc.
- b) List all of governmental organisations related to disaster management.
- c) Discuss organization structure of safety department along with role and responsibilities of each position.

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T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 Self Learning SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

1.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

	•	
Choose the correct answer:		(10×1=10)
1) The work place hazard excessive noisa) Air conditioningc) Shift work	se may be controlled by b) Ventilation d) PPE	
2) An emergency that could arise and caa) Firec) Chemical spill	ause a risk to H & S could include b) Explosion d) All of the above	Э
3) Which is the most effective method ofa) PPEc) Fans	f reducing contamination to work b) Administration controls d) Engineering controls	ers?
4) Which of the following is a major conta) Low payc) Reasonable work pressures	ribution to workplace stress? b) Poor working conditions d) Social isolation	
5) All of the following are TRUE about di	sasters EXCEPT	

a) A disaster may be domestic or international

d) A disaster may have a known and gradual onset

b) A disaster may be caused by nature or have human origins

c) A disaster always receives widespread media coverage



- 6) Disasters frequently result in all of the following EXCEPT
 - a) Damage to the ecological environment
 - b) Displacement of populations
 - c) Destruction of a population's homeland
 - d) Sustained public attention during the recovery phase
- 7) There are nine tasks in the of *disaster management*. All of the following are tasks of this model EXCEPT
 - a) Assess secondary social problems such as heath epidemics, displaced persons
 - b) Counsel those who have suffered trauma and bereavement
 - c) Control rumors, provide accurate information
 - d) Provide security; prevent looting, protect person and property
- 8) Which one of the following theories of disaster management informs organizational readiness and response in a disaster?
 - a) Hobfoll's theory of conservation of resources
 - b) The problem solving "task model"
 - c) Structure functional theory
 - d) Theory of traumatogenic forces
- 9) Ensuring the safety, health and welfare of the employees is the primary purpose of the
 - a) Factories Act, 1948
- b) Payment of Wages Act, 1936
- c) Equal Remuneration Act, 1976
- d) Industrial Disputes Act, 1947
- 10) A workplace emergency evacuation plan is the responsibility of
 - a) Company Management
- b) The Government
- c) The Health and Safety Committee d) Individual Employees



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T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 Self Learning

SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

2. Solve any four: (4×5=20)

- a) Discuss in detail about Hazards, their nature.
- b) Discuss various hazard analysis techniques. Also discuss hazard prevention strategies.
- c) What are various types of fires? What are the strategies to be adopted for fire prevention?
- d) As an engineer how would you describe safety as an essential parameter in designing industrial production system?
- e) Discuss safety engineering analysis.

3. Solve any two: (2×10=20)

- a) What are the impacts of most damaging hazards occurring in the country, on communities, infrastructure, environment etc.
- b) List all of governmental organisations related to disaster management.
- c) Discuss organization structure of safety department along with role and responsibilities of each position.

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T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 Self Learning SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose the correct answer:

 $(10 \times 1 = 10)$

- 1) Ensuring the safety, health and welfare of the employees is the primary purpose of the
 - a) Factories Act, 1948
- b) Payment of Wages Act, 1936
- c) Equal Remuneration Act, 1976
- d) Industrial Disputes Act, 1947
- 2) A workplace emergency evacuation plan is the responsibility of
 - a) Company Management
- b) The Government
- c) The Health and Safety Committee d) Individual Employees
- 3) The work place hazard excessive noise may be controlled by
 - a) Air conditioning

b) Ventilation

c) Shift work

- d) PPE
- 4) An emergency that could arise and cause a risk to H & S could include
 - a) Fire

b) Explosion

c) Chemical spill

- d) All of the above
- 5) There are nine tasks in the of *disaster management*. All of the following are tasks of this model EXCEPT
 - a) Assess secondary social problems such as heath epidemics, displaced persons
 - b) Counsel those who have suffered trauma and bereavement
 - c) Control rumors, provide accurate information
 - d) Provide security; prevent looting, protect person and property



- 6) Which one of the following theories of disaster management informs organizational readiness and response in a disaster?
 - a) Hobfoll's theory of conservation of resources
 - b) The problem solving "task model"
 - c) Structure functional theory
 - d) Theory of traumatogenic forces
- 7) All of the following are TRUE about disasters EXCEPT
 - a) A disaster may be domestic or international
 - b) A disaster may be caused by nature or have human origins
 - c) A disaster always receives widespread media coverage
 - d) A disaster may have a known and gradual onset
- 8) Disasters frequently result in all of the following EXCEPT
 - a) Damage to the ecological environment
 - b) Displacement of populations
 - c) Destruction of a population's homeland
 - d) Sustained public attention during the recovery phase
- 9) Which is the most effective method of reducing contamination to workers?
 - a) PPE

b) Administration controls

c) Fans

- d) Engineering controls
- 10) Which of the following is a major contribution to workplace stress?
 - a) Low pay

b) Poor working conditions

c) Reasonable work pressures

d) Social isolation



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T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 Self Learning

SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

2. Solve any four: (4×5=20)

- a) Discuss in detail about Hazards, their nature.
- b) Discuss various hazard analysis techniques. Also discuss hazard prevention strategies.
- c) What are various types of fires? What are the strategies to be adopted for fire prevention?
- d) As an engineer how would you describe safety as an essential parameter in designing industrial production system?
- e) Discuss safety engineering analysis.

3. Solve any two: (2×10=20)

- a) What are the impacts of most damaging hazards occurring in the country, on communities, infrastructure, environment etc.
- b) List all of governmental organisations related to disaster management.
- c) Discuss organization structure of safety department along with role and responsibilities of each position.

SLR-VB - 326 (a)

Seat	Set	S
No.	Set)

T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 Self Learning SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. Choose the correct answer:

 $(10 \times 1 = 10)$

- 1) There are nine tasks in the of *disaster management*. All of the following are tasks of this model EXCEPT
 - a) Assess secondary social problems such as heath epidemics, displaced persons
 - b) Counsel those who have suffered trauma and bereavement
 - c) Control rumors, provide accurate information
 - d) Provide security; prevent looting, protect person and property
- 2) Which one of the following theories of disaster management informs organizational readiness and response in a disaster?
 - a) Hobfoll's theory of conservation of resources
 - b) The problem solving "task model"
 - c) Structure functional theory
 - d) Theory of traumatogenic forces
- 3) Ensuring the safety, health and welfare of the employees is the primary purpose of the
 - a) Factories Act, 1948
- b) Payment of Wages Act, 1936
- c) Equal Remuneration Act, 1976
- d) Industrial Disputes Act, 1947



4)	A workplace emergency evacuation p a) Company Management		is the responsibility of The Government
	c) The Health and Safety Committee	,	
5)	Which is the most effective method of a) PPE c) Fans	b)	ducing contamination to workers ? Administration controls Engineering controls
6)	Which of the following is a major cont a) Low payc) Reasonable work pressures	b)	ution to workplace stress ? Poor working conditions Social isolation
7)	The work place hazard excessive nois a) Air conditioningc) Shift work	b)	may be controlled by Ventilation PPE
8)	An emergency that could arise and ca		
	a) Firec) Chemical spill	•	Explosion All of the above
9)	All of the following are TRUE about disa. a) A disaster may be domestic or interest. b) A disaster may be caused by nature. c) A disaster always receives widesp. d) A disaster may have a known and great the control of the contr	erna re c rea	ational or have human origins ad media coverage
10)	Disasters frequently result in all of the a) Damage to the ecological environment		•
	b) Displacement of populationsc) Destruction of a population's homed) Sustained public attention during the		

 $(4 \times 5 = 20)$



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T.E. (Electrical) (Part – II) (New-CGPA) Examination, 2017 Self Learning

SAFETY ENGINEERING AND DISASTER MANAGEMENT

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

2. Solve any four:

a) Discuss in detail about Hazards, their nature.

- b) Discuss various hazard analysis techniques. Also discuss hazard prevention strategies.
- c) What are various types of fires? What are the strategies to be adopted for fire prevention?
- d) As an engineer how would you describe safety as an essential parameter in designing industrial production system?
- e) Discuss safety engineering analysis.

3. Solve any two: (2×10=20)

- a) What are the impacts of most damaging hazards occurring in the country, on communities, infrastructure, environment etc.
- b) List all of governmental organisations related to disaster management.
- c) Discuss organization structure of safety department along with role and responsibilities of each position.



SLR-VB - 326 (b)

Seat	Set [D
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T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS Self Learning

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. **True** or **False**: 10

- The semiconductor Integrated Circuit Layout Design Act was enacted in year 2000.
- 2) Any invention concerning with composition, construction or manufacture of a substance, of an article or of an apparatus or an industrial type of process can be patented.
- 3) A trademark is a special symbol for distinguishing the goods offered for sale.
- 4) Trademark includes mark, symbol, name, alphabet, numerical, colour or any combination.
- 5) Solapuri Chadar is not an example of geographical indication.



- 6) Infringement of a patent consists of the unauthorized making, importing, using, offering for sale or selling any patented invention within the India.
- 7) The Indian Trademark Act was passed in 1948.
- 8) Design means the shape, pattern, configuration or ornamentation of an industrial article.
- 9) Piracy means illegal use of intellectual property.
- 10) Intellectual Property Rights (IPR) protect the use of information and ideas that are of ethical value.

-3-

Seat	
No.	

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS Self Learning

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

2. Attempt following questions (any two):

20

- 1) What are the Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement?
- 2) Explain the Procedure for obtaining patents.
- 3) Discuss the need to spread awareness regarding piracy, IP Act in India.
- 3. Short notes (any four):

20

- 1) Overview of Indian Intellectual Property Act.
- 2) Law on industrial designs.
- 3) Importance of IP Rights and Patents for engineers.
- 4) Commercial exploitation and infringement.
- 5) Geographical indication of goods.
- 6) Trademark.



SLR-VB - 326 (b)

Seat No.	Set Q
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T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS Self Learning

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. True or False:

- 1) Piracy means illegal use of intellectual property.
- 2) Intellectual Property Rights (IPR) protect the use of information and ideas that are of ethical value.
- 3) The Indian Trademark Act was passed in 1948.
- 4) Design means the shape, pattern, configuration or ornamentation of an industrial article.
- 5) The semiconductor Integrated Circuit Layout Design Act was enacted in year 2000.
- 6) Any invention concerning with composition, construction or manufacture of a substance, of an article or of an apparatus or an industrial type of process can be patented.



- 7) A trademark is a special symbol for distinguishing the goods offered for sale.
- 8) Trademark includes mark, symbol, name, alphabet, numerical, colour or any combination.
- 9) Solapuri Chadar is not an example of geographical indication.
- 10) Infringement of a patent consists of the unauthorized making, importing, using, offering for sale or selling any patented invention within the India.

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Seat	
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T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS Self Learning

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

2. Attempt following questions (any two):

20

- 1) What are the Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement?
- 2) Explain the Procedure for obtaining patents.
- 3) Discuss the need to spread awareness regarding piracy, IP Act in India.
- 3. Short notes (any four):

20

- 1) Overview of Indian Intellectual Property Act.
- 2) Law on industrial designs.
- 3) Importance of IP Rights and Patents for engineers.
- 4) Commercial exploitation and infringement.
- 5) Geographical indication of goods.
- 6) Trademark.



SLR-VB - 326 (b)

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No.	Set	K

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS Self Learning

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. True or False:

- 1) Solapuri Chadar is not an example of geographical indication.
- 2) Infringement of a patent consists of the unauthorized making, importing, using, offering for sale or selling any patented invention within the India.
- 3) Piracy means illegal use of intellectual property.
- 4) Intellectual Property Rights (IPR) protect the use of information and ideas that are of ethical value.
- 5) A trademark is a special symbol for distinguishing the goods offered for sale.
- 6) Trademark includes mark, symbol, name, alphabet, numerical, colour or any combination.

SLR-VB - 326 (b)





- 7) The semiconductor Integrated Circuit Layout Design Act was enacted in year 2000.
- 8) Any invention concerning with composition, construction or manufacture of a substance, of an article or of an apparatus or an industrial type of process can be patented.

-2-

- 9) The Indian Trademark Act was passed in 1948.
- 10) Design means the shape, pattern, configuration or ornamentation of an industrial article.

Seat	
No.	

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS Self Learning

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

2. Attempt following questions (any two):

20

- 1) What are the Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement?
- 2) Explain the Procedure for obtaining patents.
- 3) Discuss the need to spread awareness regarding piracy, IP Act in India.
- 3. Short notes (any four):

20

- 1) Overview of Indian Intellectual Property Act.
- 2) Law on industrial designs.
- 3) Importance of IP Rights and Patents for engineers.
- 4) Commercial exploitation and infringement.
- 5) Geographical indication of goods.
- 6) Trademark.



SLR-VB - 326 (b)

Seat	Set	S
No.	Set	3

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS Self Learning

Day and Date: Friday, 26-5-2017 Max. Marks: 50

Time: 3.00 p.m. to 5.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Marks: 10

1. **True** or **False**: 10

- 1) A trademark is a special symbol for distinguishing the goods offered for sale.
- 2) Trademark includes mark, symbol, name, alphabet, numerical, colour or any combination.
- 3) Solapuri Chadar is not an example of geographical indication.
- 4) Infringement of a patent consists of the unauthorized making, importing, using, offering for sale or selling any patented invention within the India.
- 5) The Indian Trademark Act was passed in 1948.
- 6) Design means the shape, pattern, configuration or ornamentation of an industrial article.



- 7) Piracy means illegal use of intellectual property.
- 8) Intellectual Property Rights (IPR) protect the use of information and ideas that are of ethical value.
- 9) The semiconductor Integrated Circuit Layout Design Act was enacted in year 2000.
- 10) Any invention concerning with composition, construction or manufacture of a substance, of an article or of an apparatus or an industrial type of process can be patented.

Seat	
No.	

T.E. (Electrical Engineering) (Part – II) (New CGPA) Examination, 2017 INTELLECTUAL PROPERTY RIGHTS Self Learning

Day and Date: Friday, 26-5-2017 Marks: 40

Time: 3.00 p.m. to 5.00 p.m.

2. Attempt following questions (any two):

20

- 1) What are the Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement?
- 2) Explain the Procedure for obtaining patents.
- 3) Discuss the need to spread awareness regarding piracy, IP Act in India.
- 3. Short notes (any four):

20

- 1) Overview of Indian Intellectual Property Act.
- 2) Law on industrial designs.
- 3) Importance of IP Rights and Patents for engineers.
- 4) Commercial exploitation and infringement.
- 5) Geographical indication of goods.
- 6) Trademark.

SLR-VB - 327

Seat	
No.	

T.E. (Electrical Engineering) (Old) (Part – II) Examination, 2017 POWER SYSTEM - II

Day and Date: Thursday, 25-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to the **right** indicate **full** marks.
- 4) Assume data, if necessary.
- 5) All questions are compulsory.

MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 20 1. Choose the correct alternatives: $(20 \times 1 = 20)$ 1) A 75 MVA, 10KV synchronous generator has reactance of 0.4, the reactance value in p.u to a base of 100 MVA, 11 KV is A) 0.578 D) 0.44 B) 0.412 C) 0.279 $I_{BUS} =$ B) $[Z_{BUS}] / [Y_{BUS}]$ A) $[Y_{BUS}] \times [V_{BUS}]$ C) $[V_{BUS}] / [Y_{BUS}]$ D) $[Z_{BUS}] \times [V_{BUS}]$ 3) An acceleration factor is used in load flow studies using G-S method to A) To increase the number of iterations B) To increase the speed of calculations

C) Both a) and b)

- D) None of above
- 4) The positive, negative and zero sequence impedance of a solidly grounded system under steady state condition always follow the relations:
 - A) $Z_1 > Z_2 < Z_0$

C) $Z_1 < Z_2 < Z_0$

- B) $Z_0 < Z_1 < Z_2$ D) None of the above
- 5) The new p.u. impedance if the new base MVA is twice the old base MVA will be
 - A) Four times of old p.u. impedance
- B) Twice the old p.u. impedance
- C) Same as the old p.u. impedance
- D) Thrice the old p.u. impedance
- 6) Load flow study carried is out for
 - A) Fault calculations

B) Stability studies

C) System planning

D) Load frequency control

- 7) A circuit breaker is
 - A) A power factor correcting device
 - B) A device to neutralize the effect of transients
 - C) A waveform correcting device
 - D) A current interrupting device



8)	Which of the following results in a symmetri A) Single line to earth C) All the three phases to earth	cal fault ? B) Phase to phase D) Two phases to earth
9)	In a balance 3-ph system, negative and zer A) Absent B) Equal	o sequence currents are C) Infinite D) Present
10)	to a	ease of two conductors open faults is similar
	A) L-G fault B) L-L fault	C) L-L-G fault D) L-L-L fault
11)	The theoretical maximum power occurs who	
	A) $\delta = 0^{\circ}$ B) $\delta = 30^{\circ}$	C) $\delta = 60^{\circ}$ D) $\delta = 90^{\circ}$
12)	Equal area criteria gives the information reg A) Stability region C) Absolute stability	arding B) Relative stability D) Swing curves
13)	The critical clearing time of a fault in a power A) Steady state stability limit C) Transient stability limit	er system is related to B) Short circuit current limit D) Reactive power limit
14)	The lightning arrestor is located A) At the top of the building C) Away from the building to be protected	B) At the bottom of the buildingD) In the centre of the building
15)	The off-diagonal elements in an Y _{BUS} are ca A) Driving point admittance C) Self admittance	alled as B) Mutual admittance D) All of the above
16)	The constant impedance representation of IA) Load flow studies C) Security studies	oads is quite often used in B) Stability studies D) None of the above
17)	The unidirectional transient component of s A) DC Offset current C) AC Offset current	hort circuit current is called B) DC Onset current D) None of the above
18)	Phase shift of sequence components occur	rs in
	A) Y-Y transformers	B) Y- Δ transformers
	C) Δ - Δ transformers	D) None of the above
19)	In two synchronous generators are intercor	nnected, loss of synchronism will result in
	A) Stalling of generators	B) Wild fluctuations in current
	C) Wild fluctuations in current and voltage	D) None of the above
20)	Compare with steady state stability limit, tra	nsient stability limit is
	A) Always less	B) Always more
	C) Sometimes less	D) Sometimes more



Seat	
No.	

T.E. (Electrical Engineering) (Old) (Part – II) Examination, 2017 POWER SYSTEM – II

Day and Date: Thursday, 25-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the **right** indicate **full** marks.

2) Assume data, if necessary.

3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following:

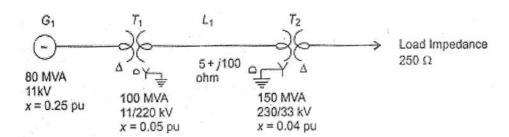
 $(4 \times 5 = 20)$

- a) Explain:
 - i) Single line diagram and reactance diagram.
 - ii) Selection of circuit braker ratings.
- b) Draw equivalent circuit models of following power system components :
 - i) Transformer
 - ii) Transmission lines.
- c) Discuss formation of Y_{BUS} by method of inspection method with suitable example.
- d) Write short notes on classification of buses in a power system.
- e) Explain transients on a transmission line.

3. Attempt any two of the following:

 $(2 \times 10 = 20)$

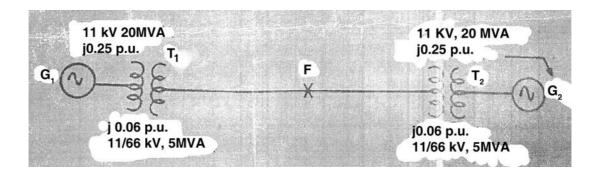
a) Below figure shows the single line diagram of a simple power system. The transformer ratings, generator rating, line impedance and load impedance are as shown. Draw impedance diagram. Select generator rating as a common base.



b) Write steps of a computational algorithm of Gauss Seidel method for PQ buses.



c) Generators G_1 and G_2 are identical and rated 11 KV, 20MVA and have a transient resistance of 0.25 p.u. at own MVA base. The transformer T_1 and T_2 are also identical and are rated 11/66KV, 5MVA and have a reactance of 0.06 p.u. to their own MVA base. The tie line is 50 km long each conductor has a reactance of 0.848 ohm per km. The three phase fault is assumed at F, 20 km from generator as shown in fig. Find short circuit current.



SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Define a stability of power system. Classify and explain the types of power system stabilities.
- b) Derive the expression of power in terms of symmetrical components.
- c) Derive the swing equation and discuss its applications in the study of power system stability.
- d) Define fault. What are the reasons for the occurrence of fault.
- e) Derive the expressions and draw sequence networks of Open conductor faults in power system of :
 - a) Two conductors open
 - b) One conductor open.

5. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain sequence impedances and sequence networks of following PS elements:
 - i) Transformer
- ii) Transmission lines.
- b) Define an equal area criteria. Discuss the applications of equal area criteria in power systems.
- c) Derive the necessary equation to determine the fault current for single line to line fault. Draw a diagram showing the interconnections of sequence networks.

SLR-VB - 327

Seat	
No.	

T.E. (Electrical Engineering) (Old) (Part – II) Examination, 2017 **POWER SYSTEM - II**

Da	ay and Date: Thursday, 25-5-2017	Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions :

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to the **right** indicate **full** marks

	4) As	gares to the right ma ssume data, if neces I questions are com p	sary	/ .		
		MCQ/Objective T	уре	Questions		
Duratio	n : 30 Minutes					Marks: 20
1. Ch	noose the correct alterna	itives:				(20×1=20)
1) The constant impedarA) Load flow studiesC) Security studies	ce representation of	B)	ls is quite often use Stability studies None of the above		
2) The unidirectional tranA) DC Offset currentC) AC Offset current	sient component of s	B)	t circuit current is on DC Onset current None of the above	t	
3) Phase shift of sequence components occurs in						
	A) Y-Y transformers C) Δ - Δ transformer	rs.	,	Y- Δ transformers		
4) In two synchronous ge A) Stalling of generate			cted, loss of synch Wild fluctuations i		t in
	C) Wild fluctuations in		,			
5) Compare with steady A) Always less	state stability limit, tra		ent stability limit is Always more		
	C) Sometimes less		D)	Sometimes more		
 A 75 MVA, 10KV synchronous generator has reactance of 0.4, the reactance value to a base of 100 MVA, 11 KV is 					in p.u	
	A) 0.578	B) 0.412	C)	0.279	D) 0.44	
7) $I_{BUS} =$ A) $[Y_{BUS}] \times [V_{BUS}]$ C) $[V_{BUS}] / [Y_{BUS}]$			$[Z_{BUS}] / [Y_{BUS}]$ $[Z_{BUS}] \times [V_{BUS}]$		



8)	An acceleration factor is used in load flow s A) To increase the number of iterations C) Both a) and b)	studies using G-S method to B) To increase the speed of calculations D) None of above					
9)	The positive, negative and zero sequence in steady state condition always follow the relation $Z_1 > Z_2 < Z_0$ C) $Z_1 < Z_2 < Z_0$	mpedance of a solidly grounded system under lations: B) $Z_0 < Z_1 < Z_2$ D) None of the above					
10)	The new p.u. impedance if the new base M A) Four times of old p.u. impedance C) Same as the old p.u. impedance	IVA is twice the old base MVA will be B) Twice the old p.u. impedance D) Thrice the old p.u. impedance					
11)	Load flow study carried is out for A) Fault calculations C) System planning	B) Stability studies D) Load frequency control					
12)	 A circuit breaker is A) A power factor correcting device B) A device to neutralize the effect of transients C) A waveform correcting device D) A current interrupting device 						
13)	Which of the following results in a symmetriA) Single line to earthC) All the three phases to earth	ical fault ? B) Phase to phase D) Two phases to earth					
14)	In a balance 3-ph system, negative and zer A) Absent B) Equal	ro sequence currents are C) Infinite D) Present					
15)	to a	case of two conductors open faults is similar					
	A) L-G fault B) L-L fault	C) L-L-G fault D) L-L-L fault					
16)	The theoretical maximum power occurs wh						
	A) $\delta = 0^{\circ}$ B) $\delta = 30^{\circ}$	C) $\delta = 60^{\circ}$ D) $\delta = 90^{\circ}$					
17)	Equal area criteria gives the information reg A) Stability region C) Absolute stability	parding B) Relative stability D) Swing curves					
18)	The critical clearing time of a fault in a power A) Steady state stability limit C) Transient stability limit	er system is related to B) Short circuit current limit D) Reactive power limit					
19)	The lightning arrestor is located A) At the top of the building C) Away from the building to be protected	B) At the bottom of the building D) In the centre of the building					
20)	The off-diagonal elements in an Y _{BUS} are c.A) Driving point admittance C) Self admittance	alled as B) Mutual admittance D) All of the above					



Seat	
No.	

T.E. (Electrical Engineering) (Old) (Part – II) Examination, 2017 POWER SYSTEM – II

Day and Date: Thursday, 25-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the right indicate full marks.

2) Assume data, if necessary.

3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following:

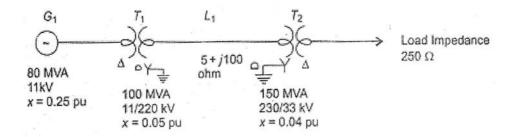
 $(4 \times 5 = 20)$

- a) Explain:
 - i) Single line diagram and reactance diagram.
 - ii) Selection of circuit braker ratings.
- b) Draw equivalent circuit models of following power system components :
 - i) Transformer
 - ii) Transmission lines.
- c) Discuss formation of Y_{BUS} by method of inspection method with suitable example.
- d) Write short notes on classification of buses in a power system.
- e) Explain transients on a transmission line.

3. Attempt any two of the following:

 $(2 \times 10 = 20)$

a) Below figure shows the single line diagram of a simple power system. The transformer ratings, generator rating, line impedance and load impedance are as shown. Draw impedance diagram. Select generator rating as a common base.

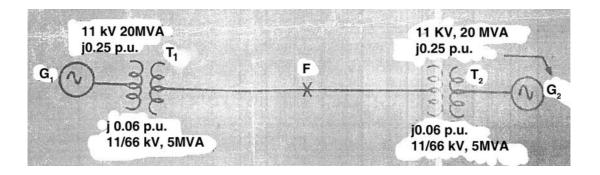


b) Write steps of a computational algorithm of Gauss Seidel method for PQ buses.

Set Q



c) Generators G_1 and G_2 are identical and rated 11 KV, 20MVA and have a transient resistance of 0.25 p.u. at own MVA base. The transformer T_1 and T_2 are also identical and are rated 11/66KV, 5MVA and have a reactance of 0.06 p.u. to their own MVA base. The tie line is 50 km long each conductor has a reactance of 0.848 ohm per km. The three phase fault is assumed at F, 20 km from generator as shown in fig. Find short circuit current.



SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Define a stability of power system. Classify and explain the types of power system stabilities.
- b) Derive the expression of power in terms of symmetrical components.
- c) Derive the swing equation and discuss its applications in the study of power system stability.
- d) Define fault. What are the reasons for the occurrence of fault.
- e) Derive the expressions and draw sequence networks of Open conductor faults in power system of :
 - a) Two conductors open
 - b) One conductor open.

5. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain sequence impedances and sequence networks of following PS elements:
 - i) Transformer
- ii) Transmission lines.
- b) Define an equal area criteria. Discuss the applications of equal area criteria in power systems.
- c) Derive the necessary equation to determine the fault current for single line to line fault. Draw a diagram showing the interconnections of sequence networks.

SLR-VB - 327

Seat	
No.	

A) Y-Y transformers

C) Δ - Δ transformers

Set R

7	Γ.Ε. (Electric	cal Engineering) (Ol POWER SY		Part – II) Examination, EM – II	2017
•	Date: Thursda .00 p.m. to 6.00			Max	x. Marks : 100
	Instructions :	Answer Book Page No. 2) Answer MCQ/Object	o. 3. ive t .P. S dicat ssar	/ .	k.
		MCQ/Objective	Гуре	Questions	
	: 30 Minutes				Marks : 20
	oose the correct				(20×1=20)
1)		maximum power occurs w		2 000 2 000	
0)	A) $\delta = 0^{\circ}$	B) δ = 30°	,	,	
2)	A) Stability regC) Absolute st		В)	ing Relative stability Swing curves	
3)	The critical clean A) Steady stat C) Transients	<u>-</u>	B)	ystem is related to Short circuit current limit Reactive power limit	
4)	A) At the top o	<u>-</u>	•	At the bottom of the building In the centre of the building	
5)		al elements in an Y _{BUS} are nt admittance ance	B)	d as Mutual admittance All of the above	
6)	The constant in A) Load flow s C) Security str		B)	ls is quite often used in Stability studies None of the above	
7)	The unidirection A) DC Offset (C) AC Offset (C)		B)	t circuit current is called DC Onset current None of the above	
8)	Phase shift of s	sequence components occ	urs ir	1	

B) Y- Δ transformers

D) None of the above



9)	In two synchronous generators are interconnected, loss of synchronism will result in						
	A) Stalling of generator	ors	B)	Wild fluctuations i	n cu	ırrent	
	C) Wild fluctuations in	current and voltage	D)	None of the above	Э		
10)	Compare with steady state stability limit, transient stability limit is						
	A) Always less		B)	Always more			
	C) Sometimes less		D)	Sometimes more			
11)	A 75 MVA, 10KV synchto a base of 100 MVA,	_	as reactance of 0.4, the reactance value in p.u				
	A) 0.578	B) 0.412	C)	0.279	D)	0.44	
12)	I _{BUS} =						
	A) $[Y_{BUS}] \times [V_{BUS}]$ C) $[V_{BUS}] / [Y_{BUS}]$			$[Z_{BUS}] / [Y_{BUS}]$ $[Z_{BUS}] \times [V_{BUS}]$			
13)	An acceleration factor			-			
	A) To increase the nuC) Both a) and b)	mber of iterations	•	To increase the s None of above	pee	d of calculations	
14)	The positive, negative a steady state condition				rour	nded system under	
	A) $Z_1 > Z_2 < Z_0$ C) $Z_1 < Z_2 < Z_0$		B) Z₀ < Z₁ < Z₂D) None of the above				
15)	The new p.u. impedan	ce if the new base M	VA	is twice the old bas	se M	IVA will be	
	A) Four times of old p	•	•	Twice the old p.u.	-		
	C) Same as the old p.	•	D)	Thrice the old p.u.	. imp	pedance	
16)	Load flow study carried	d is out for	D)	Otability at dias			
	A) Fault calculationsC) System planning		•	Stability studies Load frequency co	ontr	ol	
17)	A circuit breaker is		_,	zoda noquency o	0	0 .	
,	A) A power factor cor	recting device					
	B) A device to neutral	ize the effect of trans	ien	ts			
	C) A waveform correct	_					
	D) A current interrupti	_					
18)	Which of the following	results in a symmetri					
	A) Single line to earthC) All the three phase	s to earth	•	Phase to phase Two phases to ea	rth		
10)	,		•	•			
19)	In a balance 3-ph system A) Absent	em, negative and zer B) Equal		Infinite		Present	
20)	Inter connection of sector to a	quence networks in o	ase	of two conductors	з ор	en faults is similar	
	A) L-G fault	B) L-L fault	C)	L-L-G fault	D)	L-L-L fault	



Seat	
No.	

T.E. (Electrical Engineering) (Old) (Part – II) Examination, 2017 POWER SYSTEM – II

Day and Date: Thursday, 25-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the **right** indicate **full** marks.

2) Assume data, if necessary.

3) All questions are compulsory.

SECTION - I

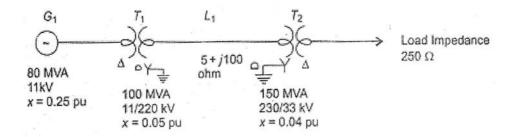
2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Explain:
 - i) Single line diagram and reactance diagram.
 - ii) Selection of circuit braker ratings.
- b) Draw equivalent circuit models of following power system components :
 - i) Transformer
 - ii) Transmission lines.
- c) Discuss formation of Y_{BUS} by method of inspection method with suitable example.
- d) Write short notes on classification of buses in a power system.
- e) Explain transients on a transmission line.
- 3. Attempt any two of the following:

 $(2 \times 10 = 20)$

a) Below figure shows the single line diagram of a simple power system. The transformer ratings, generator rating, line impedance and load impedance are as shown. Draw impedance diagram. Select generator rating as a common base.

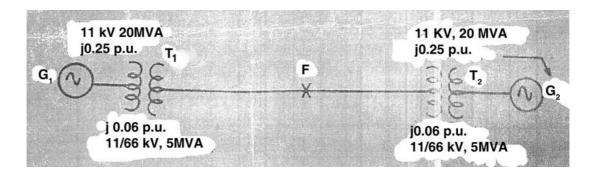


b) Write steps of a computational algorithm of Gauss Seidel method for PQ buses.

Set R



c) Generators G_1 and G_2 are identical and rated 11 KV, 20MVA and have a transient resistance of 0.25 p.u. at own MVA base. The transformer T_1 and T_2 are also identical and are rated 11/66KV, 5MVA and have a reactance of 0.06 p.u. to their own MVA base. The tie line is 50 km long each conductor has a reactance of 0.848 ohm per km. The three phase fault is assumed at F, 20 km from generator as shown in fig. Find short circuit current.



SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Define a stability of power system. Classify and explain the types of power system stabilities.
- b) Derive the expression of power in terms of symmetrical components.
- c) Derive the swing equation and discuss its applications in the study of power system stability.
- d) Define fault. What are the reasons for the occurrence of fault.
- e) Derive the expressions and draw sequence networks of Open conductor faults in power system of :
 - a) Two conductors open
 - b) One conductor open.

5. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain sequence impedances and sequence networks of following PS elements:
 - i) Transformer
- ii) Transmission lines.
- b) Define an equal area criteria. Discuss the applications of equal area criteria in power systems.
- c) Derive the necessary equation to determine the fault current for single line to line fault. Draw a diagram showing the interconnections of sequence networks.

SLR-VB - 327

Seat	
No.	

C) Transient stability limit

Set S

	Γ.E. (Electric	al Engir	neering) POWER		-	Examinatio	on, 2017
-	l Date : Thursday .00 p.m. to 6.00 p		7				Max. Marks: 100
	Instructions :	Answe 2) Answ forget 3) Figure 4) Assun	er Book Pag er MCQ/Ob t to mentio i	ie No. 3. jective ty n, Q.P. S ht indicat ecessary	et (P/Q/R/S) o e full marks. /.	n carries one <mark>s on Page N</mark> o	mark. o. 3 only. Don't
Duration	n : 30 Minutes	IV	ICQ/Object	ive Type	Questions		Marks : 20
	oose the correct	altornativo	0:				(20×1=20)
							(20x1=20)
1)	Load flow study A) Fault calcula C) System plan	ations	out for	,	Stability stud Load frequer		
2)	A circuit breake A) A power fac B) A device to C) A waveform D) A current in	ctor correct neutralize correcting	the effect of device	transien	ts		
3)	Which of the fol A) Single line to C) All the three	o earth	-	B)	fault ? Phase to pha Two phases		
4)	In a balance 3-p A) Absent	-	negative ar Equal		equence curre Infinite	ents are D) Pres	sent
5)	Inter connection A) L-G fault		e networks ir L-L fault		two conductors L-L-G fault	open faults is D) L-L-	
6)	The theoretical A) δ = 0°		power occu δ = 30°		δ = 60°	D) δ =	90°
7)	Equal area crite A) Stability reg C) Absolute sta	ion	ne informatio	В)	ing Relative stab Swing curve	-	
8)	The critical clea A) Steady state	•		•	stem is relate Short circuit		

D) Reactive power limit

9)	The lightning arrestor is located			
	A) At the top of the buildingC) Away from the building to be protected	•	At the bottom of the In the centre of the	<u>-</u>
10)	The off-diagonal elements in an Y _{BUS} are c	alle	d as	-
	A) Driving point admittance		Mutual admittance	•
	C) Self admittance	D)	All of the above	
11)	The constant impedance representation of	load	ls is quite often use	ed in
	A) Load flow studies	-	Stability studies	
	C) Security studies	D)	None of the above	9
12)	The unidirectional transient component of s			
	A) DC Offset currentC) AC Offset current	,	DC Onset current	
10\	•	•	None of the above	,
13)	Phase shift of sequence components occur			
	A) Y-Y transformers	,	Y-Δ transformers	
	C) Δ - Δ transformers	•	None of the above	
14)	In two synchronous generators are intercor		-	
	A) Stalling of generators Wild flustrations in accuracy and uplease.	,	Wild fluctuations in	
4 = \	C) Wild fluctuations in current and voltage	•)
15)	Compare with steady state stability limit, tra A) Always less			
	C) Sometimes less	•	Always more Sometimes more	
40)	·	•		
16)	A 75 MVA, 10KV synchronous generator ha to a base of 100 MVA, 11 KV is	sre	actance of 0.4, the	reactance value in p.t
	A) 0.578 B) 0.412	C)	0.279	D) 0.44
17)	I _{BUS} =			
	A) $[Y_{BUS}] \times [V_{BUS}]$	B)	$[Z_{BUS}] / [Y_{BUS}]$	
	C) [V _{BUS}] / [Y _{BUS}]	D)	$[Z_{BUS}] \times [V_{BUS}]$	
18)	An acceleration factor is used in load flow s		=	
	A) To increase the number of iterationsC) Both a) and b)		None of above	peed of calculations
10\	The positive, negative and zero sequence in	,		rounded evetem unde
19)	steady state condition always follow the rela	•		ounded system unde
	A) $Z_1 > Z_2 < Z_0$		$Z_0 < Z_1 < Z_2$	
	C) $Z_1 < Z_2 < Z_0$	D)	None of the above	9
20)	The new p.u. impedance if the new base M			
	A) Four times of old p.u. impedance	•	Twice the old p.u.	•
	C) Same as the old p.u. impedance	(ט	Thrice the old p.u.	impedance



Seat	
No.	

T.E. (Electrical Engineering) (Old) (Part – II) Examination, 2017 POWER SYSTEM – II

Day and Date: Thursday, 25-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the **right** indicate **full** marks.

2) Assume data, if necessary.

3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following:

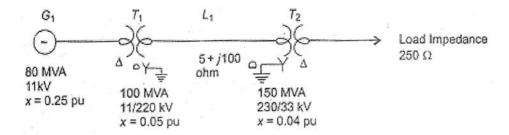
 $(4 \times 5 = 20)$

- a) Explain:
 - i) Single line diagram and reactance diagram.
 - ii) Selection of circuit braker ratings.
- b) Draw equivalent circuit models of following power system components :
 - i) Transformer
 - ii) Transmission lines.
- c) Discuss formation of Y_{BUS} by method of inspection method with suitable example.
- d) Write short notes on classification of buses in a power system.
- e) Explain transients on a transmission line.

3. Attempt any two of the following:

 $(2 \times 10 = 20)$

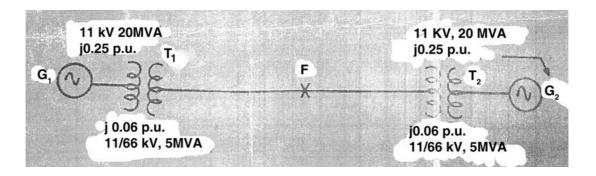
a) Below figure shows the single line diagram of a simple power system. The transformer ratings, generator rating, line impedance and load impedance are as shown. Draw impedance diagram. Select generator rating as a common base.



b) Write steps of a computational algorithm of Gauss Seidel method for PQ buses.



c) Generators G_1 and G_2 are identical and rated 11 KV, 20MVA and have a transient resistance of 0.25 p.u. at own MVA base. The transformer T_1 and T_2 are also identical and are rated 11/66KV, 5MVA and have a reactance of 0.06 p.u. to their own MVA base. The tie line is 50 km long each conductor has a reactance of 0.848 ohm per km. The three phase fault is assumed at F, 20 km from generator as shown in fig. Find short circuit current.



SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Define a stability of power system. Classify and explain the types of power system stabilities.
- b) Derive the expression of power in terms of symmetrical components.
- c) Derive the swing equation and discuss its applications in the study of power system stability.
- d) Define fault. What are the reasons for the occurrence of fault.
- e) Derive the expressions and draw sequence networks of Open conductor faults in power system of :
 - a) Two conductors open
 - b) One conductor open.

5. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain sequence impedances and sequence networks of following PS elements:
 - i) Transformer
- ii) Transmission lines.
- b) Define an equal area criteria. Discuss the applications of equal area criteria in power systems.
- c) Derive the necessary equation to determine the fault current for single line to line fault. Draw a diagram showing the interconnections of sequence networks.

|--|--|--|

SLR-VB - 328

Seat	F	
No.	Set	Р
		•

T.E. (Electrical) (Part – II) (Old) Examination, 2017 UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date: Monday, 29-05-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't

forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

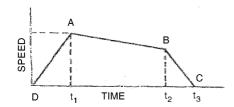
MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

1. Choose the correct alternatives:

 $(1 \times 20 = 20)$

1) The speed time curve for a local train is shown in figure. In this AB represents



- A) Coasting
- B) Acceleration
- C) Braking
- D) Regeneration
- 2) The material of the heating element for a furnace should have
 - A) Lower melting point

- B) Higher temperature coefficient
- C) High specific resistance
- D) All of the above
- 3) A zero watt lamp consumes
 - A) No power

- B) About 5 to 7 W power
- C) About 15 to 20 W power
- D) About 25 to 30 W power
- 4) Which of the following will happen if the thickness of refractory wall of furnace is increased?
 - A) Heat loss through furnace wall will increase
 - B) Temperature inside the furnace will fall
 - C) Energy consumption will increase
 - D) Temperature on the outer surface of furnace walls will drop
- 5) When a body reflects entire radiation incident on it, then it is known as
 - A) White body

B) Grey body

C) Transparent body

D) Black body

- 6) Braking retardation on suburban trains is
 - A) 0.3 to 0.5 kmphps

B) 0.5 to 1 kmphps

C) 3 to 5 kmphps

D) 30 to 40 kmphps



7)	In a steam locomotive A) Battery system C) Overhead wire	electric power is prov	B)	d through Diesel engine ge Small turbo gene		
8)	The coefficient of adhe A) Rails are dry C) Rails are wet with	Ū	B)	Rails are oiled Rails are dusty		
9)	For tramways the retu A) Cables	rn circuit is through B) Rails	C)	Neutral wire	D)	Common earthling
10)	When the speed of the in addition to the actual A) Average speed C) Notching speed		en s B)			of stop at a station
11)	The unit of luminous fl A) Steradian	ux is B) Candela	C)	Lumen	D)	Lux
12)	The illumination is dire the illuminated surface with			•		•
	A) Planck's lawC) Bunsen's law of ill	umination	,	Macbeth's law of Lambert's cosine		
13)	Which of the followingA) Arc heatingC) Resistance heating	•	B)	ximum power fac Dielectric heating None of the abov	9	?
14)	Which of the following A) Sodium vapour la C) Tube light	. •	B)	chromatic light ? GLS lamp Mercury vapour	lamı	0
15)	Which of the following A) Proof reading	will need the highest B) Bed rooms			D)	Railway platforms
16)	A submarine while mo	•		• .		ough Batteries
17)	Standard wattage of 3 A) 10 W	ft. fluorescent tube is B) 40 W		65 W	D)	100 W
18)	Which locomotive has A) Diesel C) Steam	the highest operation	B)	vailability ? Electric All have same av	/aila	bility
19)	In a resistance furnace A) Oxidizing	e the atmosphere is B) Deoxidizing	C)	Neutral	D)	All of the above
20)	A perfect white body is A) Transmits all incide C) Reflects all incide	lent radiations	•	Absorbs all incid		



Seat	
No.	

T.E. (Electrical) (Part – II) (Old) Examination, 2017 UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date: Monday, 29-05-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

- 1) Describe the construction and operation of indirect arc furnace.
- 2) Write a note on motor selection in rolling machines.
- 3) What are the factors to be considered while designing the lighting scheme?
- 4) A 15 kW, 220 V, single phase resistance oven employs nickel-chrome wire for its heating elements. If the wire temperature is not to exceed 1000°C and the temperature of the charge is to be 600°C, calculate the diameter and length of the wire. Assume radiating efficiency to be 0.6 and emissivity as 0.9, for nickel-chrome resistivity is $1.016 \times 10^{-6} \Omega$ m.
- 5) Write short note on integrating sphere.

3. Solve the following:

 $(10 \times 2 = 20)$

- 1) Draw and explain circuit of fluorescent tube lamp.
- 2) With neat diagram explain seam welding and butt welding.

OR

3) Explain the classification of electric heating. What are the advantages of electric heating?

SECTION - II

4. Solve any four:

 $(5 \times 4 = 20)$

- 1) Explain Quadrilateral speed-time curve.
- 2) Write a short note on energy conservation planning.
- 3) An electric train is to have a braking retardation of 3.2 km/h/s. If the ratio of maximum speed to average speed is 1.3, the time for stop is 26 seconds and acceleration is 0.8 km/h/s, find its schedule speed for a run of 1.5 km. Assume trapezoidal speed time curve.
- 4) How can energy conservation be done in power plant?
- 5) Explain suitability of DC series motor for traction work.

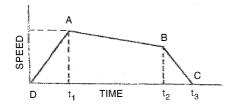


5. Solve any two: (10×2=20)

- 1) Derive specific energy output from speed-time curve.
- 2) What is meant by energy conservation? Explain maximum energy efficiency principle and maximum cost effectiveness in energy use.
- 3) An electric train is weighing 100 tonnes has a rotational inertia 10%. Distance between two stop is 2.5 km and trains have an average speed of 50 kmph. The acceleration and retardation are 1 kmphps and 2 kmphps respectively. Track has an up gradient of 1%, train resistance is 40 N/tonne and efficiency of gearing and motor system is 60%. Determine
 - i) maximum power at driving axle
 - ii) total energy consumption
 - iii) specific energy consumption. Assume trapezoidal speed-time curve.

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					02.1. 7.5	<i></i>
Sea No.					Set	Q
	•	ectrical) (Part – II) LECTRICAL ENER			on, 2017 Y CONSERVATION	
•	and Date : Monday, 29-0e : 3.00 p.m. to 6.00 p.m.	05-2017			Max. Marks	: 100
	,	Answer Book Page No	o. 3. Ea ive typ	ach question of the questions	on Page No. 3 only. Do	
Dura	ation : 30 Minutes	MCQ/Objective 1	Гуре С	Questions	Mark	s : 20
	Choose the correct alte	rnatives :			(1×20	0=20)
	A submarine while i A) Diesel engines	•	•	led driving pov Gas turbine	•	ŕ
	Standard wattage of A) 10 W	f 3 ft. fluorescent tube i B) 40 W	is C) 6	65 W	D) 100 W	
	3) Which locomotive hA) DieselC) Steam	as the highest operatio	B) E	ailability ? Electric All have same	availability	
	In a resistance furn A) Oxidizing	ace the atmosphere is B) Deoxidizing	C) N	Neutral	D) All of the above	
	5) A perfect white bodA) Transmits all inC) Reflects all inci	cident radiations	,		ident radiations ets all incident radiations	



- A) Coasting
- B) Acceleration

6) The speed time curve for a local train is shown in figure. In this AB represents

- C) Braking
- D) Regeneration
- 7) The material of the heating element for a furnace should have
 - A) Lower melting point

- B) Higher temperature coefficient
- C) High specific resistance
- D) All of the above
- 8) A zero watt lamp consumes
 - A) No power

- B) About 5 to 7 W power
- C) About 15 to 20 W power
- D) About 25 to 30 W power



	•	• •		-	of furnace is increased?
	,	n furnace wall will incre	ease	Э	
	•	de the furnace will fall			
	C) Energy consump		, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	مع سماله سنال طعمه	
	,	the outer surface of fu		•	
10)	•	entire radiation incide			wn as
	A) White body		•	Grey body	
	C) Transparent body		D)	Black body	
11)	Braking retardation o				
	A) 0.3 to 0.5 kmphp	S	•	0.5 to 1 kmphps	
	C) 3 to 5 kmphps		D)	30 to 40 kmphps	
12)		e electric power is prov		•	
	A) Battery system		,	Diesel engine ge	
	C) Overhead wire		D)	Small turbo gene	erator
13)		esion is highest when			
	A) Rails are dry		,	Rails are oiled	
	C) Rails are wet with	n dew	D)	Rails are dusty	
14)	For tramways the ret	<u> </u>			
	A) Cables	B) Rails	C)	Neutral wire	D) Common earthling
15)	-	e train is estimated tak al running time betwee	_		ime of stop at a station
	A) Average speed		B)	Schedule speed	
	A) Average speedC) Notching speed		•	Schedule speed Free running spe	eed
16)	, .	·lux is	•	•	eed
16)	C) Notching speed	flux is B) Candela	D)	•	eed D) Lux
,	C) Notching speed The unit of luminous to A) Steradian The illumination is dir	B) Candela ectly proportional to th	D) C)	Free running specific Lumen being of the angle	
,	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface	B) Candela ectly proportional to th	D) C) e co	Free running specific Lumen being of the angle	D) Lux made by the normal to statement is associated
,	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface with	B) Candela ectly proportional to the with the direction of the	D) C) e co e inc	Free running spe Lumen osine of the angle cident flux. Above	D) Lux made by the normal to statement is associated illumination
17)	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface with A) Planck's law C) Bunsen's law of i	B) Candela ectly proportional to the with the direction of the	D) e co e inc B) D)	Free running specific control of the angle cident flux. Above Macbeth's law of Lambert's cosine	D) Lux made by the normal to statement is associated fillumination as law
17)	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface with A) Planck's law C) Bunsen's law of i	B) Candela ectly proportional to the with the direction of the	D) e co e ind B) D) ma	Free running specific control of the angle cident flux. Above Macbeth's law of Lambert's cosine	D) Lux made by the normal to statement is associated fillumination e law tor ?
17)	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface with A) Planck's law C) Bunsen's law of interest with the illuminated surface with	B) Candela ectly proportional to the with the direction of the lumination gheating methods has	D) C) e coe e inc B) D) ma B)	Free running specific control of the angle cident flux. Above Macbeth's law of Lambert's cosine eximum power fac	D) Lux made by the normal to statement is associated fillumination e law tor?
17) 18)	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface with A) Planck's law C) Bunsen's law of in the tollowing A) Arc heating C) Resistance heating	B) Candela ectly proportional to the with the direction of the lumination gheating methods has	D) C) e core inc B) D) ma B) D)	Lumen Disine of the angle cident flux. Above Macbeth's law of Lambert's cosine eximum power factoric heating None of the above	D) Lux made by the normal to statement is associated fillumination e law tor?
17) 18)	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface with A) Planck's law C) Bunsen's law of in the following A) Arc heating C) Resistance heating Which of the following A) Sodium vapour later the steel the stee	B) Candela ectly proportional to the with the direction of the direction o	D) e cce in B) D) ma B) D) pnocc B)	Lumen Disine of the angle cident flux. Above Macbeth's law of Lambert's cosine eximum power fact Dielectric heating None of the above chromatic light? GLS lamp	D) Lux made by the normal to statement is associated fillumination e law tor ?
17) 18)	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface with A) Planck's law C) Bunsen's law of in the following A) Arc heating C) Resistance heating Which of the following the following A and A arc heating C) Resistance heating	B) Candela ectly proportional to the with the direction of the direction o	D) e cce in B) D) ma B) D) pnocc B)	Lumen posine of the angle cident flux. Above Macbeth's law of Lambert's cosine eximum power factoric heating None of the above chromatic light?	D) Lux made by the normal to statement is associated fillumination e law tor ?
117) 118)	C) Notching speed The unit of luminous to A) Steradian The illumination is directly the illuminated surface with A) Planck's law C) Bunsen's law of it which of the following A) Arc heating C) Resistance heatith which of the following A) Sodium vapour late C) Tube light	B) Candela ectly proportional to the with the direction of the direction o	D) e coe inc B) D) ma B) D) pnoo	Lumen psine of the angle cident flux. Above Macbeth's law of Lambert's cosine eximum power fact Dielectric heating None of the above chromatic light? GLS lamp Mercury vapour el of illumination?	D) Lux made by the normal to statement is associated fillumination e law tor ?



Seat	
No.	

T.E. (Electrical) (Part – II) (Old) Examination, 2017 UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date: Monday, 29-05-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

- 1) Describe the construction and operation of indirect arc furnace.
- 2) Write a note on motor selection in rolling machines.
- 3) What are the factors to be considered while designing the lighting scheme?
- 4) A 15 kW, 220 V, single phase resistance oven employs nickel-chrome wire for its heating elements. If the wire temperature is not to exceed 1000°C and the temperature of the charge is to be 600°C, calculate the diameter and length of the wire. Assume radiating efficiency to be 0.6 and emissivity as 0.9, for nickel-chrome resistivity is $1.016 \times 10^{-6} \Omega$ m.
- 5) Write short note on integrating sphere.

3. Solve the following:

 $(10 \times 2 = 20)$

- 1) Draw and explain circuit of fluorescent tube lamp.
- 2) With neat diagram explain seam welding and butt welding.

OR

3) Explain the classification of electric heating. What are the advantages of electric heating?

SECTION - II

4. Solve any four:

 $(5 \times 4 = 20)$

- 1) Explain Quadrilateral speed-time curve.
- 2) Write a short note on energy conservation planning.
- 3) An electric train is to have a braking retardation of 3.2 km/h/s. If the ratio of maximum speed to average speed is 1.3, the time for stop is 26 seconds and acceleration is 0.8 km/h/s, find its schedule speed for a run of 1.5 km. Assume trapezoidal speed time curve.
- 4) How can energy conservation be done in power plant?
- 5) Explain suitability of DC series motor for traction work.



5. Solve any two: (10×2=20)

- 1) Derive specific energy output from speed-time curve.
- 2) What is meant by energy conservation? Explain maximum energy efficiency principle and maximum cost effectiveness in energy use.
- 3) An electric train is weighing 100 tonnes has a rotational inertia 10%. Distance between two stop is 2.5 km and trains have an average speed of 50 kmph. The acceleration and retardation are 1 kmphps and 2 kmphps respectively. Track has an up gradient of 1%, train resistance is 40 N/tonne and efficiency of gearing and motor system is 60%. Determine
 - i) maximum power at driving axle
 - ii) total energy consumption
 - iii) specific energy consumption. Assume trapezoidal speed-time curve.

				SLR-	VB – 328
Seat No.					Set R
ι	•		II) (Old) Examinati ERGY AND ENERG	•	/ATION
-	d Date : Monday, 29-0 3.00 p.m. to 6.00 p.m.	05-2017		Ma	ax. Marks : 100
	•	Answer Book Page Answer MCQ/Obje	Isory. It should be solve No. 3. Each question ective type questions Q.P. Set (P/Q/R/S) of	carries one ma on Page No. 3	ark. 3 only. Don't
Duratio	n : 30 Minutes	MCQ/Objectiv	e Type Questions		Marks : 20
	noose the correct alte	rnatives :			(1×20=20)
) The unit of luminous A) Steradian		C) Lumen	D) Lux	(1×20-20)
2	the illuminated surfa with A) Planck's law	ce with the direction (to the cosine of the and of the incident flux. Abo B) Macbeth's law	ve statement is a	
3,	C) Bunsen's law oWhich of the followingA) Arc heatingC) Resistance heating	ng heating methods	D) Lambert's cos has maximum power f B) Dielectric hea D) None of the al	factor ? ting	
4)	Which of the followingA) Sodium vapourC) Tube light		y monochromatic light B) GLS lamp D) Mercury vapo		
5)) Which of the followi A) Proof reading	ng will need the high B) Bed rooms	est level of illumination C) Hospital ward		platforms
6)	A submarine while A) Diesel engines	•	is provided driving pore C) Gas turbine	wer through D) Batteries	S
7)) Standard wattage o	f 3 ft. fluorescent tub B) 40 W	oe is C) 65 W	D) 100 W	
8)) Which locomotive hA) DieselC) Steam	as the highest opera	ational availability ? B) Electric D) All have same	e availability	

B) Deoxidizing

D) All of the above

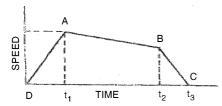
9) In a resistance furnace the atmosphere is

A) Oxidizing

C) Neutral



- 10) A perfect white body is one that
 - A) Transmits all incident radiations
- B) Absorbs all incident radiations
- C) Reflects all incident radiations
- D) Absorbs, reflects all incident radiations
- 11) The speed time curve for a local train is shown in figure. In this AB represents



- A) Coasting
- B) Acceleration
- C) Braking
- D) Regeneration
- 12) The material of the heating element for a furnace should have
 - A) Lower melting point

- B) Higher temperature coefficient
- C) High specific resistance
- D) All of the above
- 13) A zero watt lamp consumes
 - A) No power

- B) About 5 to 7 W power
- C) About 15 to 20 W power
- D) About 25 to 30 W power
- 14) Which of the following will happen if the thickness of refractory wall of furnace is increased?
 - A) Heat loss through furnace wall will increase
 - B) Temperature inside the furnace will fall
 - C) Energy consumption will increase
 - D) Temperature on the outer surface of furnace walls will drop
- 15) When a body reflects entire radiation incident on it, then it is known as
 - A) White body

B) Grey body

C) Transparent body

- D) Black body
- 16) Braking retardation on suburban trains is
 - A) 0.3 to 0.5 kmphps

B) 0.5 to 1 kmphps

C) 3 to 5 kmphps

- D) 30 to 40 kmphps
- 17) In a steam locomotive electric power is provided through
 - A) Battery system

B) Diesel engine generator

C) Overhead wire

- D) Small turbo generator
- 18) The coefficient of adhesion is highest when the
 - A) Rails are dry

- B) Rails are oiled
- C) Rails are wet with dew
- D) Rails are dusty
- 19) For tramways the return circuit is through
 - A) Cables
- B) Rails
- C) Neutral wire
- D) Common earthling
- 20) 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



Seat	
No.	

T.E. (Electrical) (Part – II) (Old) Examination, 2017 UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date: Monday, 29-05-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

- 1) Describe the construction and operation of indirect arc furnace.
- 2) Write a note on motor selection in rolling machines.
- 3) What are the factors to be considered while designing the lighting scheme?
- 4) A 15 kW, 220 V, single phase resistance oven employs nickel-chrome wire for its heating elements. If the wire temperature is not to exceed 1000°C and the temperature of the charge is to be 600°C, calculate the diameter and length of the wire. Assume radiating efficiency to be 0.6 and emissivity as 0.9, for nickel-chrome resistivity is $1.016 \times 10^{-6} \Omega$ m.
- 5) Write short note on integrating sphere.

3. Solve the following:

 $(10 \times 2 = 20)$

- 1) Draw and explain circuit of fluorescent tube lamp.
- 2) With neat diagram explain seam welding and butt welding.

OR

3) Explain the classification of electric heating. What are the advantages of electric heating?

SECTION - II

4. Solve any four:

 $(5 \times 4 = 20)$

- 1) Explain Quadrilateral speed-time curve.
- 2) Write a short note on energy conservation planning.
- 3) An electric train is to have a braking retardation of 3.2 km/h/s. If the ratio of maximum speed to average speed is 1.3, the time for stop is 26 seconds and acceleration is 0.8 km/h/s, find its schedule speed for a run of 1.5 km. Assume trapezoidal speed time curve.
- 4) How can energy conservation be done in power plant?
- 5) Explain suitability of DC series motor for traction work.



5. Solve any two: (10×2=20)

- 1) Derive specific energy output from speed-time curve.
- 2) What is meant by energy conservation? Explain maximum energy efficiency principle and maximum cost effectiveness in energy use.
- 3) An electric train is weighing 100 tonnes has a rotational inertia 10%. Distance between two stop is 2.5 km and trains have an average speed of 50 kmph. The acceleration and retardation are 1 kmphps and 2 kmphps respectively. Track has an up gradient of 1%, train resistance is 40 N/tonne and efficiency of gearing and motor system is 60%. Determine
 - i) maximum power at driving axle
 - ii) total energy consumption
 - iii) specific energy consumption. Assume trapezoidal speed-time curve.

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Seat No.					Set S
	•	, ,	•	l) Examination, 2017 AND ENERGY CONSERV	ATION
-	nd Date : Monday, 29-0 3.00 p.m. to 6.00 p.m.	05-2017		Max	k. Marks : 100
	,	Answer Book Page No Answer MCQ/Objecti	o. 3 . l ive ty	should be solved in first 30 mi Each question carries one mark ope questions on Page No. 3 of et (P/Q/R/S) on Top of Page.	κ .
Domati	an . OO Minutas	MCQ/Objective T	Гуре	Questions	Marka . 00
Durati	on : 30 Minutes				Marks : 20
1. C	Choose the correct alte	rnatives :			(1×20=20)
	 Braking retardation A) 0.3 to 0.5 kmph C) 3 to 5 kmphps 		-	0.5 to 1 kmphps 30 to 40 kmphps	
	2) In a steam locomotiA) Battery systemC) Overhead wire	ve electric power is pro	B)	d through Diesel engine generator Small turbo generator	
	3) The coefficient of acA) Rails are dryC) Rails are wet w	dhesion is highest wher rith dew	B)	Rails are oiled Rails are dusty	
	4) For tramways the re	eturn circuit is through			

- 5) 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
 - B) Schedule speed

C) Neutral wire

A) Average speedC) Notching speed

- D) Free running speed
- 6) The unit of luminous flux is
 - A) Steradian

A) Cables

B) Candela

B) Rails

- C) Lumen
- D) Lux

D) Common earthling

- 7) The illumination is directly proportional to the cosine of the angle made by the normal to the illuminated surface with the direction of the incident flux. Above statement is associated with
 - A) Planck's law

- B) Macbeth's law of illumination
- C) Bunsen's law of illumination
- D) Lambert's cosine law
- 8) Which of the following heating methods has maximum power factor?
 - A) Arc heating

B) Dielectric heating

C) Resistance heating

D) None of the above

C) Transparent body



Which of the following lam			bromatic light 2		
A) Sodium vapour lampC) Tube light	. g	3)	GLS lamp Mercury vapour I	amı	0
Which of the following will	need the highest le	امری	l of illumination 2		
_	-			D)	Railway platforms
A submarine while moving	under water, is pro	oivo	ded driving power	r thr	ough
A) Diesel engines B)	Steam turbine C	C)	Gas turbine	D)	Batteries
Standard wattage of 3 ft. fl	uorescent tube is				
		C)	65 W	D)	100 W
Which locomotive has the	highest operational	lav	vailability ?		
	•		-		
,		,		aila	bility
•		,			,
	•	٠,	Noutral	רם	All of the above
,	G)	redital	υ)	All of the above
•		٠,	A1 1 11 11 11 11		e e
,		,			
C) Reflects all incident ra	idiations L))	Absorbs, reflects	all	incident radiations
The speed time curve for a	a local train is show	vn i	in figure. In this A	B re	epresents
A B B D t ₁ TIME t ₂	C t ₃				
A) Coasting B)	Acceleration C	2)	Braking	D)	Regeneration
The material of the heating	g element for a furna	ace	e should have		
A) Lower melting point	E	3)	Higher temperatu	ire d	coefficient
C) High specific resistan	ce D	D)	All of the above		
A zero watt lamp consume	es				
-		٦١	About 5 to 7 W p		
A) No power	E	رر	, 100 at 0 t0 , tt p	owe	er
A) No powerC) About 15 to 20 W pow		•	About 25 to 30 W		
C) About 15 to 20 W pow	er D))	About 25 to 30 W	po po	wer
C) About 15 to 20 W pow Which of the following will h	er Dappen if the thicknes	o) ss	About 25 to 30 Work of refractory wall of	po po	wer
C) About 15 to 20 W pow Which of the following will h A) Heat loss through furn	ver C appen if the thicknes nace wall will increa	o) ss	About 25 to 30 Work of refractory wall of	po po	wer
C) About 15 to 20 W pow Which of the following will h A) Heat loss through furn B) Temperature inside th	ver E appen if the thicknes nace wall will increa e furnace will fall	o) ss	About 25 to 30 Work of refractory wall of	po po	wer
C) About 15 to 20 W pow Which of the following will h A) Heat loss through furn	ver E appen if the thicknes nace wall will increa e furnace will fall will increase	o) ess ase	About 25 to 30 Woof refractory wall o	po po	wer
C) About 15 to 20 W pow Which of the following will h A) Heat loss through furn B) Temperature inside th C) Energy consumption v	ver E appen if the thicknes nace wall will increa e furnace will fall will increase uter surface of furn	o) ess ase	About 25 to 30 Woof refractory wall of the control	/ po	wer rnace is increased ?
	A) Proof reading B) A submarine while moving A) Diesel engines B) Standard wattage of 3 ft. ft A) 10 W B) Which locomotive has the A) Diesel C) Steam In a resistance furnace the A) Oxidizing B) A perfect white body is one A) Transmits all incident rance C) Reflects all incident rance The speed time curve for a subject of the heating A) Coasting B) The material of the heating A) Lower melting point C) High specific resistan	A) Proof reading B) Bed rooms A submarine while moving under water, is property A) Diesel engines B) Steam turbine Control Standard wattage of 3 ft. fluorescent tube is A) 10 W B) 40 W Which locomotive has the highest operational A) Diesel C) Steam Control Steam Cont	A) Proof reading B) Bed rooms C) A submarine while moving under water, is provid A) Diesel engines B) Steam turbine C) Standard wattage of 3 ft. fluorescent tube is A) 10 W B) 40 W C) Which locomotive has the highest operational at A) Diesel B) C) Steam D) In a resistance furnace the atmosphere is A) Oxidizing B) Deoxidizing C) A perfect white body is one that A) Transmits all incident radiations B) C) Reflects all incident radiations D) The speed time curve for a local train is shown A) Coasting B) Acceleration C) The material of the heating element for a furnace A) Lower melting point B) C) High specific resistance D)	A submarine while moving under water, is provided driving power A) Diesel engines B) Steam turbine C) Gas turbine Standard wattage of 3 ft. fluorescent tube is A) 10 W B) 40 W C) 65 W Which locomotive has the highest operational availability? A) Diesel B) Electric C) Steam D) All have same available in a resistance furnace the atmosphere is A) Oxidizing B) Deoxidizing C) Neutral A perfect white body is one that A) Transmits all incident radiations B) Absorbs all incident C) Reflects all incident radiations D) Absorbs, reflects The speed time curve for a local train is shown in figure. In this A A) Coasting B) Acceleration C) Braking The material of the heating element for a furnace should have A) Lower melting point B) Higher temperation C) High specific resistance D) All of the above	A) Proof reading B) Bed rooms C) Hospital wards D) A submarine while moving under water, is provided driving power thr A) Diesel engines B) Steam turbine C) Gas turbine D) Standard wattage of 3 ft. fluorescent tube is A) 10 W B) 40 W C) 65 W D) Which locomotive has the highest operational availability? A) Diesel B) Electric C) Steam D) All have same availa In a resistance furnace the atmosphere is A) Oxidizing B) Deoxidizing C) Neutral D) A perfect white body is one that A) Transmits all incident radiations B) Absorbs all incident all incident radiations D) Absorbs, reflects all The speed time curve for a local train is shown in figure. In this AB reflects all the heating element for a furnace should have A) Lower melting point B) Higher temperature of C) High specific resistance D) All of the above

D) Black body



Seat	
No.	

T.E. (Electrical) (Part – II) (Old) Examination, 2017 UTILIZATION OF ELECTRICAL ENERGY AND ENERGY CONSERVATION

Day and Date: Monday, 29-05-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

- 1) Describe the construction and operation of indirect arc furnace.
- 2) Write a note on motor selection in rolling machines.
- 3) What are the factors to be considered while designing the lighting scheme?
- 4) A 15 kW, 220 V, single phase resistance oven employs nickel-chrome wire for its heating elements. If the wire temperature is not to exceed 1000°C and the temperature of the charge is to be 600°C, calculate the diameter and length of the wire. Assume radiating efficiency to be 0.6 and emissivity as 0.9, for nickel-chrome resistivity is $1.016 \times 10^{-6} \Omega$ m.
- 5) Write short note on integrating sphere.

3. Solve the following:

 $(10 \times 2 = 20)$

- 1) Draw and explain circuit of fluorescent tube lamp.
- 2) With neat diagram explain seam welding and butt welding.

OR

3) Explain the classification of electric heating. What are the advantages of electric heating?

SECTION - II

4. Solve any four:

 $(5 \times 4 = 20)$

- 1) Explain Quadrilateral speed-time curve.
- 2) Write a short note on energy conservation planning.
- 3) An electric train is to have a braking retardation of 3.2 km/h/s. If the ratio of maximum speed to average speed is 1.3, the time for stop is 26 seconds and acceleration is 0.8 km/h/s, find its schedule speed for a run of 1.5 km. Assume trapezoidal speed time curve.
- 4) How can energy conservation be done in power plant?
- 5) Explain suitability of DC series motor for traction work.

5. Solve any two: (10×2=20)

- 1) Derive specific energy output from speed-time curve.
- 2) What is meant by energy conservation? Explain maximum energy efficiency principle and maximum cost effectiveness in energy use.
- 3) An electric train is weighing 100 tonnes has a rotational inertia 10%. Distance between two stop is 2.5 km and trains have an average speed of 50 kmph. The acceleration and retardation are 1 kmphps and 2 kmphps respectively. Track has an up gradient of 1%, train resistance is 40 N/tonne and efficiency of gearing and motor system is 60%. Determine
 - i) maximum power at driving axle
 - ii) total energy consumption
 - iii) specific energy consumption. Assume trapezoidal speed-time curve.

Seat	Γ	_
No.	Set	Р

B F (Flectrical) (Part – I) Examination 2017

	ELECTRICAL DRIVE	•	
Day and Date : Thursday Time : 3.00 p.m. to 6.00 p			Max. Marks: 100
Instructions :	Answer Book Page No	. 3. Each question ve type questions	on Page No. 3 only. Don't
Duration : 30 Minutes	MCQ/Objective T	ype Questions	Marks : 20
1. Choose the correct	alternative :		(1×20=20)
 Machine tools a Constant po Variable tore 		B) Constant torque D) Both A) and B	
2) The power consA) Cube of speC) Speed	sumption in case of centrifu	gal loads like pump B) Square of spe D) Not applicable	ed
3) Reduction in su A) 38%	pply voltage by 10% will ch B) 19%	ange the torque of C) 9.5%	motor by D) No change
A) Armature re	elow than the base speed o sistance control is used oltage control is used	f the dc shunt moto B) Field resistand D) None of these	ce control is used
A) When the dr	torque is more pronounced ive is running on full speed rive is being stopped	B) When the driv	e is being started e at half of its normal speed
A) Synchronou	lowing is preferred for auto s motors ard controlled dc motors	matic drives ? B) Squirrel cage D) Any of the abo	
runs at 1000 rp	cited dc motor fed from 1 pl m. If this motor is connect motor would now run at		

A) 2000 rpm B) 1500 rpm C) 1450 rpm

D) 1000 rpm



8)	A 6 pulse non reversible thyristorised 415 V ac converter is controlling a 440 V dc motor. If the total drop in the circuit is limited to 10% then the converter must be locked at an angle of						
	A) 30°	B) 60°	C)	45°	D)	90°	
9)	Applications of dc mot A) Cost of motor is his C) Maintenance probl	gh	ew load speed applications because of B) Mechanical commutation problems D) All of the above				
10)	Slip power control sch range is	·		•		•	
44\	A) 0 to Ns	B) – Ns to Ns	,	0 to 2Ns	,	– 2Ns to 2Ns	
11)	In a chopper fed dc dr A) 50 Hz	B) 300 Hz		cy is approximatel 1000 Hz		ual to 5000 Hz	
12)	The no. of thyristors re A) 4	equired for single pha B) 8		nidpoint type cyclo 12		nverter are 16	
13)	For the motor to deliver A) 125.5 V	a torque of 2.5 Nm at ⁻ B) 200 V) rpm, the armature 193.3 V		age to be applied is 241.7 V	
14)	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					sused	
15)	A three phase inductio at maximum torque is	0.15 at 25 Hz, the slip	at	maximum torque v	voul	d be	
	A) 0.15	B) 0.30	C)	0.40	D)	0.28	
16)	Stepper motors are meA) High speed operatC) Control system operat	ion	•	Low speed opera High power opera			
17)	Output power requirer A) Speed	nents of constant tord B) Voltage	·	loads vary with Current	D)	Power factor	
18)	A stepping motor has f reluctance motor with			-	s an	unwound variable	
	A) 36°	B) 9°	C)	18°	D)	72°	
19)	Regenerative braking A) By reversing source C) By increasing indu	ce voltage	B)	C motor By reversing soul All of the above	rce (current	
20)	5% increase in supply A) -5%	frequency will chang B) +5%		e speed of motor I - 10%		+10%	



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL DRIVES AND CONTROL

Day and Date: Thursday, 4-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

- a) What is overloading factor? Derive expression of it for short time duty of motor rating.
- b) With the help of neat sketch explain operation of closed loop speed control of multi motor drive.
- c) A 220 V, 24 A, 100 rpm DC shunt motor has an armature resistance of 2 Ω . Motor is controlled by a chopper with frequency of 500 Hz and source voltage of 230 V. Calculate duty ratio for 1.2 times rated torque and 500 rpm.
- d) A motor load system has torque of T = -400 0.4 N, N-m. Where N is speed in rpm. A load of ± 200 N-m is coupled with motor. Calculate the equilibrium speed of motor in quadrant III.
- e) Explain how regenerative braking is employed for DC series motor.

3. Solve following: (10×2=20)

- a) Explain speed torque characteristics for following speed transitions:
 - i) Increase in speed in same direction
 - ii) Decrease in speed
 - iii) Speed reversal.
- b) A 230 V, 960 rpm and 200 A, separately excited dc motor has an armature resistance of 0.02 ohms. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assume continuous conduction. Calculate
 - iv) Duty ratio of chopper for motoring at rated torque and 350 rpm.
 - v) Duty ratio of chopper for braking at rated torque and 350 rpm.
 - vi) Duty ratio of chopper for motor speed of 600 rpm and braking torque of twice the rated value if motor is operating in dynamic braking with a braking resistance of 2 ohm.

OR

- b) A 220 V, 1200 rpm, 15 A separately excited dc motor has armature circuit resistance and inductance of 1.8 ohm and 32 mH respectively. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230 V, 50 Hz. Calculate
 - a) Motor torque for $\alpha = 60^{\circ}$ and speed = 450 rpm.
 - b) Motor speed for $\alpha = 45^{\circ}$ and T = 40 N-m.



4. Solve any four: (5×4=20)

- a) A 400 V, 3 phase, 50 Hz, 4 pole, 1370 rpm star connected induction motor has following parameters referred to stator:
 - $R_s = 2$ ohm, $R_r' = 3$ ohm, $X_s = 3.5$ ohm, $X_r' = 3.5$ ohm, motor is controlled by a voltage source inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz. Obtain a plot between the breakdown torque and frequency.
- b) Explain bipolar drive for permanent magnet and hybrid motors.
- c) Explain with block diagram feedback vector control.
- d) A 500 kW, three phase 3.3 kV, 50 Hz, 0.8 lagging power factor, 4 pole star connected synchronous motor has $X_s = 15$ ohm. Neglect stator resistance and determine for regenerative braking operation, braking torque and field current for rated current and unity power factor.
- e) Explain how for the speeds below base speed v/f ratio is maintained constant.

5. Solve any two: (10×2=20)

- a) A 440 V, 2 phase, 50 Hz, 4 pole, 1415 rpm, delta connected induction motor has following parameters referred to stator:
 - $R_s = 0.6$ ohm, $R_r' = 0.8$ ohm, $X_s = 0.5$ ohm, $X_r' = 0.6$ ohm and $X_m = 15$ ohm. Motor is fed from a current source inverter at a constant flux. Determine
 - i) Motor torque, speed and current when operating at 40 Hz. And rated slip speed.
 - ii) Inverter frequency and stator current for the rated motor torque and a motor speed of 1000 rpm.
- b) A 440 V, 3 phase, 50 Hz, 6 pole 970 rpm star connected wound rotor induction motor has following parameters referred to stator:

$$R_s = 0.1$$
 ohm, $R_r' = 0.08$ ohm, $X_s = 0.3$ ohm, $X_r' = 0.4$ ohm,

The stator to rotor turns ratio is 2

The motor speed is controlled by static scherbius drive. Drive is designed for a speed range of 25% below the synchronous speed. Maximum value of firing angle is 165°. Determine

- i) Torque for a speed of 780 rpm and α = 140°
- ii) Firing angle for half the rated torque and speed of 800 rpm. DC link inductor has a resistance of 0.01 ohm.
- c) Explain with circuit diagram working operation of switched reluctance motor. Also derive its torque equation.

Seat		
No.	Set	$ \mathbf{Q} $

	E	, , ,	art – I) Examination, 2 RIVES AND CONTRO	
-	I Date : Thursday, .00 p.m. to 6.00 p.r			Max. Marks: 100
		Answer Book Pag 2) Answer MCQ/O b	ge No. 3. Each question	on Page No. 3 only. Don't
Duration	n : 30 Minutes	MCQ/Object	ive Type Questions	Marks : 20
1. Ch	oose the correct al	ternative :		(1×20=20)
·	Stepper motors a A) High speed op C) Control system	peration m operation	B) Low speed op D) High power op	peration
2)	Output power req A) Speed	uirements of consta B) Voltage	nt torque loads vary with C) Current	D) Power factor
3)			coils on its 4 pole stator. It tep angle for this motor is C) 18°	t has an unwound variable s D) 72°
4)	,	•	,	
5)	5% increase in su A) -5%	upply frequency will o	change the speed of mot	or by D) +10%
6)	Machine tools are A) Constant pow C) Variable torqu		B) Constant torqu	
7)	The power consu A) Cube of spee C) Speed	•	ntrifugal loads like pump B) Square of spe D) Not applicable	ed
8)	Reduction in supp		vill change the torque of a	•



9)	To get speed below th A) Armature resistance C) Armature voltage of	ce control is used	B)	dc shunt motor Field resistance c None of these	ontrol is used		
10)	Effect of friction torque A) When the drive is to C) When the drive is to	unning on full speed		When the drive is When the drive at I	being started nalf of its normal speed		
11)	Which of the following A) Synchronous moto C) Ward Leonard con	ors	B)	c drives ? Squirrel cage induction motor Any of the above			
12)	A separately excited druns at 1000 rpm. If the firing angle, the motor	nis motor is connecte would now run at	ed to	o 1 phase semi co	nverter with the same		
13)	A) 2000 rpm A 6 pulse non reversib If the total drop in the angle of A) 30°	_	ac (_		
14)	 A) So B) 60 A) Applications of dc motor is restricted to a fe A) Cost of motor is high C) Maintenance problem 			ew load speed applications because of B) Mechanical commutation problems D) All of the above			
15)	Slip power control sch range is A) 0 to Ns	neme provide a range B) – Ns to Ns		speed control of a 0 to 2Ns	three phase IM. The D) - 2Ns to 2Ns		
16)	In a chopper fed dc dri	ive the chopping freque		cy is approximately 1000 Hz	/ equal to D) 5000 Hz		
17)	The no. of thyristors re A) 4	equired for single pha B) 8					
18)	For the motor to deliver A) 125.5 V	a torque of 2.5 Nm at 3 B) 200 V) rpm, the armature 193.3 V	voltage to be applied is D) 241.7 V		
19)	To save the energy du A) Dynamic braking is C) Regenerative brak	s used	•	Plugging is used Mechanical brakir	ng is used		
20)	A three phase inductio at maximum torque is A) 0.15		at	•	•		



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL DRIVES AND CONTROL

Day and Date: Thursday, 4-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

- a) What is overloading factor? Derive expression of it for short time duty of motor rating.
- b) With the help of neat sketch explain operation of closed loop speed control of multi motor drive.
- c) A 220 V, 24 A, 100 rpm DC shunt motor has an armature resistance of 2 Ω . Motor is controlled by a chopper with frequency of 500 Hz and source voltage of 230 V. Calculate duty ratio for 1.2 times rated torque and 500 rpm.
- d) A motor load system has torque of T = -400 0.4 N, N-m. Where N is speed in rpm. A load of ± 200 N-m is coupled with motor. Calculate the equilibrium speed of motor in quadrant III.
- e) Explain how regenerative braking is employed for DC series motor.

3. Solve following: (10×2=20)

- a) Explain speed torque characteristics for following speed transitions:
 - i) Increase in speed in same direction
 - ii) Decrease in speed
 - iii) Speed reversal.
- b) A 230 V, 960 rpm and 200 A, separately excited dc motor has an armature resistance of 0.02 ohms. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assume continuous conduction. Calculate
 - iv) Duty ratio of chopper for motoring at rated torque and 350 rpm.
 - v) Duty ratio of chopper for braking at rated torque and 350 rpm.
 - vi) Duty ratio of chopper for motor speed of 600 rpm and braking torque of twice the rated value if motor is operating in dynamic braking with a braking resistance of 2 ohm.

OF

- b) A 220 V, 1200 rpm, 15 A separately excited dc motor has armature circuit resistance and inductance of 1.8 ohm and 32 mH respectively. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230 V, 50 Hz. Calculate
 - a) Motor torque for $\alpha = 60^{\circ}$ and speed = 450 rpm.
 - b) Motor speed for $\alpha = 45^{\circ}$ and T = 40 N-m.



4. Solve any four: (5×4=20)

a) A 400 V, 3 phase, 50 Hz, 4 pole, 1370 rpm star connected induction motor has following parameters referred to stator:

 $R_s = 2$ ohm, $R_r' = 3$ ohm, $X_s = 3.5$ ohm, $X_r' = 3.5$ ohm, motor is controlled by a voltage source inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz. Obtain a plot between the breakdown torque and frequency.

- b) Explain bipolar drive for permanent magnet and hybrid motors.
- c) Explain with block diagram feedback vector control.
- d) A 500 kW, three phase 3.3 kV, 50 Hz, 0.8 lagging power factor, 4 pole star connected synchronous motor has $X_s = 15$ ohm. Neglect stator resistance and determine for regenerative braking operation, braking torque and field current for rated current and unity power factor.
- e) Explain how for the speeds below base speed v/f ratio is maintained constant.

5. Solve any two: (10×2=20)

a) A 440 V, 2 phase, 50 Hz, 4 pole, 1415 rpm, delta connected induction motor has following parameters referred to stator:

 $R_s = 0.6$ ohm, $R_r' = 0.8$ ohm, $X_s = 0.5$ ohm, $X_r' = 0.6$ ohm and $X_m = 15$ ohm. Motor is fed from a current source inverter at a constant flux. Determine

- i) Motor torque, speed and current when operating at 40 Hz. And rated slip speed.
- ii) Inverter frequency and stator current for the rated motor torque and a motor speed of 1000 rpm.
- b) A 440 V, 3 phase, 50 Hz, 6 pole 970 rpm star connected wound rotor induction motor has following parameters referred to stator :

$$R_s = 0.1 \text{ ohm}, R'_r = 0.08 \text{ ohm}, X_s = 0.3 \text{ ohm}, X'_r = 0.4 \text{ ohm},$$

The stator to rotor turns ratio is 2

The motor speed is controlled by static scherbius drive. Drive is designed for a speed range of 25% below the synchronous speed. Maximum value of firing angle is 165°. Determine

- i) Torque for a speed of 780 rpm and α = 140°
- ii) Firing angle for half the rated torque and speed of 800 rpm. DC link inductor has a resistance of 0.01 ohm.
- Explain with circuit diagram working operation of switched reluctance motor. Also derive its torque equation.

Seat		
No.	Set	$ \mathbf{R} $

	В	, , ,	art – I) Examinatio RIVES AND CON ⁻	•
•	Date : Thursday, 4 .00 p.m. to 6.00 p.m			Max. Marks : 100
1	ŕ	Answer Book Pag Answer MCQ/Ob	e No. 3. Each quest	solved in first 30 minutes in tion carries one mark. ons on Page No. 3 only. Don't on Top of Page.
		MCQ/Object	ive Type Questions	;
Duration	: 30 Minutes			Marks : 20
1. Cho	oose the correct alt	ernative :		(1×20=20)
1)	In a chopper fed d A) 50 Hz C) 1000 Hz	c drive the choppin	g frequency is approx B) 300 Hz D) 5000 Hz	ximately equal to
2)	The no. of thyristo A) 4	rs required for singl B) 8	e phase midpoint typ C) 12	pe cyclo-converter are D) 16
3)	For the motor to de A) 125.5 V	liver a torque of 2.5 N B) 200 V	lm at 1400 rpm, the a C) 193.3 V	rmature voltage to be applied is D) 241.7 V
4)	To save the energ A) Dynamic braki C) Regenerative I	ng is used	B) Plugging is D) Mechanica	s used al braking is used
5)	•		olled by keeping ratione slip at maximum t C) 0.40	V/f constant at 50 Hz, the slip orque would be D) 0.28
6)	Stepper motors ar A) High speed op C) Control system	e mostly used for eration	B) Low speed D) High powe	doperation
7)	Output power requ A) Speed	uirements of consta B) Voltage	nt torque loads vary C) Current	with D) Power factor
8)			oils on its 4 pole state ep angle for this mot C) 18°	or. It has an unwound variable or is D) 72°



9)	Regenerative braking can be achieved in BLDC motor						
	A) By reversing source	•	-) By reversing source current			
	C) By increasing indu	ced emf	D)	All of the above			
10)	5% increase in supply			•	•		
	A) –5%	B) +5%	C)	- 10%	D)	+10%	
11)	Machine tools are typi	•					
	A) Constant power lo		•	Constant torque lo	oad		
4.0\	C) Variable torque loa		•	Both A) and B)			
12)	The power consumption	on in case of centrifug		• • • •	por	tional to	
	A) Cube of speedC) Speed		•	Square of speed Not applicable			
12\	Reduction in supply vo	oltago by 10% will obs			or by	.,	
13)	A) 38%	B) 19%	_	9.5%		y No change	
14)	To get speed below th	•	,		-,		
,	A) Armature resistant	·		Field resistance c	ontr	ol is used	
	C) Armature voltage of		,	None of these			
15)	Effect of friction torque	e is more pronounced					
	A) When the drive is ru	unning on full speed	B)	When the drive is	beir	ng started	
	C) When the drive is I	being stopped	D)	D) When the drive at half of its normal speed			
16)	Which of the following	is preferred for auton	natio	c drives ?			
	A) Synchronous moto		B) Squirrel cage induction motor			n motor	
	C) Ward Leonard con	trolled dc motors	D)	Any of the above			
17)	A separately excited d runs at 1000 rpm. If the firing angle, the motor	his motor is connecte				• •	
	A) 2000 rpm	B) 1500 rpm	C)	1450 rpm	D)	1000 rpm	
18)	A 6 pulse non reversible thyristorised 415 V ac converter is controlling a 440 V dc motor. If the total drop in the circuit is limited to 10% then the converter must be locked at an angle of					a 440 V dc motor.	
	A) 30°	B) 60°	C)	45°	D)	90°	
19)	Applications of dc mot	or is restricted to a fe	w Ic	oad speed applicati	ons	because of	
	A) Cost of motor is high		B) Mechanical commutation problems				
	C) Maintenance probl	em	D)	All of the above			
20)	Slip power control sch range is	neme provide a range	e of	speed control of a	thr	ee phase IM. The	
	A) 0 to Ns	B) - Ns to Ns	C)	0 to 2Ns	D)	– 2Ns to 2Ns	



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL DRIVES AND CONTROL

Day and Date: Thursday, 4-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

- a) What is overloading factor? Derive expression of it for short time duty of motor rating.
- b) With the help of neat sketch explain operation of closed loop speed control of multi motor drive.
- c) A 220 V, 24 A, 100 rpm DC shunt motor has an armature resistance of 2 Ω . Motor is controlled by a chopper with frequency of 500 Hz and source voltage of 230 V. Calculate duty ratio for 1.2 times rated torque and 500 rpm.
- d) A motor load system has torque of T = -400 0.4 N, N-m. Where N is speed in rpm. A load of ± 200 N-m is coupled with motor. Calculate the equilibrium speed of motor in quadrant III.
- e) Explain how regenerative braking is employed for DC series motor.

3. Solve following: (10×2=20)

- a) Explain speed torque characteristics for following speed transitions:
 - i) Increase in speed in same direction
 - ii) Decrease in speed
 - iii) Speed reversal.
- b) A 230 V, 960 rpm and 200 A, separately excited dc motor has an armature resistance of 0.02 ohms. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assume continuous conduction. Calculate
 - iv) Duty ratio of chopper for motoring at rated torque and 350 rpm.
 - v) Duty ratio of chopper for braking at rated torque and 350 rpm.
 - vi) Duty ratio of chopper for motor speed of 600 rpm and braking torque of twice the rated value if motor is operating in dynamic braking with a braking resistance of 2 ohm.

OF

- b) A 220 V, 1200 rpm, 15 A separately excited dc motor has armature circuit resistance and inductance of 1.8 ohm and 32 mH respectively. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230 V, 50 Hz. Calculate
 - a) Motor torque for $\alpha = 60^{\circ}$ and speed = 450 rpm.
 - b) Motor speed for $\alpha = 45^{\circ}$ and T = 40 N-m.

Set R



4. Solve any four: (5×4=20)

a) A 400 V, 3 phase, 50 Hz, 4 pole, 1370 rpm star connected induction motor has following parameters referred to stator:

 $R_s = 2$ ohm, $R_r' = 3$ ohm, $X_s = 3.5$ ohm, $X_r' = 3.5$ ohm, motor is controlled by a voltage source inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz. Obtain a plot between the breakdown torque and frequency.

- b) Explain bipolar drive for permanent magnet and hybrid motors.
- c) Explain with block diagram feedback vector control.
- d) A 500 kW, three phase 3.3 kV, 50 Hz, 0.8 lagging power factor, 4 pole star connected synchronous motor has $X_s = 15$ ohm. Neglect stator resistance and determine for regenerative braking operation, braking torque and field current for rated current and unity power factor.
- e) Explain how for the speeds below base speed v/f ratio is maintained constant.

5. Solve any two : (10×2=20)

a) A 440 V, 2 phase, 50 Hz, 4 pole, 1415 rpm, delta connected induction motor has following parameters referred to stator:

 $R_s = 0.6$ ohm, $R_r' = 0.8$ ohm, $X_s = 0.5$ ohm, $X_r' = 0.6$ ohm and $X_m = 15$ ohm. Motor is fed from a current source inverter at a constant flux. Determine

- i) Motor torque, speed and current when operating at 40 Hz. And rated slip speed.
- ii) Inverter frequency and stator current for the rated motor torque and a motor speed of 1000 rpm.
- b) A 440 V, 3 phase, 50 Hz, 6 pole 970 rpm star connected wound rotor induction motor has following parameters referred to stator :

 $R_s = 0.1 \text{ ohm}, R'_r = 0.08 \text{ ohm}, X_s = 0.3 \text{ ohm}, X'_r = 0.4 \text{ ohm},$

The stator to rotor turns ratio is 2

The motor speed is controlled by static scherbius drive. Drive is designed for a speed range of 25% below the synchronous speed. Maximum value of firing angle is 165°. Determine

- i) Torque for a speed of 780 rpm and α = 140°
- ii) Firing angle for half the rated torque and speed of 800 rpm. DC link inductor has a resistance of 0.01 ohm.
- c) Explain with circuit diagram working operation of switched reluctance motor. Also derive its torque equation.

Seat]	
No.	Set	S

		• , •	I) Examination, 201 S AND CONTROL	7
•	Date : Thursday, 4-5-2 00 p.m. to 6.00 p.m.	2017		Max. Marks : 100
1	Ar 2) A I	nswer Book Page No. Inswer MCQ/Objectiv	. 3. Each question cal	Page No. 3 only. Don't
		MCQ/Objective T	ype Questions	
Duration	: 30 Minutes			Marks : 20
1. Cho	oose the correct alterna	tive:		(1×20=20)
1)	Which of the following	is preferred for autor	matic drives ?	
	A) Synchronous moto		B) Squirrel cage ind	
	C) Ward Leonard con		, ,	
2)	A separately excited druns at 1000 rpm. If the firing angle, the motor	nis motor is connecte		ifiring angle 60 degree onverter with the same
	A) 2000 rpm	B) 1500 rpm	C) 1450 rpm	D) 1000 rpm
3)	A 6 pulse non reversib If the total drop in the angle of			olling a 440 V dc motor. r must be locked at an
	A) 30°	B) 60°	C) 45°	D) 90°
4)	Applications of dc mot	or is restricted to a fe	ew load speed applicat	tions because of
	A) Cost of motor is high	•	B) Mechanical comm	nutation problems
	C) Maintenance probl		D) All of the above	
5)	Slip power control sch range is	neme provide a range	e of speed control of a	a three phase IM. The
	A) 0 to Ns	B) - Ns to Ns	C) 0 to 2Ns	D) - 2Ns to 2Ns
6)	In a chopper fed dc dr	ive the chopping freq	uency is approximatel	y equal to
	A) 50 Hz	B) 300 Hz	C) 1000 Hz	D) 5000 Hz
7)	The no. of thyristors re A) 4	equired for single pha B) 8	se midpoint type cyclo C) 12	o-converter are D) 16



8)	For the motor to deliver A) 125.5 V	a torque of 2.5 Nm at ⁻ B) 200 V) rpm, the armature 193.3 V		age to be applied is 241.7 V
9)	To save the energy du A) Dynamic braking is C) Regenerative brak	s used	-	Plugging is used Mechanical brakir	ng is	used
10)	A three phase inductio at maximum torque is A) 0.15		at	•	voul	•
11)	Stepper motors are me A) High speed operat C) Control system op	ion	•	Low speed operat		
12)	Output power requirer A) Speed	nents of constant tord B) Voltage	-	loads vary with Current	D)	Power factor
13)	A stepping motor has f reluctance motor with A) 36°		gle	-		unwound variable
14)	Regenerative braking A) By reversing source C) By increasing indu	ce voltage	B)	C motor By reversing sour All of the above	ce (current
15)	5% increase in supply A) -5%	frequency will chang B) +5%		e speed of motor b -10%	-	+10%
16)	Machine tools are typic A) Constant power los C) Variable torque los	ad	•	Constant torque lo Both A) and B)	oad	
17)	The power consumption A) Cube of speed C) Speed	on in case of centrifug	B)	oads like pump, pro Square of speed Not applicable	opor	tional to
18)	Reduction in supply vo A) 38%	oltage by 10% will cha B) 19%		e the torque of mot 9.5%		y No change
19)	To get speed below th A) Armature resistant C) Armature voltage of	ce control is used	B)	dc shunt motor Field resistance c None of these	ontr	ol is used
20)	Effect of friction torque A) When the drive is ru C) When the drive is b	unning on full speed	B)	When the drive is When the drive at I		



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL DRIVES AND CONTROL

Day and Date: Thursday, 4-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

- a) What is overloading factor? Derive expression of it for short time duty of motor rating.
- b) With the help of neat sketch explain operation of closed loop speed control of multi motor drive.
- c) A 220 V, 24 A, 100 rpm DC shunt motor has an armature resistance of 2 Ω . Motor is controlled by a chopper with frequency of 500 Hz and source voltage of 230 V. Calculate duty ratio for 1.2 times rated torque and 500 rpm.
- d) A motor load system has torque of T = -400 0.4 N, N-m. Where N is speed in rpm. A load of ± 200 N-m is coupled with motor. Calculate the equilibrium speed of motor in quadrant III.
- e) Explain how regenerative braking is employed for DC series motor.

3. Solve following: (10×2=20)

- a) Explain speed torque characteristics for following speed transitions:
 - i) Increase in speed in same direction
 - ii) Decrease in speed
 - iii) Speed reversal.
- b) A 230 V, 960 rpm and 200 A, separately excited dc motor has an armature resistance of 0.02 ohms. The motor is fed from a chopper which provides both motoring and braking operations. The source has a voltage of 230 V. Assume continuous conduction. Calculate
 - iv) Duty ratio of chopper for motoring at rated torque and 350 rpm.
 - v) Duty ratio of chopper for braking at rated torque and 350 rpm.
 - vi) Duty ratio of chopper for motor speed of 600 rpm and braking torque of twice the rated value if motor is operating in dynamic braking with a braking resistance of 2 ohm.

OR

- b) A 220 V, 1200 rpm, 15 A separately excited dc motor has armature circuit resistance and inductance of 1.8 ohm and 32 mH respectively. It is fed from a single phase fully controlled rectifier with an ac source voltage of 230 V, 50 Hz. Calculate
 - a) Motor torque for $\alpha = 60^{\circ}$ and speed = 450 rpm.
 - b) Motor speed for $\alpha = 45^{\circ}$ and T = 40 N-m.



4. Solve any four: (5×4=20)

- a) A 400 V, 3 phase, 50 Hz, 4 pole, 1370 rpm star connected induction motor has following parameters referred to stator:
 - $R_s = 2$ ohm, $R_r' = 3$ ohm, $X_s = 3.5$ ohm, $X_r' = 3.5$ ohm, motor is controlled by a voltage source inverter at constant v/f ratio. Inverter allows frequency variation from 10 to 50 Hz. Obtain a plot between the breakdown torque and frequency.
- b) Explain bipolar drive for permanent magnet and hybrid motors.
- c) Explain with block diagram feedback vector control.
- d) A 500 kW, three phase 3.3 kV, 50 Hz, 0.8 lagging power factor, 4 pole star connected synchronous motor has $X_s = 15$ ohm. Neglect stator resistance and determine for regenerative braking operation, braking torque and field current for rated current and unity power factor.
- e) Explain how for the speeds below base speed v/f ratio is maintained constant.

5. Solve any two: (10×2=20)

- a) A 440 V, 2 phase, 50 Hz, 4 pole, 1415 rpm, delta connected induction motor has following parameters referred to stator:
 - $R_s = 0.6$ ohm, $R_r' = 0.8$ ohm, $X_s = 0.5$ ohm, $X_r' = 0.6$ ohm and $X_m = 15$ ohm. Motor is fed from a current source inverter at a constant flux. Determine
 - i) Motor torque, speed and current when operating at 40 Hz. And rated slip speed.
 - ii) Inverter frequency and stator current for the rated motor torque and a motor speed of 1000 rpm.
- b) A 440 V, 3 phase, 50 Hz, 6 pole 970 rpm star connected wound rotor induction motor has following parameters referred to stator:

$$R_s = 0.1$$
 ohm, $R_r' = 0.08$ ohm, $X_s = 0.3$ ohm, $X_r' = 0.4$ ohm,

The stator to rotor turns ratio is 2

The motor speed is controlled by static scherbius drive. Drive is designed for a speed range of 25% below the synchronous speed. Maximum value of firing angle is 165°. Determine

- i) Torque for a speed of 780 rpm and α = 140°
- ii) Firing angle for half the rated torque and speed of 800 rpm. DC link inductor has a resistance of 0.01 ohm.
- Explain with circuit diagram working operation of switched reluctance motor. Also derive its torque equation.

Seat No.	Set	Р

B.E. (Electrical) (Part – I) Examination, 2017 SWITCHGEAR & PROTECTION

	SWITCHG	EAR & PROTECTION	
Day and Date: Friday, Time: 3.00 p.m. to 6.00			Max. Marks : 100
Instructions :	Answer Book 2) Answer MCC forget to me 3) All questions 4) Assume suita 5) Figures to the	compulsory. It should be solved a Page No. 3. Each question carred Q/Objective type questions on It ention, Q.P. Set (P/Q/R/S) on Togs compulsory. Table data if necessary and mention is eright indicate full marks. It up current equal to rated C.T. so	es one mark. Page No. 3 only. Don't o of Page. n it clearly.
	MCQ/O	ojective Type Questions	
Duration: 30 Minutes			Marks : 20
I. Choose the correc	t answer :		(20×1=20)
 A fuse is a Protective Current co 		b) Current limiting ded) None of the above	vice
2) A circuit break	er is a		

- 3) If the length of arc in C.B. increases, its resistance
 - a) decreases

b) increases

c) remains same

d) none of the above

d) none of the above

b) circuit interrupting device

- 4) Current chopping Phenomenon mainly occurs in
 - a) Air-Blast C.B
- b) Oil C.B
- c) SF₆ C.B
- d) Vacuum C.B

5) Capacitive current breaking results in

a) current controlling device

c) current limiting device

- a) short circuit
- b) open circuit
- c) voltage surge
- d) none of the above
- 6) If the fault current is 2000 A, the relay setting is 50%, CT ratio is 400/5 A, the P.S.M. is
 - a) 23
- b) 50
- c) 15
- d) 10
- 7) The current rating of fuse is 5A. The fusing current will be
 - a) 5A
- b) 2.5A
- c) 1A
- d) more than 5A
- 8) The rate of Rise of restriking voltage depends upon
 - a) the type of C.B

- b) the inductance of system only
- c) the capacitance of system only
- d) both b and c



9)	In low oil C.B., the oils performs the function a) insulation onlyb) arc extinction onlyc) both insulation and arc extinctiond) none of the above	of	
10)	Back-Up protection is a) Second line of defenceb) Operates when primary protection failsc) Operation disconnect a large parts of syd) All of the above	ste	m
11)	The time current graph for fuse a) has linear characteristics c) has inverse characteristics	,	is a circle none of the above
12)	When failure of prime-mover takes place, the a) runs as synchronous motor c) is in the inverted running mode	b)	ternator draws some current from the supply all of the above
13)	Buchholz relay is a) a gas actuated relay c) either a) or b)	•	oil actuated relay none of the above
14)	To protect the power transformer with star- faults. The current transformer should have a) delta-delta connection c) star-star connection	b)	Ita connection against earth and phase delta-star connection star-delta connection
15)	Merz-price protection scheme is employed f a) alternator c) both a) and b)	b)	transformer transmission line
16)	Location of lightening arrestor is near a a) transformer c) bus-bar	•	generator circuit-breaker
17)	By burdent of relay, we generally mean a) current rating of relay c) voltage rating of relay	•	volt-ampere rating of relay none of the above
18)	Directional overcurrent relay is for the protect a) ring main distribution system c) long transmission line	b)	n of radial distribution system power transformer
19)	On which relay, the effect of arc is neutral a) impedance relay c) Mho relay		reactance relay all of the above
20)	For very long H.V. transmission, the system a) time-graded protection c) distance protection	b)	overcurrent protection used is pilot-wire system none of the above



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 SWITCHGEAR & PROTECTION

Day and Date: Friday, 5-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to right indicates full marks.
- 4) **Assume** pick up current equal to rated C.T. secondary current.

SECTION - I

II. Solve any four: (4×5=20)

- a) What are the qualities of protective scheme?
- b) Derive torque equation of induction relay. Explain its significance.
- c) Write a short note on factors affecting Selection of fuse.
- d) Write the advantages and disadvantages of static relay.
- e) Current rating of an overcurrent relay is 5 A. relay has plug-setting of 150% and TMS setting of 0.4 CT having ratio 400/5 is connected to relay. Determine operating time of relay for fault current of 6000 A. If Plug setting multiplier is 5 for above fault current. What is the plug-setting for relay? At TMS = 1, operating time is given,

PSM	2	4	5	8	10	20
Operating time	10	5	4	3	2.8	2.4

III. Solve any two : (2×10=20)

- a) Discuss in detail the overcurrent protective scheme for various distribution feeders.
- b) Explain with block diagram and flowchart microprocessor based impedance relay.
- c) Derive an expression for a generalized mathematical equations for the operating conditions of Mho, off-set Mho and impedance relays.



IV. Solve any four: (4×5=20)

- a) Explain with neat sketch Buchholz relay.
- b) Explain backup protection of bus-bars.
- c) Explain current chopping phenomenon.
- d) Explain with neat sketch Vacuum Circuit Breaker.
- e) Explain with neat sketch metal oxide (ZnO) arrestors.

V. Solve any two: (2×10=20)

- a) Explain percentage differential scheme. Write down the need of percentage differential scheme over simple differential scheme.
- b) Derive an expression for the Restriking voltage in terms of system voltage, inductance and capacitance across a circuit breaker when a 3-ph fault takes place.
- c) In 220 KV system the reactance and capacitance up to the location of C.B. are 8 Ohm and 0.025 μ F. a resistance of 600 Ohm is connected across contact of C.B. Determine,
 - i) Natural frequency of oscillation
 - ii) Damped frequency of oscillation
 - iii) Critical value of resistance.

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Seat	
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Set

Q

B.E. (Electrical) (Part – I) Examination, 2017 SWITCHGEAR & PROTECTION

Day and Date: Friday, 5-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) All questions compulsory.
- 4) Assume suitable data if necessary and mention it clearly.
- 5) Figures to the right indicate full marks.

6) **Assume** pick up current **equal** to rated C.T. secondary current. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 20 I. Choose the correct answer: $(20 \times 1 = 20)$ 1) Location of lightening arrestor is near a a) transformer b) generator c) bus-bar d) circuit-breaker 2) By burdent of relay, we generally mean a) current rating of relay b) volt-ampere rating of relay c) voltage rating of relay d) none of the above 3) Directional overcurrent relay is for the protection of a) ring main distribution system b) radial distribution system c) long transmission line d) power transformer 4) On which relay, the effect of arc is neutral

a) impedance relay b) reactance relay

c) Mho relay d) all of the above

5) For very long H.V. transmission, the system of overcurrent protection used is

a) time-graded protectionb) pilot-wire systemc) distance protectiond) none of the above

6) A fuse is a

a) Protective deviceb) Current limiting devicec) Current controllingd) None of the above

7) A circuit breaker is a

a) current controlling deviceb) circuit interrupting devicec) current limiting deviced) none of the above



8)	If the length of arc in C a) decreases c) remains same	C.B. increases, its res	b)	nce increases none of the above			
9)	Current chopping Phera) Air-Blast C.B	nomenon mainly occu b) Oil C.B		n SF ₆ C.B	d)	Vacuum C.B	
10)	Capacitive current brea a) short circuit	aking results in b) open circuit	c)	voltage surge	d)	none of the above	
11)	If the fault current is 20 a) 23	000 A, the relay settin b) 50	_	50%, CT ratio is 4 15		5 A, the P.S.M. is 10	
12)	The current rating of fu a) 5A	use is 5A. The fusing (b) 2.5A		rent will be 1A	d)	more than 5A	
13)	The rate of Rise of res a) the type of C.B c) the capacitance of		b)	upon the inductance of both b and c	sys	tem only	
14)	In low oil C.B., the oils performs the function of a) insulation only b) arc extinction only c) both insulation and arc extinction d) none of the above						
15)	Back-Up protection is a) Second line of defence b) Operates when primary protection fails c) Operation disconnect a large parts of system d) All of the above						
16)	The time current graph a) has linear characterc) has inverse character	eristics	,	is a circle none of the above			
17)	When failure of prime- a) runs as synchrono c) is in the inverted ru	us motor	b)	Iternator draws some curre all of the above	nt f	rom the supply	
18)	Buchholz relay is a) a gas actuated rela c) either a) or b)	ay	•	oil actuated relay none of the above			
19)	To protect the power faults. The current tran a) delta-delta connect c) star-star connectio	sformer should have ion	b)	Ita connection aga delta-star connect star-delta connect	ion	t earth and phase	
20)			for b)	transformer transmission line			



Seat	
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B.E. (Electrical) (Part – I) Examination, 2017 SWITCHGEAR & PROTECTION

Day and Date: Friday, 5-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to **right** indicates **full** marks.
- 4) Assume pick up current equal to rated C.T. secondary current.

SECTION - I

II. Solve any four: (4×5=20)

- a) What are the qualities of protective scheme?
- b) Derive torque equation of induction relay. Explain its significance.
- c) Write a short note on factors affecting Selection of fuse.
- d) Write the advantages and disadvantages of static relay.
- e) Current rating of an overcurrent relay is 5 A. relay has plug-setting of 150% and TMS setting of 0.4 CT having ratio 400/5 is connected to relay. Determine operating time of relay for fault current of 6000 A. If Plug setting multiplier is 5 for above fault current. What is the plug-setting for relay? At TMS = 1, operating time is given,

PSM	2	4	5	8	10	20
Operating time	10	5	4	3	2.8	2.4

III. Solve any two: (2×10=20)

- a) Discuss in detail the overcurrent protective scheme for various distribution feeders.
- b) Explain with block diagram and flowchart microprocessor based impedance relay.
- c) Derive an expression for a generalized mathematical equations for the operating conditions of Mho, off-set Mho and impedance relays.



IV. Solve any four: (4×5=20)

- a) Explain with neat sketch Buchholz relay.
- b) Explain backup protection of bus-bars.
- c) Explain current chopping phenomenon.
- d) Explain with neat sketch Vacuum Circuit Breaker.
- e) Explain with neat sketch metal oxide (ZnO) arrestors.

V. Solve any two: (2×10=20)

- a) Explain percentage differential scheme. Write down the need of percentage differential scheme over simple differential scheme.
- b) Derive an expression for the Restriking voltage in terms of system voltage, inductance and capacitance across a circuit breaker when a 3-ph fault takes place.
- c) In 220 KV system the reactance and capacitance up to the location of C.B. are 8 Ohm and 0.025 μ F. a resistance of 600 Ohm is connected across contact of C.B. Determine,
 - i) Natural frequency of oscillation
 - ii) Damped frequency of oscillation
 - iii) Critical value of resistance.

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Set R

B.E. (Electrical) (Part – I) Examination, 2017 SWITCHGEAR & PROTECTION

Day and Date: Friday, 5-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) All questions compulsory.
- 4) Assume suitable data if necessary and mention it clearly.
- 5) Figures to the right indicate full marks.
- 6) **Assume** pick up current **equal** to rated C.T. secondary current.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

I. Choose the correct answer:

 $(20 \times 1 = 20)$

- 1) The time current graph for fuse
 - a) has linear characteristics
- b) is a circle
- c) has inverse characteristics
- d) none of the above
- 2) When failure of prime-mover takes place, the alternator
 - a) runs as synchronous motor
- b) draws some current from the supply
- c) is in the inverted running mode
- d) all of the above

- 3) Buchholz relay is
 - a) a gas actuated relay

b) oil actuated relay

c) either a) or b)

- d) none of the above
- 4) To protect the power transformer with star-delta connection against earth and phase faults. The current transformer should have
 - a) delta-delta connection

b) delta-star connection

c) star-star connection

- d) star-delta connection
- 5) Merz-price protection scheme is employed for
 - a) alternator

b) transformer

c) both a) and b)

- d) transmission line
- 6) Location of lightening arrestor is near a
 - a) transformer

b) generator

c) bus-bar

- d) circuit-breaker
- 7) By burdent of relay, we generally mean
 - a) current rating of relay

b) volt-ampere rating of relay

c) voltage rating of relay

d) none of the above



8)	Directional overcurrent relay is for the prote a) ring main distribution system c) long transmission line	ection of b) radial distribution system d) power transformer					
9)	On which relay, the effect of arc is neutral a) impedance relay c) Mho relay	b) reactance relayd) all of the above					
10)	For very long H.V. transmission, the system a) time-graded protection c) distance protection	b)	n of overcurrent protection used is b) pilot-wire system d) none of the above				
11)	A fuse is a a) Protective device c) Current controlling	-) Current limiting device) None of the above				
12)	A circuit breaker is a a) current controlling device c) current limiting device	-	b) circuit interrupting device d) none of the above				
13)	If the length of arc in C.B. increases, its res a) decreases c) remains same	b)	ance increases none of the above				
14)	Current chopping Phenomenon mainly occua) Air-Blast C.B b) Oil C.B		n SF ₆ C.B	d)	Vacuum C.B		
15)	Capacitive current breaking results in a) short circuit b) open circuit	c)	voltage surge	d)	none of the above		
16)	If the fault current is 2000 A, the relay setting a) 23 b) 50	_	50%, CT ratio is 4 15		5 A, the P.S.M. is 10		
17)	The current rating of fuse is 5A. The fusing a) 5A b) 2.5A		rent will be 1A	d)	more than 5A		
18)	The rate of Rise of restriking voltage depend a) the type of C.B c) the capacitance of system only	b)	ipon the inductance of both b and c	sys	tem only		
19)	In low oil C.B., the oils performs the function a) insulation onlyb) arc extinction onlyc) both insulation and arc extinctiond) none of the above	n of					
20)	Back-Up protection isa) Second line of defenceb) Operates when primary protection failsc) Operation disconnect a large parts of syd) All of the above	/ste	m				



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 SWITCHGEAR & PROTECTION

Day and Date: Friday, 5-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to **right** indicates **full** marks.
- 4) **Assume** pick up current equal to rated C.T. secondary current.

SECTION - I

II. Solve any four: (4×5=20)

- a) What are the qualities of protective scheme?
- b) Derive torque equation of induction relay. Explain its significance.
- c) Write a short note on factors affecting Selection of fuse.
- d) Write the advantages and disadvantages of static relay.
- e) Current rating of an overcurrent relay is 5 A. relay has plug-setting of 150% and TMS setting of 0.4 CT having ratio 400/5 is connected to relay. Determine operating time of relay for fault current of 6000 A. If Plug setting multiplier is 5 for above fault current. What is the plug-setting for relay? At TMS = 1, operating time is given,

PSM	2	4	5	8	10	20
Operating time	10	5	4	3	2.8	2.4

III. Solve any two: (2×10=20)

- a) Discuss in detail the overcurrent protective scheme for various distribution feeders.
- b) Explain with block diagram and flowchart microprocessor based impedance relay.
- c) Derive an expression for a generalized mathematical equations for the operating conditions of Mho, off-set Mho and impedance relays.

Set R



SECTION - II

IV. Solve any four: (4×5=20)

- a) Explain with neat sketch Buchholz relay.
- b) Explain backup protection of bus-bars.
- c) Explain current chopping phenomenon.
- d) Explain with neat sketch Vacuum Circuit Breaker.
- e) Explain with neat sketch metal oxide (ZnO) arrestors.

V. Solve any two: (2×10=20)

- a) Explain percentage differential scheme. Write down the need of percentage differential scheme over simple differential scheme.
- b) Derive an expression for the Restriking voltage in terms of system voltage, inductance and capacitance across a circuit breaker when a 3-ph fault takes place.
- c) In 220 KV system the reactance and capacitance up to the location of C.B. are 8 Ohm and 0.025 μ F. a resistance of 600 Ohm is connected across contact of C.B. Determine,
 - i) Natural frequency of oscillation
 - ii) Damped frequency of oscillation
 - iii) Critical value of resistance.

Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 **SWITCHGEAR & PROTECTION**

Day and Date: Friday, 5-5-2017	Max. Marks: 100
Time: 3.00 p.m. to 6.00 p.m.	

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) All questions compulsory.
- 4) Assume suitable data if necessary and mention it clearly.
- 5) Figures to the **right** indicate **full** marks.

	6) Assume pick up c		ted C.T. secondary current	
	-	ve Type Questio		
Du	ration : 30 Minutes		M	larks : 20
I.	Choose the correct answer:		(2	20×1=20)
	 If the fault current is 2000 A, the relays a) 23 b) 50 The current rating of fuse is 5A. The function is 2.5A 	c) 15 sing current will b	d) 10 e	
	 a) 5A b) 2.5A 3) The rate of Rise of restriking voltage defail that is a second of the type of C.B c) the capacitance of system only 	b) the indu	d) more than 5A ctance of system only nd c	
	 4) In low oil C.B., the oils performs the fur a) insulation only b) arc extinction only c) both insulation and arc extinction d) none of the above 	nction of		

5) Back-Up protection is

a) Second line of defence

- b) Operates when primary protection fails
- c) Operation disconnect a large parts of system
- d) All of the above
- 6) The time current graph for fuse
 - a) has linear characteristics
- b) is a circle
- c) has inverse characteristics
- d) none of the above



7)	When failure of prime-mover takes place	e, the alternator
	a) runs as synchronous motor	b) draws some current from the supply
- •	c) is in the inverted running mode	d) all of the above
8)	Buchholz relay is	b) oil actuated relay
	a) a gas actuated relayc) either a) or b)	b) oil actuated relayd) none of the above
9)		star-delta connection against earth and phase
0)	faults. The current transformer should I	· · · · · · · · · · · · · · · · · · ·
	a) delta-delta connection	b) delta-star connection
	c) star-star connection	d) star-delta connection
10)	Merz-price protection scheme is emplo	•
	a) alternatorc) both a) and b)	b) transformerd) transmission line
11)	Location of lightening arrestor is near a	•
'''	a) transformer	b) generator
	c) bus-bar	d) circuit-breaker
12)	By burdent of relay, we generally mean	r
	a) current rating of relay	b) volt-ampere rating of relay
\	c) voltage rating of relay	d) none of the above
13)	Directional overcurrent relay is for the partial ring main distribution system	brotection of b) radial distribution system
	c) long transmission line	d) power transformer
14)	On which relay, the effect of arc is neur	, .
,	a) impedance relay	b) reactance relay
	c) Mho relay	d) all of the above
15)	For very long H.V. transmission, the sy	
	a) time-graded protectionc) distance protection	b) pilot-wire systemd) none of the above
10)	•	d) Holle of the above
10)	A fuse is a a) Protective device	b) Current limiting device
	c) Current controlling	d) None of the above
17)	A circuit breaker is a	,
,	a) current controlling device	b) circuit interrupting device
	c) current limiting device	d) none of the above
18)	If the length of arc in C.B. increases, its	s resistance
	a) decreases	b) increases
	c) remains same	d) none of the above
19)	Current chopping Phenomenon mainly	
	a) Air-Blast C.B b) Oil C.B	c) SF ₆ C.B d) Vacuum C.B
20)	Capacitive current breaking results in	a) valtage average all many at the all average
	a) short circuit b) open circuit	c) voltage surge d) none of the above



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 SWITCHGEAR & PROTECTION

Day and Date: Friday, 5-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to **right** indicates **full** marks.
- 4) Assume pick up current equal to rated C.T. secondary current.

SECTION - I

II. Solve any four: (4×5=20)

- a) What are the qualities of protective scheme?
- b) Derive torque equation of induction relay. Explain its significance.
- c) Write a short note on factors affecting Selection of fuse.
- d) Write the advantages and disadvantages of static relay.
- e) Current rating of an overcurrent relay is 5 A. relay has plug-setting of 150% and TMS setting of 0.4 CT having ratio 400/5 is connected to relay. Determine operating time of relay for fault current of 6000 A. If Plug setting multiplier is 5 for above fault current. What is the plug-setting for relay? At TMS = 1, operating time is given,

PSM	2	4	5	8	10	20
Operating time	10	5	4	3	2.8	2.4

III. Solve any two: (2×10=20)

- a) Discuss in detail the overcurrent protective scheme for various distribution feeders.
- b) Explain with block diagram and flowchart microprocessor based impedance relay.
- c) Derive an expression for a generalized mathematical equations for the operating conditions of Mho, off-set Mho and impedance relays.



SECTION - II

IV. Solve any four: (4×5=20)

- a) Explain with neat sketch Buchholz relay.
- b) Explain backup protection of bus-bars.
- c) Explain current chopping phenomenon.
- d) Explain with neat sketch Vacuum Circuit Breaker.
- e) Explain with neat sketch metal oxide (ZnO) arrestors.

V. Solve any two: (2×10=20)

- a) Explain percentage differential scheme. Write down the need of percentage differential scheme over simple differential scheme.
- b) Derive an expression for the Restriking voltage in terms of system voltage, inductance and capacitance across a circuit breaker when a 3-ph fault takes place.
- c) In 220 KV system the reactance and capacitance up to the location of C.B. are 8 Ohm and 0.025 μ F. a resistance of 600 Ohm is connected across contact of C.B. Determine,
 - i) Natural frequency of oscillation
 - ii) Damped frequency of oscillation
 - iii) Critical value of resistance.

SLR-VB - 331

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B.E. (Electrical) (Part ELECTRICAL	- I) Examination, 201 UTILIZATION	7
Day and Date : Saturday, 6-5-2017 Time : 3.00 p.m. to 6.00 p.m.		Max. Marks : 100
2) Answer MCQ/Obje Don't forget to me	age No. 3. Each question of ective type questions on ention, Q.P. Set (P/Q/R/S) lata if necessary and med	carries one mark. Page No. 3 only. On Top of Page.
MCQ/Objective Duration: 30 Minutes	Type Questions	Marks : 20
 Choose the correct answer: The main application of indirect arc 	furnace is to melt	(20×1=20)
a) ironc) non-ferrous metals	b) steeld) none of these	
2) Radiant efficiency of the luminous soa) shape of the sourcec) wavelength of light rays	b) temperature of the sd) all of the above	source
3) Light waves travel with a velocity of a) 3×10^{10} cm/s b) 3×10^{12} cm/s		3 _× 10 ¹⁸ cm/s
4) The unit of luminous flux isa) steradianb) candela	,	lux
5) One lumen per square meter is the sa) one luxc) one foot candle	same as b) one candela d) one lumen meter	
6) The normal value of coefficient of aca a) 0.25 b) 0.15		0.14
7) The distance between two stops diva) Crest speedc) Schedule speed	vided by the actual time of b) Average speed d) None of these	run
8) Specific energy consumption is minia) Main-linec) Sub urban	imum in serv b) Urban d) Equal for all type of	



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9)	9) Which motor is used in tramways?						
	a) ac single phase capacitor start mo	otor					
	b) ac three phase motor						
	c) dc series motor						
	d) dc shunt motor						
10)	When the speed of the train is estima		_				
	at a station in addition to the actual ru		~	-	os, is known as		
	a) average speed	,	schedule speed				
	c) notching speed	,	free running spe	ed			
11)	The system which uses electrical end						
	a) Electric traction system		Non-electric tra	ctic	on system		
	c) Both a and b	d)	None of these				
12)	Which locomotive has the highest ope		-	?			
	a) diesel	,	electric				
	c) steam	d)	all have same a	ıvai	lability		
13)	Parallel operation of traction motors is easier with						
	a) DC shunt motor		b) DC series motor				
	c) Induction motor	d) None of these					
14)	1) The specific energy consumption for main line services is around						
	watt hours per tonne-km.			_			
	a) 20-30 b) 30-45	c)	50 – 75	d)	100 – 150		
15)	Overhead lines for power supply to tr			imı	um height of		
	a) 2 m b) 5 m	c)	10 m	d)	15 m		
16)	The unit of solid angle is						
	a) solid angle b) radian	c)	steradian	d)	candela		
17)	The power factor will be leading in ca	se (of				
	a) Induction heating	b)	Resistance hea	ting)		
	c) Dielectric heating	d)	Electric arc hea	ting	9		
18)	B) The method suitable for heating of conducting medium is						
	a) Induction heating	b)	Indirect arc hea	ting)		
	c) Radiant heating	d)	Eddy current he	eatir	ng		
19)	The tips of the electrodes, for spot we	eldir	ng are made of				
	a) carbon b) copper alloy	c)	mica	d)	porcelain		
20)	Power factor is highest in case of						
•	a) Mercury arc lamp	b)	Sodium vapour	lan	nps		
	c) Tube lights	d)	GLS lamps				



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL UTILIZATION

Day and Date: Saturday, 6-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions **compulsory**.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.

SECTION - I

2. Solve any four:

 $(4 \times 5 = 20)$

- a) What are the requirements of an ideal traction system?
- b) An Electric train has an average speed of 42 km/h on a level track between stops 1400 m apart. It is accelerated at 1.7 km/h/s and is braked at 3.3 km/h/s. Draw the speed-time curve for the run.
- c) Explain with neat sketch dynamic braking.
- d) Explain shunt transition in detail.
- e) Explain mechanical regenerative braking.
- f) Explain block diagram of AC Locomotive.

3. Solve any two:

 $(2\times10=20)$

- a) An electric train has quadrilateral speed-time curve as follows:
 - i) uniform acceleration from rest at 2 kmphps for 30 seconds.
 - ii) coasting for 50 seconds.
 - iii) braking period of 20 seconds.

The train is moving a uniform upgradient 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.

- b) Explain quadrilateral Speed-Time curve. Derive expression fortotal distance travelled in km.
- c) Explain Series-Parallel Starting.



 $(4 \times 5 = 20)$

SECTION - II

4. Solve any four:

- a) Define and explain
 - i) Maintenance factor
 - ii) Absorption factor.
- b) Explain with neat sketch resistance welding.
- c) Compare tungsten filament lamp and fluorescent tubes.
- d) Explain energy conservation in small scale industries.
- e) Explain with neat sketch indirect resistance heating.
- f) Explain motor selection textile industries.
- 5. Solve any two: (2×10=20)
 - a) i) Compare resistance welding and Arc welding.
 - ii) Compare DC welding and AC welding.
 - b) i) Explain energy conservation in legislation.
 - ii) Explain motor selection in sugar mills.
 - c) Explain laws of illumination.

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Seat No.	Set	Q

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL UTILIZATION

Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

	ention, Q.P. Set (P/Q/R/S) on To lata if necessary and mention it nt indicate full marks.	
MCQ/Objective Duration: 30 Minutes	Type Questions	Marks : 20
1. Choose the correct answer:		(20×1=20)
 The main application of indirect arc tage iron 	furnace is to melt b) steel	
c) non-ferrous metals	d) none of these	
Radiant efficiency of the luminous so	•	
a) shape of the source	b) temperature of the source	
c) wavelength of light rays	d) all of the above	
3) Light waves travel with a velocity of a) 3×10^{10} cm/s b) 3×10^{12} cm/s	c) $3_{\times}10^{15}$ cm/s d) $3_{\times}10^{16}$	⁸ cm/s
The unit of luminous flux is		
a) steradian b) candela	c) lumen d) lux	
5) One lumen per square meter is the s		
a) one lux	b) one candela	
c) one foot candle	d) one lumen meter	
6) The normal value of coefficient of ac		
a) 0.25 b) 0.15	,	
7) The distance between two stops div	-	
a) Crest speed	b) Average speed	
c) Schedule speed	d) None of these	
Specific energy consumption is mini Main line		
a) Main-line c) Sub urban	b) Urband) Equal for all type of	
c) oub dibail	a, Equal for all type of	



9)	Which motor is use a) ac single phase b) ac three phase c) dc series motor d) dc shunt motor	capacitor start mo motor	otor			
10)	When the speed of at a station in addit a) average speed		nniı		sto	
	c) notching speed		,	free running spe	eed	
11)	The system which					
	a) Electric traction	system			Ctic	on system
10\	c) Both a and b	hae the highest on	,	None of these	, 2	
12)	Which locomotive I a) diesel	nas trie riighest opi		electric	•	
	c) steam		,	all have same a	avai	lability
13) Parallel operation of traction motors is easier with						,
-,	a) DC shunt motor			DC series moto	r	
	c) Induction motor			d) None of these		
14)	The specific energy watt hours per tonn		nain	line services is a	ırou	ınd
	a) 20 – 30 ·		c)	50 - 75	d)	100 - 150
15)	Overhead lines for	power supply to tr	am	cars are at a mir	nim	um height of
	a) 2 m	b) 5 m	c)	10 m	d)	15 m
16)	The unit of solid an	igle is				
	a) solid angle	b) radian	c)	steradian	d)	candela
17)	The power factor w	ill be leading in ca	se (of		
	a) Induction heating	g	b)	Resistance hea	ting)
	c) Dielectric heating	ng	d)	Electric arc hea	tino	g
18)	B) The method suitable for heating of conducting medium is					
	a) Induction heatin	g	b)	Indirect arc hea	ting	9
	c) Radiant heating		d)	Eddy current he	eatii	ng
19)	The tips of the elec	trodes, for spot we	eldir	ng are made of		
	a) carbon	b) copper alloy		_	d)	porcelain
20)	Power factor is hig	hest in case of				
,	a) Mercury arc lan		b)	Sodium vapour	lan	nps
	c) Tube lights			GLS lamps		



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL UTILIZATION

Day and Date: Saturday, 6-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions **compulsory**.

2) Assume suitable data if necessary and mention it clearly.

3) Figures to the **right** indicate **full** marks.

SECTION - I

2. Solve any four:

 $(4 \times 5 = 20)$

- a) What are the requirements of an ideal traction system?
- b) An Electric train has an average speed of 42 km/h on a level track between stops 1400 m apart. It is accelerated at 1.7 km/h/s and is braked at 3.3 km/h/s. Draw the speed-time curve for the run.
- c) Explain with neat sketch dynamic braking.
- d) Explain shunt transition in detail.
- e) Explain mechanical regenerative braking.
- f) Explain block diagram of AC Locomotive.

3. Solve any two:

 $(2\times10=20)$

- a) An electric train has quadrilateral speed-time curve as follows:
 - i) uniform acceleration from rest at 2 kmphps for 30 seconds.
 - ii) coasting for 50 seconds.
 - iii) braking period of 20 seconds.

The train is moving a uniform upgradient 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.

- b) Explain quadrilateral Speed-Time curve. Derive expression fortotal distance travelled in km.
- c) Explain Series-Parallel Starting.

SECTION - II

4. Solve any four: (4×5=20)

- a) Define and explain
 - i) Maintenance factor
 - ii) Absorption factor.
- b) Explain with neat sketch resistance welding.
- c) Compare tungsten filament lamp and fluorescent tubes.
- d) Explain energy conservation in small scale industries.
- e) Explain with neat sketch indirect resistance heating.
- f) Explain motor selection textile industries.
- 5. Solve any two: (2×10=20)
 - a) i) Compare resistance welding and Arc welding.
 - ii) Compare DC welding and AC welding.
 - b) i) Explain energy conservation in legislation.
 - ii) Explain motor selection in sugar mills.
 - c) Explain laws of illumination.

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Seat		7	
No.	Set	K	

ELECTRICAL	UTILIZATION
Day and Date : Saturday, 6-5-2017 Time : 3.00 p.m. to 6.00 p.m.	Max. Marks : 100
in Answer Book Pag 2) Answer MCQ/Obje Don't forget to me l	sory. It should be solved in first 30 minutes age No. 3. Each question carries one mark. ective type questions on Page No. 3 only. ention, Q.P. Set (P/Q/R/S) on Top of Page. lata if necessary and mention it clearly. In the indicate full marks.
MCQ/Objective Touration: 30 Minutes	Type Questions Marks: 20
 Choose the correct answer: The unit of solid angle is 	(20×1=20)
a) solid angle b) radian	c) steradian d) candela
 2) The power factor will be leading in ca a) Induction heating c) Dielectric heating 3) The method suitable for heating of co 	b) Resistance heatingd) Electric arc heating
a) Induction heating c) Radiant heating	b) Indirect arc heating d) Eddy current heating
4) The tips of the electrodes, for spot w a) carbon b) copper alloy	9
5) Power factor is highest in case ofa) Mercury arc lampc) Tube lights	b) Sodium vapour lampsd) GLS lamps
6) The main application of indirect arc fa) ironc) non-ferrous metals	furnace is to melt b) steel d) none of these
7) Radiant efficiency of the luminous soa) shape of the sourcec) wavelength of light rays	ource depends on b) temperature of the source d) all of the above
8) Light waves travel with a velocity of	,



9)	The unit of luminous		۵)	lumon	۹/	lunz
10\	a) steradian	•			u)	lux
10)	One lumen per squa) one lux	iare meter is the so		one candela		
	c) one foot candle		,	one lumen mete	er.	
11)	The normal value of	of coefficient of adl	,			
,	a) 0.25	b) 0.15				0.14
12)	The distance between				ne c	of run
,	a) Crest speed	·		Average speed		
	c) Schedule speed		d)	None of these		
13)	Specific energy cor	nsumption is minin			sei	vices.
	a) Main-line		,	Urban		
	c) Sub urban		d)	Equal for all typ	e o	Ť
14)	Which motor is use	•				
	a) ac single phase	-	otor			
	b) ac three phase					
	c) dc series motord) dc shunt motor					
15)	When the speed of	the train is estimate	tad	taking into acco	unt	the time of ston
13)	at a station in addit			_		•
	a) average speed			schedule speed	-	30, 10 14 10 1111 40
	c) notching speed		,	free running spe		
16)	The system which	uses electrical ene	ergy	is known as		
,	a) Electric traction			Non-electric tra	ctic	on system
	c) Both a and b		d)	None of these		-
17)	Which locomotive h	nas the highest ope	erat	ional availability	?	
	a) diesel		b)	electric		
	c) steam		d)	all have same a	ıvai	lability
18)	Parallel operation of	of traction motors i	s ea	asier with		
	a) DC shunt motor		,	DC series moto	r	
	c) Induction motor		,	None of these		
19)	The specific energy		nain	line services is a	rou	nd
	watt hours per tonn		- \	F0 7F	-1\	100 150
00,	a) 20 – 30	b) 30 – 45				100 – 150
20)	Overhead lines for					•
	a) 2 m	b) 5 m	C)	10 m	a)	15 m



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL UTILIZATION

Day and Date: Saturday, 6-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions **compulsory**.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.

SECTION - I

2. Solve any four:

 $(4 \times 5 = 20)$

- a) What are the requirements of an ideal traction system?
- b) An Electric train has an average speed of 42 km/h on a level track between stops 1400 m apart. It is accelerated at 1.7 km/h/s and is braked at 3.3 km/h/s. Draw the speed-time curve for the run.
- c) Explain with neat sketch dynamic braking.
- d) Explain shunt transition in detail.
- e) Explain mechanical regenerative braking.
- f) Explain block diagram of AC Locomotive.

3. Solve any two:

 $(2\times10=20)$

- a) An electric train has quadrilateral speed-time curve as follows:
 - i) uniform acceleration from rest at 2 kmphps for 30 seconds.
 - ii) coasting for 50 seconds.
 - iii) braking period of 20 seconds.

The train is moving a uniform upgradient 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.

- b) Explain quadrilateral Speed-Time curve. Derive expression fortotal distance travelled in km.
- c) Explain Series-Parallel Starting.

 $(4 \times 5 = 20)$

SECTION - II

4. Solve any four:

- a) Define and explain
 - i) Maintenance factor
 - ii) Absorption factor.
- b) Explain with neat sketch resistance welding.
- c) Compare tungsten filament lamp and fluorescent tubes.
- d) Explain energy conservation in small scale industries.
- e) Explain with neat sketch indirect resistance heating.
- f) Explain motor selection textile industries.

5. Solve any two: (2×10=20)

- a) i) Compare resistance welding and Arc welding.
 - ii) Compare DC welding and AC welding.
- b) i) Explain energy conservation in legislation.
 - ii) Explain motor selection in sugar mills.
- c) Explain laws of illumination.

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SLR-VB - 331

Seat No.	Set	S
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	B.E. (I	ELECTRICAL) (Pa	,	•	117
-	d Date : Saturday, 3.00 p.m. to 6.00 p				Max. Marks: 100
	2) 3)	in Answer Book Answer MCQ/C Don't forget to	Page No. 3. E bjective type nention, Q.P. data if neces	ach questior questions o Set (P/Q/R/S ssary and m	in first 30 minutes n carries one mark. n Page No. 3 only. S) on Top of Page. ention it clearly .
		MCQ/Objecti	e Type Ques	tions	
Duratio	on : 30 Minutes				Marks : 20
1. Ch	oose the correct a	nswer:			(20×1=20)
1)	The system whic	h uses electrica	energy is kno	own as	
	a) Electric traction	on system	,	electric tracti	on system
	c) Both a and b		d) None		
2)	Which locomotive	e has the highes	-	-	
	a) diesel		b) electr		9-1-99
۵)	c) steam		,	ve same ava 	liability
3)	Parallel operation				
	a) DC shunt motc) Induction mot		d) None	eries motor	
4)	,		,		ınd
4)	The specific energy watt hours per tor	• • •	Ji mamine se	i vices is aloc	
	a) 20 – 30	b) 30 – 45	c) 50-7	'5 d)	100 – 150
5)	Overhead lines fo	•	•	•	
-,	a) 2 m	b) 5 m	c) 10 m		15 m
6)	The unit of solid a	angle is	,	,	
,	a) solid angle	b) radian	c) sterac	dian d)	candela
7)	The power factor	will be leading i	n case of		
,	a) Induction heat	_		tance heating	g
	c) Dielectric heat	ting	d) Electr	ric arc heatin	g



8)	The method suitable for heating of cor a) Induction heating c) Radiant heating		Indirect arc hea	ıting
٥)	,	•	Eddy current he	eating
9)	The tips of the electrodes, for spot we			d) norodoin
10\	a) carbon b) copper alloy	C)	mica	d) porcelain
10)	Power factor is highest in case of	h)	Codium vanour	lampa
	a) Mercury arc lampc) Tube lights	,	Sodium vapour GLS lamps	iamps
11\	The main application of indirect arc fu	,	•	
' ' <i>)</i>	a) iron		steel	
	c) non-ferrous metals	,	none of these	
12)	Radiant efficiency of the luminous sou	,		
,	a) shape of the source		temperature of	the source
	c) wavelength of light rays		all of the above	
13)	Light waves travel with a velocity of			
	a) 3×10^{10} cm/s b) 3×10^{12} cm/s	c)	3×10^{15} cm/s	d) 3×10^{18} cm/s
14)	The unit of luminous flux is			
	a) steradian b) candela	c)	lumen	d) lux
15)	One lumen per square meter is the sa	ame	e as	
	a) one lux	,	one candela	
	c) one foot candle	,	one lumen mete	
16)	The normal value of coefficient of adh			
	a) 0.25 b) 0.15	-		d) 0.14
17)	The distance between two stops divid		-	ne of run
	a) Crest speedc) Schedule speed	b)	Average speed	
40\	•	•	None of these	
18)	Specific energy consumption is minim			services.
	a) Main-linec) Sub urban		Urban Equal for all typ	ne of
10\	Which motor is used in tramways?	u)	Equal for all typ	OC OI
19)	a) ac single phase capacitor start mo	nt∩r		
	b) ac three phase motor	,,,,		
	c) dc series motor			
	d) dc shunt motor			
20)	When the speed of the train is estimated	ted	taking into acco	unt the time of stop
ĺ	at a station in addition to the actual rur	nniı	ng time between	stops, is known as
	a) average speed		schedule speed	
	c) notching speed	d)	free running spe	eed



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ELECTRICAL UTILIZATION

Day and Date: Saturday, 6-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions **compulsory**.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.

SECTION - I

2. Solve any four:

 $(4 \times 5 = 20)$

- a) What are the requirements of an ideal traction system?
- b) An Electric train has an average speed of 42 km/h on a level track between stops 1400 m apart. It is accelerated at 1.7 km/h/s and is braked at 3.3 km/h/s. Draw the speed-time curve for the run.
- c) Explain with neat sketch dynamic braking.
- d) Explain shunt transition in detail.
- e) Explain mechanical regenerative braking.
- f) Explain block diagram of AC Locomotive.

3. Solve any two:

 $(2\times10=20)$

- a) An electric train has quadrilateral speed-time curve as follows:
 - i) uniform acceleration from rest at 2 kmphps for 30 seconds.
 - ii) coasting for 50 seconds.
 - iii) braking period of 20 seconds.

The train is moving a uniform upgradient 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.

- b) Explain quadrilateral Speed-Time curve. Derive expression fortotal distance travelled in km.
- c) Explain Series-Parallel Starting.

 $(4 \times 5 = 20)$

SECTION - II

4. Solve any four:

- a) Define and explain
 - i) Maintenance factor
 - ii) Absorption factor.
- b) Explain with neat sketch resistance welding.
- c) Compare tungsten filament lamp and fluorescent tubes.
- d) Explain energy conservation in small scale industries.
- e) Explain with neat sketch indirect resistance heating.
- f) Explain motor selection textile industries.

5. Solve any two: (2×10=20)

- a) i) Compare resistance welding and Arc welding.
 - ii) Compare DC welding and AC welding.
- b) i) Explain energy conservation in legislation.
 - ii) Explain motor selection in sugar mills.
- c) Explain laws of illumination.

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I			II			

Seat	
No.	
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Set P

B.E. (Part – I) (Electrical Engineering) Examination, 2017 PLC AND SCADA (Elective – I)

Day and Date : Monday, 8-5-2017 Total Marks : 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) All questions are compulsory.
- 4) Make suitable assumptions if necessary.

MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 20 1. Choose the correct answer: 20 1) PLCs are ___ designed for use in the control of a wide variety of manufacturing machines and systems. a) Special-purpose Industrial Computers b) Personal computers d) All of the above c) Electromechanical systems 2) The PLC was invented by _____ b) Dick Morley c) Bill Landis d) Tod Cunningham a) Bill Gates 3) Figure shows the ladder logic for a) NAND Gate b) EX-NOR Gate c) EX-OR Gate d) OR GATE 4) Figure shows the ladder logic for b) EX-NOR Gate c) EX-OR Gate d) NAND Gate a) NOR Gate 5) Timers and counters use what is known as a _____ and a ____ to hold the target value and the accumulated value. a) Holding count_target holder b) EN bit_DN bit c) Pre-set register_accumulated register d) None of the above 6) If you want reverse power flow to be present in a rung you must program a a) Reverse path that implements the reverse flow

b) Forward path that implements the reverse flow

c) Use reverse logicd) None of the above



		iven	tion relay systems	for comple	x operations	5 15	that
	PLCs. oor than	b) Excellent than	c) As go	od as	d)	Unpredictable as
PLCs	having less that	an _	inpu	its and outp		ed a	as Small PLC.
•			,	•		,	300
a) Lo b) SI c) SI	onger the PWM horter the PWM horter the PWM	1 per 1 per 1 per	iod, faster will be tl riod, faster will be t riod, slower will be	he variatior the variation the variation	i in an avera n in an avera on in an avei	ige age rage	value value e value
	who i	moni	tor the SCADA sys	tem and pe	rform super	/iso	ry control functions
	•	b) MTU	c) RTU	·	d)	Communications
a) So	oftware	Softw	vare and Hardware)	
						d)	Transport
Match	n List – I with Li	st –	II and select the co	orrect answ	er using the	cod	de given below the
	List – I		Li	ist – II			
Р	IEC61970	1	Transmission				
Q	IEC61968	2	Distribution				
			Distribution equir	nment and	processes		
R	IEC60870-5	3	Distribution equip	official and			
R S	IEC60870-5 IEC60870-6	4	Power systems a interfaces for inte	nd progran	nming		
S a) P		4	Power systems a	nd prograngrating b) P-3, C	nming 0-1, R-4, S-2 0-4, R-1, S-2		
a) Poc) Poc) When	IEC60870-6 -2, Q-1, R-4, S -4, Q-3, R-2, S n planning a SC	4 -3 -1 CAD/	Power systems a interfaces for inte	nd prograng grating b) P-3, C d) P-3, C	0-1, R-4, S-2 0-4, R-1, S-2 n a database	2	
a) Poc) Poc) When a) Hoc) Do The co	IEC60870-6 -2, Q-1, R-4, S -4, Q-3, R-2, S n planning a SC ave an underst esign a secure	4 -3 -1 CADA andi sys	Power systems a interfaces for inte	b) P-3, C d) P-3, C uld b) Design	0-1, R-4, S-2 0-4, R-1, S-2 on a database he above architect	e ure.	All of the above
a) Poch Poch Poch Poch Poch Poch Poch Poch	IEC60870-6 -2, Q-1, R-4, S -4, Q-3, R-2, S n planning a SC ave an underst esign a secure current generati etworked	4 -3 -1 CAD/candic sysion o	Power systems a interfaces for inter	b) P-3, C d) P-3, C d) P-3, C uld b) Design d) All of t	2-1, R-4, S-2 2-4, R-1, S-2 n a database he above architect outed as	e ure. d)	
a) Pool of Poo	IEC60870-6 -2, Q-1, R-4, S -4, Q-3, R-2, S n planning a SC ave an underst esign a secure current generati etworked nd generation S	-3 -1 CADA andi sys ion o b SCA b	Power systems a interfaces for inter	b) P-3, C d) P-3, C uld b) Design d) All of t c) Distrib	2-1, R-4, S-2 2-4, R-1, S-2 an a database he above architect outed as outed	e ure. d) d)	All of the above
a) Poch Seconda) No In TC a) All Which	IEC60870-6 -2, Q-1, R-4, S -4, Q-3, R-2, S n planning a SC ave an underst esign a secure current generati etworked nd generation S etworked P/IP model lay pplication	-3 -1 CAD/ andi sys ion o b SCA b er N b	Power systems a interfaces for inter	b) P-3, C d) P-3, C d) P-3, C dld b) Design d) All of t c) Distrib also called c) Distrib c) Interne	2-1, R-4, S-2 2-4, R-1, S-2 an a database he above architect outed as outed et	e ure. d) d)	All of the above
	PLCs a) 50 How (a) Lo b) Si c) Si d) Lo What a) C for the a) O SCAE a) Si c) C RPC a) A Match lists:	a) 50 How do the variation a) Longer the PWN b) Shorter the PWN c) Shorter the PWN d) Longer the PWN What type of applica a) Constant torque who for the remote plant. a) Operator SCADA system is a) Software c) Combination of SRPC Protocol is rela a) Application Match List – I with Lilists: List – I P IEC61970 Q IEC61968	PLCs having less thana) 50	PLCs having less than inputa a) 50 b) 200 How do the variations in an average value a) Longer the PWM period, faster will be to Shorter the PWM period, slower will be to Shorter the PWM period, slower will be d) Longer the PWM period, slower will be What type of application curve used inside a) Constant torque b) Variable torque who monitor the SCADA system to the remote plant. a) Operator b) MTU SCADA system is a) Software c) Combination of Software and Hardware RPC Protocol is related to a) Application b) Presentation Match List - I with List - II and select the collists: List - I List - I Transmission Q IEC61968 2 Distribution	PLCs having less than inputs and outpay 50	PLCs having less than	PLCs having less than



Seat	
No.	

B.E. (Part – I) (Electrical Engineering) Examination, 2017 PLC AND SCADA (Elective – I)

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Make suitable assumptions if necessary.

SECTION - I

2. Solve any four: (5×4=20)

a) Define Programmable Logic Controller. Write a short note on input and output module.

- b) What is ladder diagram? How it is different than the normal circuit diagram?
- c) What is CPU? Explain its main Section and also explain important function of each section.
- d) Explain Output ON/OFF and analog devices in detail.
- e) Explain different types of switches.
- f) Explain Variable Speed (Variable Frequency) AC motor drive.

3. Solve any two: (10×2=20)

- a) What is tuning of PID controller? Explain PID tuning methods in detail.
- b) This is an alarm system. There are four hazard inputs to the alarm system A, B, C, D that go on as some operational malfunction occurs.

The system operates as follow:

- 1) If any one inputs are ON, nothing happen.
- 2) If any two inputs are ON, a red pilot light goes on.
- 3) If any three inputs are ON, an alarm siren sounds.
- 4) If all four are ON, the fire department is notified.

Develop Gate Logic, PLC Ladder logic and Relay Logic for alarm system.

c) Two pulses start at the same time. Pulse output J is to pulse every 12 seconds. Pulse output K is to pulse every 4 seconds.

Develop PLC Ladder Logic, Relay Logic and Timing diagram for above problem.



SECTION - II

4. Solve any four: (5×4=20)

- a) Define SCADA. State advantages, disadvantages and applications of SCADA.
- b) Explain SCADA data transfer through PLCC.
- c) Explain:
 - 1) Human Machine interface
 - 2) Master Terminal Unit
 - 3) Remote Terminal Unit
- d) Explain Ethernet layers and their relationship to CIP.
- e) Explain how SCADA system is used in electrical power generation.
- f) Explain first, second, third generation of SCADA architecture.

5. Solve any two: (10×2=20)

- a) Explain with example how SCADA system is used in conventional electric power generation.
- b) Explain seven layers of OSI model and their functions. Compare OSI Model with TCP/IP Model.
- c) Draw and explain SCADA system in Petroleum Refining Process.

Seat	
No.	

Set **Q**

B.E. (Part – I) (Electrical Engineering) Examination, 2017 PLC AND SCADA (Elective – I)

Day and Date : Monday, 8-5-2017 Total Marks : 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions :

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) All questions are compulsory.
- 4) Make suitable assumptions if necessary.

		MCQ/Objective T	ype Questions		
Duration	n : 30 Minutes	·		Ma	arks : 20
1. Ch	oose the correct answe	er:			20
1)	The current generatio a) Networked	n of SCADA uses b) Monolithic	archite c) Distributed	cture. d) All of the abov	re
2)	Second generation So a) Networked	,	also called as	d) All of the abov	
3)	In TCP/IP model laye a) Application	r No. 1 consist of b) Transport	c) Internet	d) Network Acce	ess
4)	Which layer is respon	nsible for process to p b) Transport layer	-	d) Data link layer	
5)	Where is a hub specif a) Session layer		? c) Data Link layer	d) Application lay	/er
6)	PLCs are	ns. ndustrial Computers		•	ing
7)	The PLC was invente a) Bill Gates	-	c) Bill Landis	d) Tod Cunningh	am
8)	Figure shows the lade	der logic for			
	A 1	L ₂	-)	J) OD OATE	
	c) Electromechanica The PLC was invente a) Bill Gates Figure shows the lado	d by b) Dick Morley	d) All of the above		an



9)	Figure	e shows the lac	lder	logic for			
	L ₁				L ₂		
		A 1 B		2	=		
				2 \			
	a) N	OR Gate	b) EX-NOR Gate	c) EX-OR Ga	ite d)	NAND Gate
10)	Timer	rs and counters	use	what is known as a	·	and a	to hold the
		t value and the olding count_ta		ımulated value. holder	b) EN bit DN	bit	
				umulated register			
11)	a) Robby Force	everse path tha	at im It im C	er flow to be preser plements the rever plements the rever	se flow	must prog	ram a
12)	of the	PLCs.					that
) Excellent than			
13)	PLCs a) 50	having less that)	an _ b	inpu) 200	ts and outputs a c) 100	are called a d)	as Small PLC. 300
	 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 						
15)	 What type of application curve used inside VFD to operate cooling tower fan correctly? a) Constant torque b) Variable torque c) Constant power d) Variable power 						
16)							
	for the remote plant. a) Operator b) MTU c) RTU d) Communications						
17)		DA system is		,	,	,	
		oftware	Softw	vare and Hardware	b) Hardware	a ahova	
18)							
,	a) A	pplication	b	o) Presentation	c) Session	d)	Transport
19)	Match	n List – I with Li	st –	II and select the co	rrect answer us	sing the cod	de given below the
		List – I		Li	st – II		
	Р	IEC61970	1	Transmission			
	Q	IEC61968	2	Distribution			
	R	IEC60870-5	3	Distribution equip	ment and proce	esses	
	S	IEC60870-6	4	Power systems a interfaces for inte		9	
	a) P	-2, Q-1, R-4, S-	-3		b) P-3, Q-1, F	R-4, S-2	=

c) P-4, Q-3, R-2, S-1

d) P-3, Q-4, R-1, S-2

- 20) When planning a SCADA system you should
 a) Have an understanding of the process
 c) Design a secure system
 b) Design a database
 d) All of the above



Seat	
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B.E. (Part – I) (Electrical Engineering) Examination, 2017 PLC AND SCADA (Elective – I)

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Make suitable assumptions if necessary.

SECTION - I

2. Solve any four: (5×4=20)

- a) Define Programmable Logic Controller. Write a short note on input and output module.
- b) What is ladder diagram? How it is different than the normal circuit diagram?
- c) What is CPU? Explain its main Section and also explain important function of each section.
- d) Explain Output ON/OFF and analog devices in detail.
- e) Explain different types of switches.
- f) Explain Variable Speed (Variable Frequency) AC motor drive.

3. Solve any two: (10×2=20)

- a) What is tuning of PID controller? Explain PID tuning methods in detail.
- b) This is an alarm system. There are four hazard inputs to the alarm system A, B, C, D that go on as some operational malfunction occurs.

The system operates as follow:

- 1) If any one inputs are ON, nothing happen.
- 2) If any two inputs are ON, a red pilot light goes on.
- 3) If any three inputs are ON, an alarm siren sounds.
- 4) If all four are ON, the fire department is notified.

Develop Gate Logic, PLC Ladder logic and Relay Logic for alarm system.

c) Two pulses start at the same time. Pulse output J is to pulse every 12 seconds. Pulse output K is to pulse every 4 seconds.

Develop PLC Ladder Logic, Relay Logic and Timing diagram for above problem.



SECTION - II

4. Solve any four: (5×4=20)

- a) Define SCADA. State advantages, disadvantages and applications of SCADA.
- b) Explain SCADA data transfer through PLCC.
- c) Explain:
 - 1) Human Machine interface
 - 2) Master Terminal Unit
 - 3) Remote Terminal Unit
- d) Explain Ethernet layers and their relationship to CIP.
- e) Explain how SCADA system is used in electrical power generation.
- f) Explain first, second, third generation of SCADA architecture.

5. Solve any two: (10×2=20)

- a) Explain with example how SCADA system is used in conventional electric power generation.
- b) Explain seven layers of OSI model and their functions. Compare OSI Model with TCP/IP Model.
- c) Draw and explain SCADA system in Petroleum Refining Process.

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No.	

Set R

	B.E. (Pa	art –		Electrical Engir LC AND SCAD		ring) Examinat Elective – I)	ion	, 2017
-	e : Monday, o.m. to 6.00 p		017					Total Marks : 100
Inst	ructions :	A 2) A fc 3) A	nsw nsv orge II qu	ver Book Page No. ver MCQ/Objectiv	3. le ty P. Se ouls	et (P/Q/R/S) on To ory.	ries Pag	one mark. ge No. 3 only. Don't
			ı	MCQ/Objective Ty	уре	Questions		
Ouration: 30								Marks : 20
1)	the correct the remote p	who m		tor the SCADA syst	tem	and perform super	/isoı	ry control functions
2) SC a) c) 3) RP a)	C Protocol is Application tch List – I w	n is n of So s relate	oftw ed to b)	Presentation	b) d) La c)	Hardware None of the above yer in OSI model. Session et answer using the	e d)	Communications Transport de given below the
	List – I			Lis	st –	II		
F	IEC619	70	1	Transmission				
	IEC619	68	2	Distribution				
F	R IEC6087	70-5	3	Distribution equip	mer	nt and processes		
S	S IEC6087	70-6	4	Power systems ar interfaces for integ		-		
c) 5) Wh		-2, S-1 a SC/	I ADA	system you shoung of the process	d) ld	P-3, Q-1, R-4, S-2 P-3, Q-4, R-1, S-2 Design a database	2	
6) The	Design a se current ger Networked		n of	em f SCADA uses Monolithic		All of the above architect Distributed		All of the above
,	cond genera Networked	tion S		DA architecture is a Monolithic	also		d)	All of the above P.T.O.



8)	In TCP/IP model layer No. 1 consist of a) Application b) Transport	c)	Internet	d)	Network Access
9)	Which layer is responsible for process to pra) Network layer b) Transport layer			d)	Data link layer
10)	Where is a hub specified in the OSI model? a) Session layer b) Physical layer		Data Link layer	d)	Application layer
11)	PLCs are designed for use in machines and systems.	n the	e control of a wide va	ariet	ty of manufacturing
	a) Special-purpose Industrial Computersc) Electromechanical systems		Personal compute All of the above	ers	
12)	The PLC was invented by a) Bill Gates b) Dick Morley	c)	Bill Landis	d)	Tod Cunningham
13)	Figure shows the ladder logic for				
	A 1				
4.4	a) NAND Gate b) EX-NOR Gate	c)	EX-OR Gate	d)	OR GATE
14)	Figure shows the ladder logic for L ₁		L ₂		
	A 1 B 2				
	a) NOR Gate b) EX-NOR Gate	c)	EX-OR Gate	d)	NAND Gate
15)	Timers and counters use what is known as a		and a _		to hold the
	target value and the accumulated value.a) Holding count_target holderc) Pre-set register_accumulated register		EN bit_DN bit None of the above)	
16)	If you want reverse power flow to be present a) Reverse path that implements the reverse b) Forward path that implements the reverse c) Use reverse logic d) None of the above	se f	low	rogi	ram a
17)	The capability of convention relay systems to of the PLCs.				
10\	a) Poor than b) Excellent than	•	As good as	•	Unpredictable as
10)	PLCs having less than input a) 50 b) 200		100		300
19)	How do the variations in an average value g a) Longer the PWM period, faster will be th b) Shorter the PWM period, faster will be th c) Shorter the PWM period, slower will be th d) Longer the PWM period, slower will be the	ne va he v the v	ariation in an avera ariation in an avera variation in an avei	ge v age age	value value e value
20)	What type of application curve used inside		•	-	
	a) Constant torque b) Variable torque	c)	Constant power	d)	variable power



Seat	
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B.E. (Part – I) (Electrical Engineering) Examination, 2017 PLC AND SCADA (Elective – I)

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Make suitable assumptions if necessary.

SECTION - I

2. Solve any four: (5×4=20)

a) Define Programmable Logic Controller. Write a short note on input and output module.

- b) What is ladder diagram? How it is different than the normal circuit diagram?
- c) What is CPU? Explain its main Section and also explain important function of each section.
- d) Explain Output ON/OFF and analog devices in detail.
- e) Explain different types of switches.
- f) Explain Variable Speed (Variable Frequency) AC motor drive.

3. Solve any two: (10×2=20)

- a) What is tuning of PID controller? Explain PID tuning methods in detail.
- b) This is an alarm system. There are four hazard inputs to the alarm system A, B, C, D that go on as some operational malfunction occurs.

The system operates as follow:

- 1) If any one inputs are ON, nothing happen.
- 2) If any two inputs are ON, a red pilot light goes on.
- 3) If any three inputs are ON, an alarm siren sounds.
- 4) If all four are ON, the fire department is notified.

Develop Gate Logic, PLC Ladder logic and Relay Logic for alarm system.

c) Two pulses start at the same time. Pulse output J is to pulse every 12 seconds. Pulse output K is to pulse every 4 seconds.

Develop PLC Ladder Logic, Relay Logic and Timing diagram for above problem.



SECTION - II

4. Solve any four: (5×4=20)

- a) Define SCADA. State advantages, disadvantages and applications of SCADA.
- b) Explain SCADA data transfer through PLCC.
- c) Explain:
 - 1) Human Machine interface
 - 2) Master Terminal Unit
 - 3) Remote Terminal Unit
- d) Explain Ethernet layers and their relationship to CIP.
- e) Explain how SCADA system is used in electrical power generation.
- f) Explain first, second, third generation of SCADA architecture.

5. Solve any two: (10×2=20)

- a) Explain with example how SCADA system is used in conventional electric power generation.
- b) Explain seven layers of OSI model and their functions. Compare OSI Model with TCP/IP Model.
- c) Draw and explain SCADA system in Petroleum Refining Process.

Seat	
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Set S

B.E. (Part – I) (Electrical Engineering) Examination, 2017 PLC AND SCADA (Elective – I)

		PLC AND SCADA	A (Elective – I)	
-	Date: Monday, 8-5-20 00 p.m. to 6.00 p.m.	17		Total Marks : 100
1	Ar 2) Ai fo 3) Ai	nswer Book Page No. Inswer MCQ/Objectiv	P. Set (P/Q/R/S) on To oulsory.	ries one mark. Page No. 3 only. Don't
Duration	: 30 Minutes	MCQ/Objective Ty	pe Questions	Marks : 20
1. Cho	oose the correct answe	r :		20
1)	a) Reverse path that b) Forward path that c) Use reverse logic d) None of the above	implements the rever implements the revers	se flow	rogram a
2)	The capability of converse of the PLCs. a) Poor than		for complex operations c) As good as	
3)	PLCs having less than a) 50	b) 200	ts and outputs are callect	ed as Small PLC. d) 300
4)	b) Shorter the PWM pc) Shorter the PWM p	period, faster will be the period, faster will be the period, slower will be t	get affected by PWM p be variation in an avera ne variation in an avera the variation in an aver the variation in an aver	ige value age value rage value
5)	What type of application a) Constant torque		VFD to operate cooling c) Constant power	•
6)	who motor the remote plant. a) Operator	onitor the SCADA syst b) MTU	em and perform super c) RTU	visory control functions d) Communications
7)	SCADA system is a) Software c) Combination of So	ftware and Hardware	b) Hardware d) None of the above	e
8)	RPC Protocol is relate	d to	Laver in OSI model	

a) Application b) Presentation c) Session

d) Transport

9) Match List – I with List – II and select the correct answer using the code given below the

lists :					
	List – I		List – II		
Р	IEC61970	1	Transmission		
Q	IEC61968	2	Distribution		
R	IEC60870-5	3	Distribution equipment and processes		
S	IEC60870-6	4	Power systems and programming interfaces for integrating		

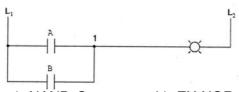
- a) P-2, Q-1, R-4, S-3
- c) P-4, Q-3, R-2, S-1

- b) P-3, Q-1, R-4, S-2
- d) P-3, Q-4, R-1, S-2
- 10) When planning a SCADA system you should
 - a) Have an understanding of the process b) Design a database
 - c) Design a secure system
- d) All of the above
- 11) The current generation of SCADA uses
 - a) Networked
- b) Monolithic
- c) Distributed
- architecture. d) All of the above
- 12) Second generation SCADA architecture is also called as
 - a) Networked
- b) Monolithic
- c) Distributed
- d) All of the above

- 13) In TCP/IP model layer No. 1 consist of a) Application b) Transport
- c) Internet 14) Which layer is responsible for process to process delivery?
- d) Network Access d) Data link layer
- b) Transport layer c) Session layer a) Network layer 15) Where is a hub specified in the OSI model?
 - a) Session layer
- b) Physical layer
- c) Data Link layer
- d) Application layer
- 16) PLCs are designed for use in the control of a wide variety of manufacturing machines and systems.
 - a) Special-purpose Industrial Computers
 - c) Electromechanical systems
- b) Personal computers
- d) All of the above

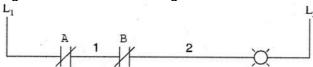
- 17) The PLC was invented by
 - a) Bill Gates
- b) Dick Morley
- c) Bill Landis
- d) Tod Cunningham

18) Figure shows the ladder logic for



- a) NAND Gate
- b) EX-NOR Gate
- c) EX-OR Gate
- d) OR GATE

19) Figure shows the ladder logic for



- a) NOR Gate
- b) EX-NOR Gate
- c) EX-OR Gate
- d) NAND Gate

to hold the

- 20) Timers and counters use what is known as a target value and the accumulated value.
 - a) Holding count_target holder
- b) EN bit_DN bit
- c) Pre-set register_accumulated register
- d) None of the above

and a



Seat	
No.	

B.E. (Part – I) (Electrical Engineering) Examination, 2017 PLC AND SCADA (Elective – I)

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Make suitable assumptions if necessary.

SECTION - I

2. Solve any four: (5×4=20)

a) Define Programmable Logic Controller. Write a short note on input and output module.

- b) What is ladder diagram? How it is different than the normal circuit diagram?
- c) What is CPU? Explain its main Section and also explain important function of each section.
- d) Explain Output ON/OFF and analog devices in detail.
- e) Explain different types of switches.
- f) Explain Variable Speed (Variable Frequency) AC motor drive.

3. Solve any two: (10×2=20)

- a) What is tuning of PID controller? Explain PID tuning methods in detail.
- b) This is an alarm system. There are four hazard inputs to the alarm system A, B, C, D that go on as some operational malfunction occurs.

The system operates as follow:

- 1) If any one inputs are ON, nothing happen.
- 2) If any two inputs are ON, a red pilot light goes on.
- 3) If any three inputs are ON, an alarm siren sounds.
- 4) If all four are ON, the fire department is notified.

Develop Gate Logic, PLC Ladder logic and Relay Logic for alarm system.

c) Two pulses start at the same time. Pulse output J is to pulse every 12 seconds. Pulse output K is to pulse every 4 seconds.

Develop PLC Ladder Logic, Relay Logic and Timing diagram for above problem.



SECTION - II

4. Solve any four: (5×4=20)

- a) Define SCADA. State advantages, disadvantages and applications of SCADA.
- b) Explain SCADA data transfer through PLCC.
- c) Explain:
 - 1) Human Machine interface
 - 2) Master Terminal Unit
 - 3) Remote Terminal Unit
- d) Explain Ethernet layers and their relationship to CIP.
- e) Explain how SCADA system is used in electrical power generation.
- f) Explain first, second, third generation of SCADA architecture.

5. Solve any two: (10×2=20)

- a) Explain with example how SCADA system is used in conventional electric power generation.
- b) Explain seven layers of OSI model and their functions. Compare OSI Model with TCP/IP Model.
- c) Draw and explain SCADA system in Petroleum Refining Process.

Seat No.	Set	Р
	I	

	-	• • • • • • • • • • • • • • • • • • • •	(Part – I) Examinati ESSING (Elective		
	Date: Monday, 8-5-20 .00 p.m. to 6.00 p.m.)17		Max. Marks : 1	00
	Ai 2) A i	nswer book Page No. nswer MCQ/Objecti	3. Each question carri	n Page No. 3 only. Don't	ţ
		MCQ/Objective T	ype Questions		
Duration	: 30 Minutes			Marks:	20
1. Cho	oose the correct answe	er:		(1×20=2	20)
1)	The number of stages 512 point sequence is		s required for the com	putation of the DFT of a	
	a) 8	b) 9	c) 6	d) 7	
2)	Circular time shift of a a) Multiplication of th b) Multiplication of th c) Multiplication of th d) None	e sequence X(k) with e sequence x(n) with	n complex exponential complex exponential		
3)	DIT algorithm related a) x(k) shuffled c) x(k) and x(n) shuff		b) x(n) shuffled d) none		
4)	FFT algorithm calcula a) DTFT	tes b) DCT	c) DFT	d) DST	
5)	Correlation is basically a) Add two signals c) Compare two sign		b) Subtract two sig d) None	nals	
6)	If the system is descr a) Linear	ibed by $y(n) = x(n)^2$ b) Non Linear	c) Homogeneous	d) None of above	
7)	When aliasing occurs a) Low frequency be b) High frequencies a bandwidth d) None	come a high frequence come a mid frequence	су	uencies below signal	
8)	Transform domain use a) Enhance the signa c) Reduce the data p	al	b) Compress the si	•	



9)	The number of complex multiplical DIT-FFT algorithms	tions require	d to calculate N-po	int DF	T using radix-2
	a) $N \log_2 N$ b) $\frac{N}{2} \log_1$	₀ N c)	N log ₁₀ N	d) $\frac{N}{2}$	log ₂ N
10)	If we modify the circular sequence sample the DFT coefficients a) Remain unchanged	b)	Shift by 4 units	l for a	k'th frequency
4.4	c) Shift by 8 units	•	Shift by 2 units		
11)	The impulse response of ideal filtea) Causalc) Non causal and finite	b)	Non causal None		
12)	To meet the magnitude response a) Select Proper Window c) Select Filter Order	b)	for a transition widtl To Select Kaiser V Select Rectangula	Vindov	1
13)	The Transformation function to be replacing S by	used for con	verting HPF to BRF	is obf	ained by
	a) $s = \frac{s^2 + \omega_0^2}{Ws}$ b) $s = \frac{s^2}{\omega_0^2}$	$\frac{+\omega_0^2}{\sigma s} \qquad c)$	$S = \frac{s^2 + W^2}{Ws}$	d) S	$=\frac{Ws}{s^2+\omega_0^2}$
14)	Specify the correct equation for ha	anning window	N		
	a) $\omega_R(n) = 1$	b)	$\omega(\textbf{n}) = 0.5 + 0.5\text{c}$	$os(2\pi$	$\begin{pmatrix} n/N-1 \end{pmatrix}$
	c) $\omega(n) = 0.42 + 0.5 \cos(2\pi n/N - 1)$) d)	$\omega(n) = 0.5 + 0.46$	cos(2	$\frac{\pi n}{N-1}$
15)	Due to the effect of coefficient qua a) False		nge in pole location True	ıs	
16)	Specify the correct equation for Bi	linear Transfo	ormation		
	a) $s = \frac{2}{T} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$ b) $s = \frac{T}{2} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$	$\left[\frac{1-Z^1}{1+Z^{-1}}\right] c)$	$s = \frac{2}{T} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$	d) s	$= \frac{T}{2} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$
17)	The binary signed number 0.1110 given by	11001 when i	rounded to eight bits	s will re	esult in numbei
	a) 0.11101111 b) 0.1110	,		,	1111111
18)	Direct Evaluation DFT requires a) $N(N-1)$ b) N^2		•		N – 1)/2
19)	IIR filter is also known asa) Cascade Structure Filterc) ARMA Filter	,	Transversal Filter AR Filter		
20)	The Number of Multiplications in F a) Finite Impulse Response c) Symmetric Nature of Impulse F	b)	Infinite Impulse Re	_	е



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B.E. (Electrical Engineering) (Part – I) Examination, 2017 **DIGITAL SIGNAL PROCESSING (Elective – I)**

Day and Date: Monday, 8-5-2017

Time: 3.00 p.m. to 6.00 p.m.

- **Instructions**: 1) **All** questions are **compulsory**.
 - 2) Figures to right indicates full marks.
 - 3) Assume suitable data if necessary.

SECTION - I

2. Attempt any four:

 $(4 \times 5 = 20)$

Marks: 80

a) Compute Circular convolution

$$x_1(n) = \{1, 3, 1, 1\}$$

$$x_2(n) = \{1, 4, 5, 3\}$$

b) Determine the Auto correlation sequence of a sequence

$$x(n) = \{1, 2, 4, 3\}$$

- c) Explain the Discrete Cosine Transform (DCT).
- d) Explain the concept of DFT as Linear Transformation.
- e) Find IDFT of Sequence

$$X(k) = \{4, 0, 0, 0\}$$

f) Explain the application of DSP in power systems.

3. Attempt any two:

 $(2\times10=20)$

a) Compare the linear convolution and circular convolution. Find linear convolution using overlap add method for the sequences.

$$x(n) = \{0.5, 2, -1.5, -1, 0, 0.75, 3, 2, 1.5, 1, -0.75, 2\}$$
 and $h(n) = \{1, 2, -1\}$

b) Determine the DFT of the given data sequence

$$x(n) = \{1,\, 0,\, 1,\, 0,\, 1,\, 0,\, 1,\, 0\}$$

By DIT-FFT Algorithm.

c) Compute 8 – point DFT of following sequence using DIF-FFT Algorithm $x(n) = \{1, 1, 1\}$.

4. Solve any four:

 $(4 \times 5 = 20)$

- a) Explain in detail Impulse Invariant Method.
- b) Derive the expression for order of the analog Butterworth filter.

c) Prove that
$$\Omega_{c} = \frac{\Omega_{p}}{(10^{0.1\alpha_{p}} - 1)^{\frac{1}{2}N}} = \frac{\Omega_{s}}{(10^{0.1\alpha_{s}} - 1)^{\frac{1}{2}N}}$$
.



- d) Compare the Triangular and hanning windows.
- e) Compare FIR and IIR Filter.
- f) Explain finite word length effect in IIR filter.
- 5. Solve any two:

 $(2 \times 10 = 20)$

a) Design an ideal low pass filter with a frequency response using rectangular window

$$Hd(e^{j\,\omega})=1 \text{ for } -\frac{\pi}{2}\leq \omega \leq \frac{\pi}{2}$$

= 0 otherwise

Find the values of h(n) for N = 11 and Plot the frequency response.

- b) Convert the analog filter into a digital filter whose system function is $H(s) = \frac{s + 0.2}{(s + 0.2)^2 + 9}$. Use impulse invariant method for T=1 sec.
- c) Apply Bilinear transformation to $H(s) = \frac{1}{(s+1)(s+3)}$ and T = 0.1 Sec.

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-	Date: Monday, 8-5-20 00 p.m. to 6.00 p.m.	17		Max. Marks: 100
	An 2) Ar	swer book Page No. 3 aswer MCQ/Objectiv	y. It should be solved in 3. Each question carries we type questions on P. Set (P/Q/R/S) on To	s one mark. Page No. 3 only. Don't
		MCQ/Objective Ty	pe Questions	
Duration	: 30 Minutes			Marks : 20
1. Cho	oose the correct answe	r:		(1×20=20)
1)	Specify the correct equ	uation for Bilinear Tra	nsformation	
	a) $s = \frac{2}{T} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$	b) $s = \frac{T}{2} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$	c) $s = \frac{2}{T} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$	d) $s = \frac{T}{2} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$
2)	The binary signed numgiven by		en rounded to eight bit	
3)	Direct Evaluation DFT a) N(N – 1)	,	•	ns.
4)	IIR filter is also known a) Cascade Structure c) ARMA Filter		b) Transversal Filter d) AR Filter	
5)	The Number of Multipl a) Finite Impulse Res c) Symmetric Nature	ponse	b) Infinite Impulse Re	_
6)	The number of stages 512 point sequence is a) 8	·		utation of the DFT of a
7)	Circular time shift of a a) Multiplication of the b) Multiplication of the c) Multiplication of the d) None	sequence is equivale e sequence X(k) with e sequence x(n) with	ent to complex exponential complex exponential	-,
8)	DIT algorithm related to a) x(k) shuffled c) x(k) and x(n) shuff		b) x(n) shuffled d) none	



9)	FFT algorithm calculates a) DTFT b) DCT	c) DFT	d)	DST
10)	Correlation is basically used to a) Add two signals c) Compare two signals	•	t two signals	
11)	If the system is described by $y(n) = x(n)^2$ a) Linear b) Non Linear		eneous d)	None of above
12)	 When aliasing occurs a) Low frequency become a high frequency b) High frequency become a mid frequency c) High frequencies above signal bandwidth d) None 	ncy	low frequenci	es below signal
13)	Transform domain used as a) Enhance the signalc) Reduce the data points	, .	ess the signal es the data po	pints
14)	The number of complex multiplications reDIT-FFT algorithms	equired to calc	ulate N-point	DFT using radix-2
	a) $N \log_2 N$ b) $\frac{N}{2} \log_{10} N$	c) N log ₁₀	N d)	$\frac{N}{2} \log_2 N$
15)	If we modify the circular sequence by r sample the DFT coefficients a) Remain unchanged c) Shift by 8 units	nultiplying it w b) Shift by d) Shift by	4 units	r a k'th frequency
16)	The impulse response of ideal filter is a) Causalc) Non causal and finite	b) Non cau	ısal	
17)	To meet the magnitude response specific a) Select Proper Window c) Select Filter Order	b) To Sele	sition width, c ct Kaiser Win Rectangular W	dow
18)	The Transformation function to be used f replacing S by	or converting H	IPF to BRF is	obtained by
	a) $s = \frac{s^2 + \omega_0^2}{Ws}$ b) $s = \frac{s^2 + \omega_0^2}{\omega s}$	c) $S = \frac{s^2}{V}$	$\frac{+W^2}{Vs}$ d)	$S = \frac{Ws}{s^2 + \omega_0^2}$
19)	Specify the correct equation for hanning	window		
	a) $\omega_R(n) = 1$	b) ⊕(n) = (0.5 + 0.5 cos	$\left(2\pi n / N - 1\right)$
	c) $\omega(n) = 0.42 + 0.5 \cos(2\pi n / N - 1)$	d) $\omega(n) = 0$	0.5 + 0.46 cos	$s\left(\frac{2\pi n}{N-1}\right)$
20)	Due to the effect of coefficient quantization a) False	on change in po b) True	ole locations	



Seat	
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B.E. (Electrical Engineering) (Part – I) Examination, 2017 **DIGITAL SIGNAL PROCESSING (Elective – I)**

Day and Date: Monday, 8-5-2017

Time: 3.00 p.m. to 6.00 p.m.

- **Instructions**: 1) **All** questions are **compulsory**.
 - 2) Figures to right indicates full marks.
 - 3) Assume suitable data if necessary.

SECTION - I

2. Attempt any four:

 $(4 \times 5 = 20)$

Marks: 80

a) Compute Circular convolution

$$x_1(n) = \{1, 3, 1, 1\}$$

$$x_2(n) = \{1, 4, 5, 3\}$$

b) Determine the Auto correlation sequence of a sequence

$$x(n) = \{1, 2, 4, 3\}$$

- c) Explain the Discrete Cosine Transform (DCT).
- d) Explain the concept of DFT as Linear Transformation.
- e) Find IDFT of Sequence

$$X(k) = \{4, 0, 0, 0\}$$

f) Explain the application of DSP in power systems.

3. Attempt any two:

 $(2\times10=20)$

a) Compare the linear convolution and circular convolution. Find linear convolution using overlap add method for the sequences.

$$x(n) = \{0.5, 2, -1.5, -1, 0, 0.75, 3, 2, 1.5, 1, -0.75, 2\}$$
 and $h(n) = \{1, 2, -1\}$

b) Determine the DFT of the given data sequence

$$x(n) = \{1, 0, 1, 0, 1, 0, 1, 0\}$$

By DIT-FFT Algorithm.

c) Compute 8 – point DFT of following sequence using DIF-FFT Algorithm $x(n) = \{1, 1, 1\}$.

4. Solve any four:

 $(4 \times 5 = 20)$

- a) Explain in detail Impulse Invariant Method.
- b) Derive the expression for order of the analog Butterworth filter.

c) Prove that
$$\Omega_{c} = \frac{\Omega_{p}}{(10^{0.1\alpha_{p}} - 1)^{\frac{1}{2}N}} = \frac{\Omega_{s}}{(10^{0.1\alpha_{s}} - 1)^{\frac{1}{2}N}}$$
.



- d) Compare the Triangular and hanning windows.
- e) Compare FIR and IIR Filter.
- f) Explain finite word length effect in IIR filter.
- 5. Solve **any two**:

 $(2 \times 10 = 20)$

a) Design an ideal low pass filter with a frequency response using rectangular window

$$Hd(e^{j\,\omega})=1 \text{ for } -\frac{\pi}{2}\leq \omega \leq \frac{\pi}{2}$$

Find the values of h(n) for N = 11 and Plot the frequency response.

- b) Convert the analog filter into a digital filter whose system function is $H(s) = \frac{s + 0.2}{(s + 0.2)^2 + 9}$. Use impulse invariant method for T=1 sec.
- c) Apply Bilinear transformation to $H(s) = \frac{1}{(s+1)(s+3)}$ and T = 0.1 Sec.



Seat	
No.	

B.E. (Electrical Engineering) (Part – I) Examination, 2017 **DIGITAL SIGNAL PROCESSING (Elective – I)**

Day and Date: Monday, 8-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each guestion carries one mark.

> 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

1. Choose the correct answer:

 $(1\times20=20)$

- 1) The impulse response of ideal filter is
 - a) Causal

b) Non causal

c) Non causal and finite

- d) None
- 2) To meet the magnitude response specification for a transition width, one has to
 - a) Select Proper Window

b) To Select Kaiser Window

c) Select Filter Order

- d) Select Rectangular Window
- 3) The Transformation function to be used for converting HPF to BRF is obtained by replacing S by

a)
$$s = \frac{s^2 + \omega_0^2}{Ws}$$

b)
$$s = \frac{s^2 + \omega_0^2}{\omega s}$$

c)
$$S = \frac{s^2 + W^2}{Ws}$$

a)
$$s = \frac{s^2 + \omega_0^2}{Ws}$$
 b) $s = \frac{s^2 + \omega_0^2}{\omega s}$ c) $S = \frac{s^2 + W^2}{Ws}$ d) $S = \frac{Ws}{s^2 + \omega_0^2}$

4) Specify the correct equation for hanning window

a)
$$\omega_{\rm B}(n)=1$$

b)
$$\omega(n) = 0.5 + 0.5 \cos(2\pi n / N - 1)$$

c)
$$\omega(n) = 0.42 + 0.5 \cos(\frac{2\pi n}{N-1})$$

d)
$$\omega(n) = 0.5 + 0.46 \cos(2\pi n / N - 1)$$

- 5) Due to the effect of coefficient quantization change in pole locations
 - a) False

- b) True
- 6) Specify the correct equation for Bilinear Transformation

a)
$$s = \frac{2}{T} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$$

a)
$$s = \frac{2}{T} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$$
 b) $s = \frac{T}{2} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$ c) $s = \frac{2}{T} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$ d) $s = \frac{T}{2} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$

c)
$$s = \frac{2}{T} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$$

d)
$$s = \frac{T}{2} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$$

- 7) The binary signed number 0.111011001 when rounded to eight bits will result in number given by
 - a) 0.11101111
- b) 0.11101101
- c) 0.10101010
- d) 0.11111111



8)	Direct Evaluation DFT a) $N(N-1)$	require b) N ²			mplex multiplication N(N+1)		N(N – 1)/2
9)	IIR filter is also known a) Cascade Structure c) ARMA Filter			,	Transversal Filter AR Filter		
10)	The Number of Multipl a) Finite Impulse Res c) Symmetric Nature	ponse	-	b)	Infinite Impulse Re	-	onse
11)	The number of stages 512 point sequence is		computations		•		
12)	a) 8Circular time shift of aa) Multiplication of theb) Multiplication of thec) Multiplication of thed) None	e seque e seque	ence X(k) with once x(n) with o	con	o nplex exponential nplex exponential	d)	
13)	DIT algorithm related to a) x(k) shuffled c) x(k) and x(n) shuffl			,	x(n) shuffled none		
14)	FFT algorithm calculat a) DTFT	es b) DC	T	c)	DFT	d)	DST
15)	Correlation is basically a) Add two signals c) Compare two signal		0	-	Subtract two signations None	als	
16)	If the system is described a) Linear		y(n) = x(n) ² n Linear	c)	Homogeneous	d)	None of above
17)	When aliasing occursa) Low frequency bedb) High frequency bedc) High frequencies a bandwidthd) None	come a	mid frequency	/	ecomes low freque	ncie	es below signal
18)	Transform domain use a) Enhance the signa c) Reduce the data po	l		,	Compress the signal increases the data		ints
19)	The number of complete DIT-FFT algorithms	ex multi	plications requ	uire	d to calculate N-po	int I	DFT using radix-2
	a) N log ₂ N	b) $\frac{N}{2}$	log ₁₀ N	c)	N log ₁₀ N	d)	$\frac{N}{2} \log_2 N$
20)	If we modify the circusample the DFT coeffica) Remain unchanged c) Shift by 8 units	cients	uence by mul	b)	ying it with e ^{j8πk/N} Shift by 4 units Shift by 2 units	l foi	r a k'th frequency



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B.E. (Electrical Engineering) (Part – I) Examination, 2017 **DIGITAL SIGNAL PROCESSING (Elective – I)**

Day and Date: Monday, 8-5-2017

Time: 3.00 p.m. to 6.00 p.m.

- **Instructions**: 1) **All** questions are **compulsory**.
 - 2) Figures to right indicates full marks.
 - 3) Assume suitable data if necessary.

SECTION - I

2. Attempt any four:

 $(4 \times 5 = 20)$

Marks: 80

a) Compute Circular convolution

$$x_1(n) = \{1, 3, 1, 1\}$$

 $x_2(n) = \{1, 4, 5, 3\}$

b) Determine the Auto correlation sequence of a sequence

$$x(n) = \{1, 2, 4, 3\}$$

- c) Explain the Discrete Cosine Transform (DCT).
- d) Explain the concept of DFT as Linear Transformation.
- e) Find IDFT of Sequence

$$X(k) = \{4, 0, 0, 0\}$$

f) Explain the application of DSP in power systems.

3. Attempt any two:

 $(2\times10=20)$

a) Compare the linear convolution and circular convolution. Find linear convolution using overlap add method for the sequences.

$$x(n) = \{0.5, 2, -1.5, -1, 0, 0.75, 3, 2, 1.5, 1, -0.75, 2\}$$
 and $h(n) = \{1, 2, -1\}$

b) Determine the DFT of the given data sequence

$$x(n) = \{1,\, 0,\, 1,\, 0,\, 1,\, 0,\, 1,\, 0\}$$

By DIT-FFT Algorithm.

c) Compute 8 – point DFT of following sequence using DIF-FFT Algorithm $x(n) = \{1, 1, 1\}$.

4. Solve any four:

 $(4 \times 5 = 20)$

- a) Explain in detail Impulse Invariant Method.
- b) Derive the expression for order of the analog Butterworth filter.

c) Prove that
$$\Omega_{c} = \frac{\Omega_{p}}{(10^{0.1\alpha_{p}} - 1)^{\frac{1}{2}N}} = \frac{\Omega_{s}}{(10^{0.1\alpha_{s}} - 1)^{\frac{1}{2}N}}$$
.



- d) Compare the Triangular and hanning windows.
- e) Compare FIR and IIR Filter.
- f) Explain finite word length effect in IIR filter.
- 5. Solve any two:

 $(2 \times 10 = 20)$

a) Design an ideal low pass filter with a frequency response using rectangular window

$$Hd(e^{j\,\omega})=1 \text{ for } -\frac{\pi}{2}\leq \omega \leq \frac{\pi}{2}$$

= 0 otherwise

Find the values of h(n) for N = 11 and Plot the frequency response.

- b) Convert the analog filter into a digital filter whose system function is $H(s) = \frac{s + 0.2}{(s + 0.2)^2 + 9}$. Use impulse invariant method for T=1 sec.
- c) Apply Bilinear transformation to $H(s) = \frac{1}{(s+1)(s+3)}$ and T = 0.1 Sec.

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No.						° [3]
	•		•	(Part – I) Examir CESSING (Electi		
-	nd Date : Monday, 3.00 p.m. to 6.00 p				Max.	Marks : 100
	Instructions :	Answer 2) Answer	r book Page No. e r MCQ/Objecti	3. Each question of	s on Page No. 3 or	
		М	CQ/Objective T	ype Questions		
Durati	on : 30 Minutes					Marks : 20
1. C	hoose the correct	answer:				(1×20=20)
	 If the system is a) Linear 		oy y(n) = x(n) ² Non Linear	c) Homogeneou	us d) None of at	oove
:	b) High freque	ncy become ncy become	a high frequen e a mid frequen e signal bandwid	су	requencies below si	gnal
;	3) Transform domaa) Enhance thec) Reduce the	e signal		b) Compress the	_	
•	 The number of DIT-FFT algorit 	•	ultiplications red	quired to calculate	N-point DFT using	radix-2
	a) N log ₂ N	b)	$\frac{N}{2} \log_{10} N$	c) N log ₁₀ N	d) $\frac{N}{2} \log_2 N$	
	5) If we modify th sample the DFT a) Remain und c) Shift by 8 ur	coefficient hanged		ultiplying it with e ^{jt} b) Shift by 4 uni d) Shift by 2 uni		quency
(6) The impulse res a) Causal c) Non causal	•	eal filter is	b) Non causal d) None		
	7) To meet the ma a) Select Prop c) Select Filter	er Window	ponse specifica	tion for a transition b) To Select Ka d) Select Recta	iser Window	



8)	The Transformation function to be used for converting HPF to BRF is obtained by
	replacing S by

a)
$$s = \frac{s^2 + \omega_0^2}{Ws}$$

b)
$$s = \frac{s^2 + \omega_0^2}{\omega s}$$

a)
$$s = \frac{s^2 + \omega_0^2}{Ws}$$
 b) $s = \frac{s^2 + \omega_0^2}{\omega s}$ c) $S = \frac{s^2 + W^2}{Ws}$ d) $S = \frac{Ws}{s^2 + \omega_0^2}$

$$d) S = \frac{Ws}{s^2 + \omega_0^2}$$

a)
$$\omega_R(n) = 1$$

b)
$$\omega(n) = 0.5 + 0.5 \cos(2\pi n / N - 1)$$

c)
$$\omega(n) = 0.42 + 0.5 \cos(2\pi n / N - 1)$$

c)
$$\omega(n) = 0.42 + 0.5 \cos(2\pi n / N - 1)$$
 d) $\omega(n) = 0.5 + 0.46 \cos(2\pi n / N - 1)$

10) Due to the effect of coefficient quantization change in pole locations

a) False

11) Specify the correct equation for Bilinear Transformation

a)
$$s = \frac{2}{T} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$$

a)
$$s = \frac{2}{T} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$$
 b) $s = \frac{T}{2} \left[\frac{1 - Z^1}{1 + Z^{-1}} \right]$ c) $s = \frac{2}{T} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$ d) $s = \frac{T}{2} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$

c)
$$s = \frac{2}{T} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$$

d)
$$s = \frac{T}{2} \left[\frac{1 - Z^{-1}}{1 + Z^{-1}} \right]$$

12) The binary signed number 0.111011001 when rounded to eight bits will result in number given by

a) 0.11101111

b) 0.11101101

c) 0.10101010

d) 0.11111111

13) Direct Evaluation DFT requires _____ complex multiplications.

a) N(N - 1)

b) N²

c) N(N+1)

d) N(N-1)/2

14) IIR filter is also known as

a) Cascade Structure Filter

b) Transversal Filter

c) ARMA Filter

d) AR Filter

15) The Number of Multiplications in FIR system can be reduced using

a) Finite Impulse Response

b) Infinite Impulse Response

c) Symmetric Nature of Impulse Response d) None of above

16) The number of stages of FFT computations required for the computation of the DFT of a 512 point sequence is

a) 8

b) 9

c) 6

d) 7

17) Circular time shift of a sequence is equivalent to

- a) Multiplication of the sequence X(k) with complex exponential
- b) Multiplication of the sequence x(n) with complex exponential
- c) Multiplication of the sequence x(n) with exponential factor
- d) None

18) DIT algorithm related to

a) x(k) shuffled

b) x(n) shuffled

c) x(k) and x(n) shuffled

d) none

19) FFT algorithm calculates

a) DTFT

b) DCT

c) DFT

d) DST

20) Correlation is basically used to

a) Add two signals

b) Subtract two signals

c) Compare two signals

d) None



Seat	
No.	

B.E. (Electrical Engineering) (Part – I) Examination, 2017 **DIGITAL SIGNAL PROCESSING (Elective – I)**

Day and Date: Monday, 8-5-2017

Time: 3.00 p.m. to 6.00 p.m.

- **Instructions**: 1) **All** questions are **compulsory**.
 - 2) Figures to right indicates full marks.
 - 3) Assume suitable data if necessary.

SECTION - I

2. Attempt any four:

 $(4 \times 5 = 20)$

Marks: 80

a) Compute Circular convolution

$$x_1(n) = \{1, 3, 1, 1\}$$

$$x_2(n) = \{1, 4, 5, 3\}$$

b) Determine the Auto correlation sequence of a sequence

$$x(n) = \{1, 2, 4, 3\}$$

- c) Explain the Discrete Cosine Transform (DCT).
- d) Explain the concept of DFT as Linear Transformation.
- e) Find IDFT of Sequence

$$X(k) = \{4, 0, 0, 0\}$$

f) Explain the application of DSP in power systems.

3. Attempt any two:

 $(2\times10=20)$

a) Compare the linear convolution and circular convolution. Find linear convolution using overlap add method for the sequences.

$$x(n) = \{0.5, 2, -1.5, -1, 0, 0.75, 3, 2, 1.5, 1, -0.75, 2\}$$
 and $h(n) = \{1, 2, -1\}$

b) Determine the DFT of the given data sequence

$$x(n) = \{1, 0, 1, 0, 1, 0, 1, 0\}$$

By DIT-FFT Algorithm.

c) Compute 8 – point DFT of following sequence using DIF-FFT Algorithm $x(n) = \{1, 1, 1\}$.

4. Solve any four:

 $(4 \times 5 = 20)$

- a) Explain in detail Impulse Invariant Method.
- b) Derive the expression for order of the analog Butterworth filter.

c) Prove that
$$\Omega_{c} = \frac{\Omega_{p}}{(10^{0.1\alpha_{p}} - 1)^{\frac{1}{2}N}} = \frac{\Omega_{s}}{(10^{0.1\alpha_{s}} - 1)^{\frac{1}{2}N}}$$
.



- d) Compare the Triangular and hanning windows.
- e) Compare FIR and IIR Filter.
- f) Explain finite word length effect in IIR filter.
- 5. Solve any two:

 $(2 \times 10 = 20)$

a) Design an ideal low pass filter with a frequency response using rectangular window

$$Hd(e^{j\,\omega})=1 \text{ for } -\frac{\pi}{2}\leq \omega \leq \frac{\pi}{2}$$

= 0 otherwise

Find the values of h(n) for N = 11 and Plot the frequency response.

- b) Convert the analog filter into a digital filter whose system function is $H(s) = \frac{s + 0.2}{(s + 0.2)^2 + 9}$. Use impulse invariant method for T=1 sec.
- c) Apply Bilinear transformation to $H(s) = \frac{1}{(s+1)(s+3)}$ and T = 0.1 Sec.

Seat No.	Set	Р
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B.E. (Electrical) (Part – I) Examination, 2017 **ENERGY AUDIT AND MANAGEMENT (Elective – I)**

Day and Date: Monday, 8-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.

> 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

1. Choose the correct answer:

 $(20 \times 1 = 20)$

- 1) The pay period is defined as the ratio of
 - A) Net investment to the net annual cash flow
 - B) Net investment to the capital cost
 - C) Net annual cash flow to the capital cost
 - D) Net annual savings to the capital cost
- 2) Power factor of a load can be improved by using
 - A) Static capacitors

B) Synchronous condenser

C) Phase advancer

A) SOx and NOx

- D) All of the above
- 3) Acid rain is caused by the release of the following components from combustion of fuels
- B) Sox and CO₂ C) CO2 and NOx D) H₂O
- 4) LNG stands for
 - A) Liquefied Natural Gas
- B) Liquid Natural Gas
- C) Low Nitrogen Content Gas
- D) Liquid Nitrogen Gas
- 5) Energy management is a key component of
 - A) Environmental management
- B) Carbon management
- C) Nitrogen management
- D) Water management
- 6) Demand Side Management is required to
 - A) Reduce overall cost of installed capacity
 - B) Reduce needs of peaking station
 - C) Ensure quality and equity of supply
 - D) All of the above
- 7) In the balance of process, recycle product is always considered as
 - A) Input to process

B) Output to process

C) Both A) and B)

- D) None of above
- 8) 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

P.T.O.



9)	What do you mean by 'toe'?				
•	A) Total oil equivalent	B)	Tons of effluent		
	C) Tons of oil equivalent	D)	None of the above	/e	
10)	The main objective of energy managem	ent	is to		
	A) Minimize energy cost				
	B) Minimum environmental effect				
	C) Maintain optimum energy procureme	ent	and utilization		
	D) All of the above				
11)	Explanation of energy conservation in r				in
	A) 1936 energy crisis	,	1972 energy cris		
	C) 1973 energy crisis	D)	1986 energy cris	IS	
12)	EPRI stands for	D)	Electrical Devices	Б	anion Instituta
	A) European Power Research Institute	•			
10\	C) Electrical Power Research Institute	-			
13)	The capital cost of generating equipmer system comes under	π, ι	ransmission syste	erri a	สาด ดเรเทยนแอก
	•	R)	Running capital		
	C) Both fixed and running capital	,	U 1		
14)	The sum of money received or paid in a	,		e ir	stallments, for a
,	given period of time is known as	α		·	otaminormo, for a
	A) Time value of money	B)	Annuity		
	C) True compounding	D)	Cash flow		
15)	The future value of one dollar in "n" period	ods	at interest rate of	"["	oresent is known
	as				
	A) Single payment compound amount				
	C) Uniform series compound amount	D)	Sinking fund pay	me	nt
16)	The watt less component is				
	A) I B) $I\cos\phi$	C)	Isin∳	D)	None of these
17)	Projected temperature increase in degre	e c	entigrade 2100 du	ie to	o climate change
	is				
	A) 2 B) 3	C)	4	D)	5
18)	Sankey diagram is an useful tool to repr				_
	A) Financial strength of the company		•		
	C) Input and output energy flow	•	Human resource	str	ength
19)	Infrared thermometer is used to measure				
	A) Surface temperature		Flame temperatu		IKO.
00/	C) Flue gas temperature	•	Hot water temper	all	ii C
∠∪)	Losses in material and energy balance				
	A) Inputs C) Both A) and B)		Outputs None of the above	<u> </u>	
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Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ENERGY AUDIT AND MANAGEMENT (Elective – I)

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Give salient features of energy Conservation Act, 2001.
- 2) State the responsibilities and duties of energy manager.
- 3) Explain demand side management concept with advantages and disadvantages.
- 4) What is energy management? Discuss the principles of energy management?
- 5) How power factor penalties and incentives in tariff help DSM?

3. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Discuss United Nations Framework Convention on Climate Change.
- 2) Write a note on format of energy policy.
- 3) Explain the role of FACTS, VAR compensation in supply side management.

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) What is internal and external benchmarking? What are the benefits of benchmarking energy performance?
- 2) Explain technical means for T and D loss minimization.
- 3) Write a note on time value of money.
- 4) What is necessity of energy audit? Explain phases of energy audit.
- 5) How cogeneration leads the energy conservation?

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) What are the objectives of carrying out sensitivity analysis? What are the different factors that are considered for the sensitivity analysis?
- 2) Explain the following techniques with their use for energy analysis.
 - a) Sankey diagram
 - b) CUSUM technique.
- 3) Explain the energy conservation in motive power application.

_____ Set P

	Seat No.		Set	Q
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	No.						Set	Q
			(Electrical) (I Y AUDIT AND				·	
	•	d Date : Monday 3.00 p.m. to 6.00				Max.	Mark	s:100
			2) Answer MCQ	k Page No / Objective	o. 3 . Each questi	ion carries on s on Page No.	e mari 3 onl	k. y.
Dι	uratio	n : 30 Minutes	MCQ/Obje	ctive Type	Questions		Mar	ks : 20
1	. Ch	oose the correct	answer:				(20×	(1= 20)
	1)	The watt less co	omponent is					
		A) I	B) I cos ∳	C)	I sin ∳	D) None of	these	
	2)	Projected temporis	erature increase i	n degree c	entigrade 2100 c	due to climate	chang	je
		A) 2	B) 3	C)		D) 5		
	3)	• •	n is an useful too	•				
		C) Input and ou	rength of the com utput energy flow	D)	Management p Human resourc			
	4)		meter is used to r		E L			
		A) Surface temC) Flue gas ter	•	,	Flame temperare Hot water temperare			
	5)	, •	rial and energy b	,	•	Ciataic		
	٥,	A) Inputs	na and energy s		Outputs			
		C) Both A) and	B)	D)	None of the abo	ove		
	6)		is defined as the					
		,	ent to the net anr ent to the capital		OW			
		•	cash flow to the c					
		D) Net annual	savings to the cap	pital cost				
	7)		a load can be im		•			
		A) Static capacC) Phase adva			Synchronous can All of the above			
	8)	,	sed by the releas	,			bustic	n
	,	of fuels	-					
	۵)	A) SOx and NO	Ox B) Sox and	CO ₂ C)	CO2 and NOx	D) H ₂ O		
	9)	LNG stands for A) Liquefied Na	atural Gas	D/	Liquid Natural (3 29		
		C) Low Nitroge		,	Liquid Natural C			DTO



10) Energy management is a key compone	
	A) Environmental management	•
	C) Nitrogen management	D) Water management
11) Demand Side Management is required	to
	A) Reduce overall cost of installed cap	acity
	B) Reduce needs of peaking station	·
	C) Ensure quality and equity of supply	
	D) All of the above	
12) In the balance of process, recycle produ	uct is always considered as
	A) Input to process	B) Output to process
	C) Both A) and B)	D) None of above
13	, , ,	expressed in a formal written declaration
10	of commitment. This is called	expressed in a formal written deciaration
	A) Company policy	B) Management policy
	C) Energy policy	D) Energy efficiency
1/) What do you mean by 'toe' ?	b) Energy emolericy
14	A) Total oil equivalent	B) Tons of effluent
	C) Tons of oil equivalent	D) None of the above
	•	•
15) The main objective of energy managem	nent is to
	A) Minimize energy cost	
	B) Minimum environmental effect	
	C) Maintain optimum energy procurem	ent and utilization
	D) All of the above	
16) Explanation of energy conservation in r	motive power application in
	A) 1936 energy crisis	B) 1972 energy crisis
	C) 1973 energy crisis	D) 1986 energy crisis
17) EPRI stands for	,
	A) European Power Research Institute	B) Electrical Power Russian Institute
	, .	D) Electrical Power Research Industries
19) The capital cost of generating equipme	•
10	system comes under	itt, transmission system and distribution
	A) Fixed capital	B) Running capital
	, ·	,
	C) Both fixed and running capital	D) All of these
19	•	annual in one or more installments, for a
	given period of time is known as	
	A) Time value of money	B) Annuity
	C) True compounding	D) Cash flow
20) The future value of one dollar in "n" peri	ods 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.	

B.E. (Electrical) (Part – I) Examination, 2017 ENERGY AUDIT AND MANAGEMENT (Elective – I)

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Give salient features of energy Conservation Act, 2001.
- 2) State the responsibilities and duties of energy manager.
- 3) Explain demand side management concept with advantages and disadvantages.
- 4) What is energy management? Discuss the principles of energy management?
- 5) How power factor penalties and incentives in tariff help DSM?

3. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Discuss United Nations Framework Convention on Climate Change.
- 2) Write a note on format of energy policy.
- 3) Explain the role of FACTS, VAR compensation in supply side management.

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) What is internal and external benchmarking? What are the benefits of benchmarking energy performance?
- 2) Explain technical means for T and D loss minimization.
- 3) Write a note on time value of money.
- 4) What is necessity of energy audit? Explain phases of energy audit.
- 5) How cogeneration leads the energy conservation?

5. Attempt any two:

 $(10 \times 2 = 20)$

Set Q

- 1) What are the objectives of carrying out sensitivity analysis? What are the different factors that are considered for the sensitivity analysis?
- 2) Explain the following techniques with their use for energy analysis.
 - a) Sankey diagram
 - b) CUSUM technique.
- 3) Explain the energy conservation in motive power application.

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Seat No.						Set	R
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	B.E. (Electrical) (Part – ENERGY AUDIT AND MAN		
•	l Date : Monday, 8-5-2017 .00 p.m. to 6.00 p.m.	Max. Marks :	100
I	in Answer book Page 2) Answer MCQ/Objec	ory. It should be solved in first 30 minutes on No. 3. Each question carries one mark. tive type questions on Page No. 3 only. tion, Q.P. Set (P/Q/R/S) on Top of Page.	
	MCQ/Objective T	ype Questions	
Duration	n : 30 Minutes	Marks	: 20
1. Ch	pose the correct answer :	(20×1=	:20)
·	Explanation of energy conservation in r A) 1936 energy crisis C) 1973 energy crisis EPRI stands for	motive power application in B) 1972 energy crisis D) 1986 energy crisis	
,	A) European Power Research InstituteC) Electrical Power Research Institute	D) Electrical Power Research Industries	
,	The capital cost of generating equipment system comes under A) Fixed capital C) Both fixed and running capital	B) Running capital D) All of these	
4)	The sum of money received or paid in a given period of time is known as A) Time value of money C) True compounding	annual in one or more installments, for a B) Annuity D) Cash flow	
	The future value of one dollar in "n" periods A) Single payment compound amount C) Uniform series compound amount The watt less component is	,	
,	A) Ι B) Ι cos φ	C) I sin ϕ D) None of these	
7)	is	ee centigrade 2100 due to climate change	
a `	A) 2 B) 3	C) 4 D) 5	
8)	Sankey diagram is an useful tool to report A) Financial strength of the company C) Input and output energy flow		



9)	Infrared thermometer is used to measure		
			Flame temperature
10\	,	,	Hot water temperature
10)	Losses in material and energy balance A) Inputs		Outputs
	C) Both A) and B)	,	None of the above
11)	The pay period is defined as the ratio of	•	Trong of the above
,	A) Net investment to the net annual cas		OW
	B) Net investment to the capital cost		
	C) Net annual cash flow to the capital c		
4.0\	D) Net annual savings to the capital cos		veie e
12)	Power factor of a load can be improved A) Static capacitors	•	using Synchronous condenser
	C) Phase advancer	,	All of the above
13)	Acid rain is caused by the release of the	,	
,	of fuels		
	A) SOx and NOx B) Sox and CO ₂	C)	CO2 and NOx D) H ₂ O
14)	LNG stands for	D)	Liquid Natural Coo
	A) Liquefied Natural GasC) Low Nitrogen Content Gas	,	Liquid Natural Gas
15)	Energy management is a key componer	,	
.0,	A) Environmental management		
	,	,	Water management
16)	Demand Side Management is required		
	A) Reduce overall cost of installed capa	acity	У
	B) Reduce needs of peaking stationC) Ensure quality and equity of supply		
	D) All of the above		
17)	In the balance of process, recycle produ	ıct i	s always considered as
	A) Input to process	,	Output to process
4.0\	C) Both A) and B)	•	None of above
18)	The support for energy management is of commitment. This is called	exp	ressed in a formal written declaration
	A) Company policy	B)	Management policy
	C) Energy policy		Energy efficiency
19)	What do you mean by 'toe'?		
	A) Total oil equivalent	,	Tons of effluent
\	C) Tons of oil equivalent	,	None of the above
20)	The main objective of energy managem	ent	is to
	A) Minimize energy costB) Minimum environmental effect		
	C) Maintain optimum energy procureme	ent :	and utilization
	D) All of the above		



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ENERGY AUDIT AND MANAGEMENT (Elective – I)

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Give salient features of energy Conservation Act, 2001.
- 2) State the responsibilities and duties of energy manager.
- 3) Explain demand side management concept with advantages and disadvantages.
- 4) What is energy management? Discuss the principles of energy management?
- 5) How power factor penalties and incentives in tariff help DSM?

3. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Discuss United Nations Framework Convention on Climate Change.
- 2) Write a note on format of energy policy.
- 3) Explain the role of FACTS, VAR compensation in supply side management.

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) What is internal and external benchmarking? What are the benefits of benchmarking energy performance?
- 2) Explain technical means for T and D loss minimization.
- 3) Write a note on time value of money.
- 4) What is necessity of energy audit? Explain phases of energy audit.
- 5) How cogeneration leads the energy conservation?

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) What are the objectives of carrying out sensitivity analysis? What are the different factors that are considered for the sensitivity analysis?
- 2) Explain the following techniques with their use for energy analysis.
 - a) Sankey diagram
 - b) CUSUM technique.
- 3) Explain the energy conservation in motive power application.

Set R

Seat	
No.	

Set S

B.E. (Electrical) (Part – I) Examination, 2017 ENERGY AUDIT AND MANAGEMENT (Elective – I)

Day and Date: Monday, 8-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

1. Choose the correct answer:

 $(20 \times 1 = 20)$

- 1) Demand Side Management is required to
 - A) Reduce overall cost of installed capacity
 - B) Reduce needs of peaking station
 - C) Ensure quality and equity of supply
 - D) All of the above
- 2) In the balance of process, recycle product is always considered as
 - A) Input to process

B) Output to process

C) Both A) and B)

- D) None of above
- 3) 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
- 4) What do you mean by 'toe'?
 - A) Total oil equivalent

- B) Tons of effluent
- C) Tons of oil equivalent
- D) None of the above
- 5) The main objective of energy management is to
 - A) Minimize energy cost
 - B) Minimum environmental effect
 - C) Maintain optimum energy procurement and utilization
 - D) All of the above
- 6) Explanation of energy conservation in motive power application in
 - A) 1936 energy crisis

B) 1972 energy crisis

C) 1973 energy crisis

D) 1986 energy crisis

- 7) EPRI stands for
 - A) European Power Research Institute B) Electrical Power Russian Institute
 - C) Electrical Power Research Institute D) Electrical Power Research Industries



8)	The capital cost of generating equipment, transmission system and distribution system comes under			
	A) Fixed capital	B) Running capital		
	C) Both fixed and running capital	, .		
9)	The sum of money received or paid in annual in one or more installments, for a			
Ο,	given period of time is known as	annual in one or more inclaimed ne, for a		
	A) Time value of money	B) Annuity		
	C) True compounding	D) Cash flow		
10)	The future value of one dollar in "n" period	ods at interest rate of "I" present is known		
,	as	·		
	A) Single payment compound amount	, - , , ,		
	C) Uniform series compound amount	D) Sinking fund payment		
11)	The watt less component is			
	A) I B) $I\cos\phi$	C) I $\sin \phi$ D) None of these		
12)	Projected temperature increase in degree centigrade 2100 due to climate change			
	is B) 0	0) 4		
40\	A) 2 B) 3	C) 4 D) 5		
13)	Sankey diagram is an useful tool to repr			
	A) Financial strength of the company			
4 4\		D) Human resource strength		
14)	Infrared thermometer is used to measure A) Surface temperature	e B) Flame temperature		
	C) Flue gas temperature	D) Hot water temperature		
15)	Losses in material and energy balance	•		
10)	A) Inputs	B) Outputs		
	C) Both A) and B)	D) None of the above		
16)	The pay period is defined as the ratio of	,		
-,	A) Net investment to the net annual cash flow			
	B) Net investment to the capital cost			
	C) Net annual cash flow to the capital c	eost		
	D) Net annual savings to the capital cos			
17)	Power factor of a load can be improved	-		
	A) Static capacitors	B) Synchronous condenser		
	C) Phase advancer	D) All of the above		
18)		e following components from combustion		
	of fuels A) SOv and NOv. B) Sov and CO.	C) CO3 and NOv. D) H O		
10\	A) SOx and NOx B) Sox and CO ₂	C) CO2 and NOX D) H ₂ O		
19)	LNG stands for A) Liquefied Natural Gas	R) Liquid Natural Gas		
	C) Low Nitrogen Content Gas	B) Liquid Natural GasD) Liquid Nitrogen Gas		
201	Energy management is a key componer	, .		
(۵	A) Environmental management	B) Carbon management		
	C) Nitrogen management	D) Water management		
	, 5	,		



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 ENERGY AUDIT AND MANAGEMENT (Elective – I)

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Attempt any four:

 $(4 \times 5 = 20)$

- 1) Give salient features of energy Conservation Act, 2001.
- 2) State the responsibilities and duties of energy manager.
- 3) Explain demand side management concept with advantages and disadvantages.
- 4) What is energy management? Discuss the principles of energy management?
- 5) How power factor penalties and incentives in tariff help DSM?

3. Attempt any two:

 $(10 \times 2 = 20)$

- 1) Discuss United Nations Framework Convention on Climate Change.
- 2) Write a note on format of energy policy.
- 3) Explain the role of FACTS, VAR compensation in supply side management.

SECTION - II

4. Attempt any four:

 $(4 \times 5 = 20)$

- 1) What is internal and external benchmarking? What are the benefits of benchmarking energy performance?
- 2) Explain technical means for T and D loss minimization.
- 3) Write a note on time value of money.
- 4) What is necessity of energy audit? Explain phases of energy audit.
- 5) How cogeneration leads the energy conservation?

5. Attempt any two:

 $(10 \times 2 = 20)$

- 1) What are the objectives of carrying out sensitivity analysis? What are the different factors that are considered for the sensitivity analysis?
- 2) Explain the following techniques with their use for energy analysis.
 - a) Sankey diagram
 - b) CUSUM technique.
- 3) Explain the energy conservation in motive power application.

Set S

SLR-VB – 335

Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 Elective – I: EXTRA HIGH VOLTAGE AC TRANSMISSION

Day and Date: Monday, 8-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) **All** questions **compulsory**.

- 2) **Assume** suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

I. Choose the correct answers:

 $(20 \times 1 = 20)$

- 1) Third mode of propagation is called as
 - a) Line to ground

b) Phase to phase

c) Homopolar

- d) Inter-phase
- 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) In general method of Laplace transform the series and shunt impedance operator per unit length of line is
 - a) z(s) = r + l(s)

b) y(s) = g + c(s)

c) both a) and b)

- d) none of the above
- 4) Find out the wrong relationship
 - a) $[Q] = 2 \pi \epsilon [M] [V]$
- b) $[V] = [P] \left| \frac{Q}{2\pi\epsilon} \right|$
- c) $\left[\frac{Q}{2\pi\epsilon}\right] = [P][V]$
- d) All equations are correct
- 5) Refraction coefficient of current (J_T) is given by

- a) $\frac{2zo}{zo + zt}$ b) $\frac{zo zt}{zo + zt}$ c) $\frac{2zt}{zo + zt}$ d) $\frac{zt zo}{zo + zt}$
- 6) In lossless transmission line theoretically have
 - a) r = l = 0
- b) l = q = 0
- c) q = c = 0 d) r = q = 0

P.T.O.



7)	Which type of corona discharge g a) Pulse type	gives interference to radio broadcast ? b) Pulse less type
	c) Glow corona	d) None of the above
8)		rough a cable of relative permittivity is c. c) 10 ⁸ m/sec. d) None of these
9)	Draining of trapped charge of line a) Main breakerc) Air circuit breaker	e is done by b) Auxiliary breaker d) Shunt reactors
10)	The crest time of pulse properties a) 20 ns b) 30 ns	s for positive cycle is c) 40 ns d) 50 ns
11)	For Aeolian vibration the frequence Hz and the amplitude a) 20 Hz, 2.5 cm c) 50 Hz, 2.5 cm	cy of vibration is usually limited to es less than cm. b) 25 Hz, 2.5 cm d) 50 Hz, 3.5 cm
12)	The function of steel wire in an ACa) compensate for skin effect c) provide additional mechanical	b) take care of surges
13)	The high voltage recognised in Inca) IS 2022 b) IS 2024	-
14)	line is	per phase in ohms 1 km in 750 transmission c) 0.722 d) none of these
15)	The measurement of electrostational Dipole c) Parallel plate	,
16)	Which of the following is protective a) Rod gap b) Surge absort	ve device against lightning over voltages ? ber c) Horn gap d) All above
17)	The dimensions of constants B an a) Ohm, Siemen c) Both are dimensionless	nd C are respectively and b) Mho, Siemen d) Siemen, Ohm
18)	For 100% series compensation, real Power frequency c) 40% of power frequency	b) 50% of power frequency
19)	Refraction coefficient of voltage (la) + 2 b) 1	K_T) for open ended line c) -1 d) 0
20)	· · · · · · · · · · · · · · · · · · ·	0 kV transmission line is nearly equal to c) 0.78 d) 2.5



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 Elective – I: EXTRA HIGH VOLTAGE AC TRANSMISSION

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) **Assume** suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.

SECTION-I

II. Solve any four: (4×5=20)

- a) Explain in detail the advantages and disadvantages of high voltages.
- b) What are the different mechanical considerations in EHV line performance?
- c) What are the properties of Bundled conductors in EHV-AC lines?
- d) Explain Reflection and refraction of travelling waves.
- e) Lightning stroke mechanism.
- f) Brief the charge potential relations of the multi conductor lines.

III. Solve any two:

 $(2 \times 10 = 20)$

- a) A tower has 40 ohms footing resistance and two ground wires with Zg = 500 ohms. The lightening stroke surge impedance Zs = 400 ohms. For Is = 50 KA crest, calculate the tower top potential:
 - i) Considering all impedances
 - ii) Neglecting the ground wire and stroke surge impedances.
 - iii) Considering only one ground wire and stroke surge impedance.
- b) Explain in detail the sequence inductance and capacitance.
- c) Explain the relation between the temperature rise and current carrying capacity of EHV-AC line.



SECTION - II

IV. Solve any four:

 $(4 \times 5 = 20)$

- a) Power circle diagram and its use.
- b) Enlist sources of over voltage and explain Ferro resonance voltages.
- c) Reduction of switching surge over voltages.
- d) Construction and characteristics of ZnO gapless arrester.
- e) Explain static reactive compensating system.
- f) Expression for generalized constants.

V. Solve any two:

 $(2\times10=20)$

- a) Explain in brief the sinusoidal excitation-lumped parameter circuits.
- b) What are the factors under steady state in design of EHV lines?
- c) Explain sub-synchronous resonance in series capacitors compensated lines.

				SL	.R-VB –	335
Seat No.					Set	Q
		` , `	Part – I) Exami GH VOLTAGE <i>i</i>	•	SSION	
-	nd Date : Monda 3.00 p.m. to 6.0	•		r	Max. Marks	: 100
 Instructions: 1) All questions compulsory. 2) Assume suitable data if necessary and mention it clearly. 3) Figures to the right indicate full marks. 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark. 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page. 						u tes ark. 3
Duratio	on : 30 Minutes	MCQ/Obje	ective Type Quest	tions	Mark	s : 20
	noose the correc	ct answers :				1=20)
		ollowing is prote	ective device agair sorber c) Horn g		er voltages	,
2)	a) Ohm, Siem		B and C are respect b) Mho, Siem d) Siemen, C	nen	_and	
3)	a) Power frequency	uency	n, resonance occ b) 50% of po d) None of th	wer frequency		
4)) Refraction coe a) +2	efficient of voltag	ge (K _T) for open ei c) – 1	nded line d) 0		
5)) The percentag a) 3.27	ge power loss in b) 4.76	750 kV transmiss c) 0.78	sion line is nearl d) 2.5	y equal to	
6)	Third mode ofa) Line to grouc) Homopolar	ind	called as b) Phase to p d) Inter-phas			
7)	Operating 750 a) 50 dB	KV line gives A b) 55.4 dB	N at a level of c) 52 dB	d) 58.5 dB		
8)		nit length of line (s)	transform the serie is b) y(s) = g + d) none of the	c(s)	pedance	



9)	Find out the wrong relationship					
	a) $[Q] = 2 \pi \epsilon [M] [V]$	b) $[V] = [P] \left \frac{Q}{2 \pi \varepsilon} \right $				
	c) $\left[\frac{Q}{2\pi\epsilon}\right] = [P][V]$	b) $[V] = [P] \left[\frac{Q}{2 \pi \epsilon} \right]$ d) All equations are correct				
	Refraction coefficient of current (J _T) is given by				
	a) $\frac{2zo}{zo + zt}$ b) $\frac{zo - zt}{zo + zt}$	c) $\frac{2zt}{z_0 + zt}$ d) $\frac{zt - z_0}{z_0 + zt}$				
11)	In lossless transmission line theo a) $r = l = 0$ b) $l = g = 0$					
12)	Which type of corona discharge g a) Pulse type c) Glow corona	ives interference to radio broadcast ? b) Pulse less type d) None of the above				
13)		rough a cable of relative permittivity is . c) 10 ⁸ m/sec. d) None of these				
14)	Draining of trapped charge of line a) Main breakerc) Air circuit breaker	is done by b) Auxiliary breaker d) Shunt reactors				
15)	The crest time of pulse properties a) 20 ns b) 30 ns	s for positive cycle is c) 40 ns d) 50 ns				
16)	a) 20 Hz, 2.5 cm	es less than cm.				
17)	The function of steel wire in an ACa) compensate for skin effect c) provide additional mechanical states.	CSR conductor is to b) take care of surges				
18)	The high voltage recognised in Inca) IS 2022 b) IS 2024	•				
19)	line is	per phase in ohms 1 km in 750 transmission				
	,	c) 0.722 d) none of these				
20)	The measurement of electrostational Dipole c) Parallel plate	c field of an e.h.v. line is done by b) Spherical Dipole d) All of the above				



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 Elective – I: EXTRA HIGH VOLTAGE AC TRANSMISSION

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) **Assume** suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.

SECTION-I

II. Solve any four: (4×5=20)

- a) Explain in detail the advantages and disadvantages of high voltages.
- b) What are the different mechanical considerations in EHV line performance?
- c) What are the properties of Bundled conductors in EHV-AC lines?
- d) Explain Reflection and refraction of travelling waves.
- e) Lightning stroke mechanism.
- f) Brief the charge potential relations of the multi conductor lines.

III. Solve any two:

 $(2 \times 10 = 20)$

- a) A tower has 40 ohms footing resistance and two ground wires with Zg = 500 ohms. The lightening stroke surge impedance Zs = 400 ohms. For Is = 50 KA crest, calculate the tower top potential:
 - i) Considering all impedances
 - ii) Neglecting the ground wire and stroke surge impedances.
 - iii) Considering only one ground wire and stroke surge impedance.
- b) Explain in detail the sequence inductance and capacitance.
- c) Explain the relation between the temperature rise and current carrying capacity of EHV-AC line.



SECTION - II

IV. Solve any four:

 $(4 \times 5 = 20)$

- a) Power circle diagram and its use.
- b) Enlist sources of over voltage and explain Ferro resonance voltages.
- c) Reduction of switching surge over voltages.
- d) Construction and characteristics of ZnO gapless arrester.
- e) Explain static reactive compensating system.
- f) Expression for generalized constants.

V. Solve any two:

 $(2\times10=20)$

- a) Explain in brief the sinusoidal excitation-lumped parameter circuits.
- b) What are the factors under steady state in design of EHV lines?
- c) Explain sub-synchronous resonance in series capacitors compensated lines.

|--|--|--|--|

a) Ohm, Siemen

c) Both are dimensionless

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B.E. (Electrical) (Part – I) Examination, 2017 Elective – I : EXTRA HIGH VOLTAGE AC TRANSMISSION							
-		d Date : Monday, 3.00 p.m. to 6.00				Max. Ma	arks : 100
		3) 4)	Assume suita Figures to the Q. No. 1 is con in Answer Boo Answer MCQ	ble data if right indic npulsory . I k Page No / Objectiv e	necessar cate full n t should b . 3. Each e type qu	ry and mention it clean narks. The solved in first 30 m question carries on The set (P/Q/R/S) on	ninutes e mark. No. 3
D	_4:_	00 Min. do a	MCQ/Objec	tive Type (Question		lawka . 00
		n : 30 Minutes					larks : 20
I.		oose the correct a				•	20×1=20)
	1)	For Aeolian vibra Hz a) 20 Hz, 2.5 cm c) 50 Hz, 2.5 cm	and the amplitu า	des less th b) 25 H		cm.	
	2)	The function of s a) compensate t c) provide additi	for skin effect		b) take	care of surges	
	3)	The high voltage a) IS 2022	recognised in l b) IS 2024		-	d) IS 2028	
	4)	The positive sequence is a) 0.272	uence reactance b) 0.227	e per phase c) 0.72		1 km in 750 transmis d) none of these	ssion
	5)	The measureme a) Dipole c) Parallel plate	nt of electrosta	b) Spho	an e.h.v. erical Dipo f the abov	ole	
	6)	Which of the folloa) Rod gap	owing is protect b) Surge abso		•	ightning over voltag d) All above	es?
	7)	The dimensions	of constants B a	and C are r	espective	ely and	

b) Mho, Siemen

d) Siemen, Ohm

8) For 100% series compensation, resonance occur at



,	a) Power frequency c) 40% of power frequency	b) 50% of power frequencyd) None of the above	
9)	Refraction coefficient of voltage (Fa) + 2 b) 1	$\binom{T}{T}$ for open ended line c) -1 d) 0	
10)		kV transmission line is nearly equal to c) 0.78 d) 2.5	
11)	Third mode of propagation is calle a) Line to ground c) Homopolar	ed as b) Phase to phase d) Inter-phase	
12)	Operating 750 KV line gives AN a a) 50 dB b) 55.4 dB	t a level of c) 52 dB d) 58.5 dB	
13)	In general method of Laplace transoperator per unit length of line is a) $z(s) = r + l(s)$ c) both a) and b)	sform the series and shunt impedance b) $y(s) = g + c(s)$ d) none of the above	
14)	Find out the wrong relationship		
	a) $[Q] = 2\pi\epsilon [M] [V]$ c) $\left[\frac{Q}{2\pi\epsilon}\right] = [P] [V]$	b) $[V] = [P] \left[\frac{Q}{2 \pi \varepsilon} \right]$	
	c) $\left[\frac{Q}{2\pi\epsilon}\right] = [P][V]$	d) All equations are correct	
	Refraction coefficient of current (
	a) $\frac{2zo}{zo + zt}$ b) $\frac{zo - zt}{zo + zt}$	c) $\frac{2zt}{z_0 + zt}$ d) $\frac{zt - z_0}{z_0 + zt}$	
16)	In lossless transmission line theorem a) $r = l = 0$ b) $l = g = 0$		
17)	Which type of corona discharge g a) Pulse type c) Glow corona	ives interference to radio broadcast ? b) Pulse less type d) None of the above	
18)	The velocity of travelling wave thr a) 9×10^8 m/sec. b) 3×10^8 m/sec	rough a cable of relative permittivity is . c) 10 ⁸ m/sec. d) None of these	
19)	Draining of trapped charge of line a) Main breakerc) Air circuit breaker	is done by b) Auxiliary breaker d) Shunt reactors	
20)	The crest time of pulse properties		
	a) 20 ns b) 30 ns	c) 40 ns d) 50 ns	
		S)(



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 Elective – I: EXTRA HIGH VOLTAGE AC TRANSMISSION

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) **Assume** suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.

SECTION-I

II. Solve any four: (4×5=20)

- a) Explain in detail the advantages and disadvantages of high voltages.
- b) What are the different mechanical considerations in EHV line performance?
- c) What are the properties of Bundled conductors in EHV-AC lines?
- d) Explain Reflection and refraction of travelling waves.
- e) Lightning stroke mechanism.
- f) Brief the charge potential relations of the multi conductor lines.

III. Solve any two:

 $(2\times10=20)$

- a) A tower has 40 ohms footing resistance and two ground wires with Zg = 500 ohms. The lightening stroke surge impedance Zs = 400 ohms. For Is = 50 KA crest, calculate the tower top potential:
 - i) Considering all impedances
 - ii) Neglecting the ground wire and stroke surge impedances.
 - iii) Considering only one ground wire and stroke surge impedance.
- b) Explain in detail the sequence inductance and capacitance.
- c) Explain the relation between the temperature rise and current carrying capacity of EHV-AC line.



SECTION - II

IV. Solve any four:

 $(4 \times 5 = 20)$

- a) Power circle diagram and its use.
- b) Enlist sources of over voltage and explain Ferro resonance voltages.
- c) Reduction of switching surge over voltages.
- d) Construction and characteristics of ZnO gapless arrester.
- e) Explain static reactive compensating system.
- f) Expression for generalized constants.

V. Solve any two:

 $(2\times10=20)$

- a) Explain in brief the sinusoidal excitation-lumped parameter circuits.
- b) What are the factors under steady state in design of EHV lines?
- c) Explain sub-synchronous resonance in series capacitors compensated lines.

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•	lectrical) (Part EXTRA HIGH	•	ation, 2017 C TRANSMISSIO	ON
Day and Date : Monday, 8 Time : 3.00 p.m. to 6.00 p			Max.	Marks : 100
3) 1 4) (5) 4	Assume suitable Figures to the rig Q. No. 1 is compu in Answer Book F Answer MCQ/O	data if necess Int indicate ful Ilsory. It should Page No. 3. Eac bjective type	eary and mention it of the last of the last of the last of the solved in first 3 contract on the last ont last on the last ont last	0 minutes one mark. ge No. 3
	MCQ/Objective	e Type Questic	ons	
Duration: 30 Minutes				Marks : 20
I. Choose the correct a	nswers :			(20×1=20)
1) In lossless transma) $r = l = 0$	hission line theor b) $l = g = 0$	-	d) $r = g = 0$	
2) Which type of corea) Pulse typec) Glow corona		ves interferenc b) Pulse less t d) None of the	type	st?
 The velocity of tra a) 9×10⁸ m/sec. 			f relative permittivit c. d) None of these	
4) Draining of trappea) Main breakerc) Air circuit brea	_	s done by b) Auxiliary bro d) Shunt react		
5) The crest time of a) 20 ns		for positive cyc c) 40 ns	cle is d) 50 ns	
6) For Aeolian vibrat ————Hz a a) 20 Hz, 2.5 cm c) 50 Hz, 2.5 cm	nd the amplitude		cm.	
7) The function of storea) compensate for controlb) provide addition	or skin effect	b) tak	e care of surges	D.T. O



8)	The high voltage real IS 2022 b	ecognised in Inc) IS 2024			d) IS 2028	
9)	The positive sequel line is	•				
	a) 0.272 b) 0.227	c)	0.722	d) none of the	nese
10)	The measurement a) Dipole c) Parallel plate	of electrostatic	b)	ld of an e.h.v. Spherical Dip All of the abo	ole	oy
11)	Which of the follow a) Rod gap b	ring is protective o) Surge absorb		-	-	-
12)	The dimensions of a) Ohm, Siemen c) Both are dimens		b)	are respective Mho, Siemen Siemen, Ohm	-	and
13)	For 100% series co a) Power frequenc c) 40% of power fr	cy .	b)	50% of powe	r frequency	
14)	Refraction coefficie a) +2 b			for open ende – 1	ed line d) 0	
15)	The percentage po a) 3.27 b			transmission 0.78	line is nearly d) 2.5	equal to
16)	Third mode of prop a) Line to ground c) Homopolar	_	b)	s Phase to pha Inter-phase	se	
17)	Operating 750 KV a) 50 dB b	line gives AN at b) 55.4 dB			d) 58.5 dB	
18)	In general method operator per unit le a) $z(s) = r + l(s)$	•		orm the series a y(s) = g + c(s)	•	pedance
	c) both a) and b)		,	none of the a	•	
19)	Find out the wrong	relationship				
	a) $[Q] = 2\pi\epsilon [M] [V]$	']	b)	$[V] = [P] \sqrt{\frac{Q}{2 \pi \epsilon}}$	-	
	c) $\left[\frac{Q}{2\pi\epsilon}\right] = [P][V]$,	All equations	are correct	
	Refraction coefficient	ent of current (J	J _T)	is given by		
	a) $\frac{2z_0}{z_0 + zt}$	$\frac{z_0-z_1}{z_0+z_1}$	c)	$\frac{2zt}{zo + zt}$	d) $\frac{zt-zo}{zo+zt}$	

a)
$$\frac{2zo}{zo + zt}$$

b)
$$\frac{zo-zt}{zo+zt}$$

c)
$$\frac{2zt}{z_0 + zt}$$

d)
$$\frac{zt-zo}{zo+zt}$$



Seat	
No.	

B.E. (Electrical) (Part – I) Examination, 2017 Elective – I: EXTRA HIGH VOLTAGE AC TRANSMISSION

Day and Date: Monday, 8-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) **Assume** suitable data if necessary and mention it clearly.
- 3) Figures to the **right** indicate **full** marks.

SECTION-I

II. Solve any four: (4×5=20)

- a) Explain in detail the advantages and disadvantages of high voltages.
- b) What are the different mechanical considerations in EHV line performance?
- c) What are the properties of Bundled conductors in EHV-AC lines?
- d) Explain Reflection and refraction of travelling waves.
- e) Lightning stroke mechanism.
- f) Brief the charge potential relations of the multi conductor lines.

III. Solve any two:

 $(2 \times 10 = 20)$

- a) A tower has 40 ohms footing resistance and two ground wires with Zg = 500 ohms. The lightening stroke surge impedance Zs = 400 ohms. For Is = 50 KA crest, calculate the tower top potential:
 - i) Considering all impedances
 - ii) Neglecting the ground wire and stroke surge impedances.
 - iii) Considering only one ground wire and stroke surge impedance.
- b) Explain in detail the sequence inductance and capacitance.
- c) Explain the relation between the temperature rise and current carrying capacity of EHV-AC line.



SECTION - II

IV. Solve any four:

 $(4 \times 5 = 20)$

- a) Power circle diagram and its use.
- b) Enlist sources of over voltage and explain Ferro resonance voltages.
- c) Reduction of switching surge over voltages.
- d) Construction and characteristics of ZnO gapless arrester.
- e) Explain static reactive compensating system.
- f) Expression for generalized constants.

V. Solve any two:

 $(2\times10=20)$

- a) Explain in brief the sinusoidal excitation-lumped parameter circuits.
- b) What are the factors under steady state in design of EHV lines?
- c) Explain sub-synchronous resonance in series capacitors compensated lines.

Seat		
No.	Set	Р

Day and Date: Friday, 19-5-2017 Max. Marks: 100

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever necessary.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Dura	tio	n : 30 Minutes						Marks : 20
1. 5	Sol	ve the following :						
	1)	In 8051 which inte	errupt is having h	_	nest priority IE1	d)	TF1	
	2)	Which of the followa) IE	wing is not bit op b) TCON		ated SFR ? P0	d)	TMOD	
	3)	MODE0 of timer c a) 8 bit auto reloa c) 13 bit timer mo	d mode	b)	051 is 16 bit timer m Split timer mo			
	4)	Serial port vector a a) 0013H, either c) 0023H, either	TI or RI set	b)	_ and causes 0013H, eithe 0023H, eithe	r TI	and RI set	
	5)	The PORT3 pins (a) P3.0 and P3.1 c) P3.4 and P3.5	used to access r	b)	mory are P3.2 and P3.3 P3.6 and P3.7			
	6)	To double the bau a) SMOD bit from c) SMO and SM1	SCON	b)	SMOD bit fro			



7)	To interface exte	•	-		are provided by	
	a) PORT0 and Pc) PORT1 and P		•			
8)	Interfacing LCD sign		da	ta lines are use	ed along with the	
	a) 6, RS, R/W	b) 8, RS, EN	c) 8, RS,	EN, R/ \overline{W} d)	8, RS, R/W	
9)	The 8051 has a) 0 KB ROM an c) 4 KB ROM an	d 128 bits RAM	•			
10)	When 8051 finish a) RI flag				d) None of these	ļ
11)	In mod2, the cou a) FFFF				H.	
12)	To access the da a) MOV	•				
13)	8051 timer are a) 4	b) 8	de. c) 16	d) 32		
14)	8051 has	interrupts.				
	a) 4	b) 5	c) 7	d) 8		
15)	What is the address a) 82H		c) 80H	d) 90H		
16)	To transfer the da	ata serially, it mu b) PCON	•	•		
17)	Which bit of registal D7	ster IE is used to b) D6		interrupts ? d) D4		
18)	The ADC in the Fa) 8	PIC16f877 is of b) 10	c) 12	it. d) 16		
19)	CCP means a) Compare, Co c) Compliment, 0		•	•		
20)	The architecture a) Harvard		c) Von-Nu	ıman d) None	of these	
					Set	Р



Seat	
No.	

Day and Date: Friday, 19-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever necessary.
- 2. Solve any four. (4×5=20)
 - a) Explain the different addressing modes of 8051 with example.
 - b) Draw and explain the timer/counter logic circuit.
 - c) Draw and explain the PSW register format of 8051.
 - d) Explain the internal memory organization of 8051.
 - e) Describe the PORT1 structure of 8051.
- 3. a) Write a assembly language program to transfer a block of ten numbers from internal memory location 20 H to external memory location 8000 H on wards. **10**
 - b) Explain the stack of 8051 and its operation using PUSH and POP instructions.

10

OR

 b) Interface DAC0808 to 8051 and write a assembly language program to generate a square wave.

4. Solve any four.

 $(4 \times 5 = 20)$

- a) Explain the various pins of LCD.
- b) Explain the features of PIC 16f877.
- c) Explain the PORT structure of PIC16f877.
- d) Explain the following instruction of PIC 16f877.
 - i) bsf f, b
 - ii) addlw k.
- e) Explain the memory organization of PIC 16f877.

5. Solve **any two**.

 $(2\times10=20)$

- a) Interface 8K×8 data RAM to 8051. Determine the initial and final address.
- b) Explain the interrupt structure of PIC16f877.
- c) Interface LCD to 8051 and write a assembly language program to display "INDIA" on it.

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Seat		
No.	Set	Q

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017 MICROCONTROLLER AND APPLICATION

Day and Date: Friday, 19-5-2017 Max. Marks: 100

Time: 10.00 a.m. to 1.00 p.m.

- Instructions: 1) All questions are compulsory.
 - 2) Figures to right indicate full marks.
 - 3) Assume suitable data wherever necessary.
 - 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

			. , , , , , , , , , , , , , , , , , , ,		
Duratio	n : 30 Minutes				Marks : 20
1. Sol	lve the following:				
1)	To transfer the da	ata serially, it mus b) PCON	•	e register d) SUBF	
2)	Which bit of regis	ster IE is used to b) D6	enable all interru c) D5	upts ? d) D4	
3)	The ADC in the Pa) 8	IC16f877 is of b) 10		d) 16	
4)	,		, .	e, Capture and PW Control and PWM	M
5)	The architecture a) Harvard		c) Von-Numan	d) None of these	
6)	In 8051 which int a) IE0	errupt is having h b) TF0	nighest priority c) IE1	d) TF1	
7)	Which of the folloa) IE	wing is not bit op b) TCON	erated SFR ? c) P0	d) TMOD	



8)	MODE0 of timera) 8 bit auto reloac) 13 bit timer me	ad mode	b)						
9)	Serial port vector a) 0013H, either c) 0023H, either	address is TI or RI set	b)	_ and causes 0013H, eithe	an r TI	interru _l and R	l set	n	
10)	The PORT3 pins a) P3.0 and P3.1 c) P3.4 and P3.5		b)	P3.2 and P3.					
11)	To double the bata) SMOD bit from c) SMO and SM1	n SCON	b)	SMOD bit fro					
12)	To interface external PORT0 and Po c) PORT1 and Po	ORT1	b)	PORT0 and F	POF	RT2	are pro	ovided by	
13)	Interfacing LCD v			data line	s ar	e usec	d along	g with the	
	a) 6, RS, R/\overline{W}	b) 8, RS, EN	c)	8, RS, EN, R	k/W	d) 8	B, RS,	R/\overline{W}	
14)	The 8051 has a) 0 KB ROM an c) 4 KB ROM an	d 128 bits RAM		•					
15)	When 8051 finish a) RI flag								se
	In mod2, the coula) FFFF			_	_			H.	
17)	To access the da a) MOV	•				ısed is None			
18)	8051 timer are a) 4			16	d)	32			
19)	8051 has a) 4		c)	7	d)	8			
20)	What is the address a) 82H		c)	80H	d)	90H			



Seat	
No.	

Day and Date: Friday, 19-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever necessary.
- 2. Solve any four. (4×5=20)
 - a) Explain the different addressing modes of 8051 with example.
 - b) Draw and explain the timer/counter logic circuit.
 - c) Draw and explain the PSW register format of 8051.
 - d) Explain the internal memory organization of 8051.
 - e) Describe the PORT1 structure of 8051.
- a) Write a assembly language program to transfer a block of ten numbers from internal memory location 20 H to external memory location 8000 H on wards.
 - b) Explain the stack of 8051 and its operation using PUSH and POP instructions.

10

OR

 b) Interface DAC0808 to 8051 and write a assembly language program to generate a square wave.

4. Solve any four.

 $(4 \times 5 = 20)$

- a) Explain the various pins of LCD.
- b) Explain the features of PIC 16f877.
- c) Explain the PORT structure of PIC16f877.
- d) Explain the following instruction of PIC 16f877.
 - i) bsf f, b
 - ii) addlw k.
- e) Explain the memory organization of PIC 16f877.

5. Solve **any two**.

 $(2\times10=20)$

- a) Interface 8K×8 data RAM to 8051. Determine the initial and final address.
- b) Explain the interrupt structure of PIC16f877.
- c) Interface LCD to 8051 and write a assembly language program to display "INDIA" on it.

Set Q

Seat		
No.	Set	\mid R \mid

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017

MICROCONTROLLER AND APPLICATION Max. Marks: 100 Day and Date: Friday, 19-5-2017 Time: 10.00 a.m. to 1.00 p.m. **Instructions**: 1) **All** questions are **compulsory**. 2) Figures to right indicate full marks. 3) **Assume** suitable data **wherever** necessary. 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark. 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page. MCQ/Objective Type Questions **Duration: 30 Minutes** Marks: 20 1. Solve the following: 1) In mod2, the counter rolls over when counter goes up to _____ H. a) FFFF b) FF c) 7F d) 00 2) To access the data from on chip ROM the instruction used is _____ b) MOVX c) MOVC d) None a) MOV 3) 8051 timer are ______ bit wide. b) 8 a) 4 c) 16 d) 32 4) 8051 has _____ interrupts. b) 5 a) 4 c) 7 d) 8 5) What is the address of DPL? a) 82H b) 83H c) 80H d) 90H 6) To transfer the data serially, it must be placed in the register a) IE b) PCON c) SCON d) SUBF 7) Which bit of register IE is used to enable all interrupts? a) D7 b) D6 c) D5 d) D4

8) The ADC in the PIC16f877 is of ______ bit.

b) 10

c) 12

d) 16

a) 8



9)	CCP means a) Compare, Coll c) Compliment, C			,	-			
10)	The architecture (a) Harvard		c)	Von-Numan	d) N	None (of these	
11)	In 8051 which into a) IE0	errupt is having hb) TF0	_	est priority IE1	d) T	ΓF1		
12)	Which of the follo a) IE	wing is not bit op b) TCON		ited SFR ? P0	d) 1	ГМОD)	
13)	MODE0 of timer of a) 8 bit auto reload c) 13 bit timer mo	ad mode	b)					
14)	Serial port vector a) 0013H, either c) 0023H, either							
15)	The PORT3 pins a) P3.0 and P3.1 c) P3.4 and P3.5		b)	nory are P3.2 and P3. P3.6 and P3.				
16)	To double the bau a) SMOD bit from c) SM0 and SM1	SCON	b)	SMOD bit fro				
17)	To interface exter a) PORT0 and PC c) PORT1 and PC	ORT1	b)	y of 8K, the a PORT0 and F PORT2 and F	POR	T2	are provide	d by
18)	Interfacing LCD v			data line	s are	used	l along with	the
	a) 6, RS, R/ \overline{W}	b) 8, RS, EN	c)	8, RS, EN, R	/W	d) 8	$R, RS, R/\overline{W}$	
19)	The 8051 has a) 0 KB ROM and c) 4 KB ROM and			•				
20)	When 8051 finish a) RI flag	es the transfer o b) TI flag						f these



Seat	
No.	

Day and Date: Friday, 19-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever necessary.
- 2. Solve any four. (4×5=20)
 - a) Explain the different addressing modes of 8051 with example.
 - b) Draw and explain the timer/counter logic circuit.
 - c) Draw and explain the PSW register format of 8051.
 - d) Explain the internal memory organization of 8051.
 - e) Describe the PORT1 structure of 8051.
- a) Write a assembly language program to transfer a block of ten numbers from internal memory location 20 H to external memory location 8000 H on wards.
 - b) Explain the stack of 8051 and its operation using PUSH and POP instructions.

10

OR

 b) Interface DAC0808 to 8051 and write a assembly language program to generate a square wave.

4. Solve any four.

 $(4 \times 5 = 20)$

- a) Explain the various pins of LCD.
- b) Explain the features of PIC 16f877.
- c) Explain the PORT structure of PIC16f877.
- d) Explain the following instruction of PIC 16f877.
 - i) bsf f, b
 - ii) addlw k.
- e) Explain the memory organization of PIC 16f877.

5. Solve **any two**.

 $(2\times10=20)$

- a) Interface 8K×8 data RAM to 8051. Determine the initial and final address.
- b) Explain the interrupt structure of PIC16f877.
- c) Interface LCD to 8051 and write a assembly language program to display "INDIA" on it.

Set R

SLR-VB - 336

Seat		
No.	Set	S

B.E. (Electrical Engineering) (Part – I) (Old) Examination, 2017 MICROCONTROLLER AND APPLICATION

Day and Date: Friday, 19-5-2017 Max. Marks: 100

Time: 10.00 a.m. to 1.00 p.m.

a) FFFF

b) FF

- Instructions: 1) All questions are compulsory.
 - 2) Figures to right indicate full marks.
 - 3) Assume suitable data wherever necessary.
 - 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
 - 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

of Page.	
MCQ/Objective Type Questions Duration: 30 Minutes MCQ/Objective Type Questions	arks : 20
	11N3 . 20
1. Solve the following:	
 To double the baud rate the bits used are a) SMOD bit from SCON b) SMOD bit from PCON c) SM0 and SM1 bit from SCON d) SM2 bit from SCON 	
 2) To interface external memory capacity of 8K, the addresses are provided a) PORT0 and PORT1 b) PORT0 and PORT2 c) PORT1 and PORT2 d) PORT2 and PORT3 	d by
3) Interfacing LCD with 8051 data lines are used along with signals.	the
a) 6, RS, R/ \overline{W} b) 8, RS, EN c) 8, RS, EN, R/ \overline{W} d) 8, RS, R/ \overline{W}	
 4) The 8051 has a) 0 KB ROM and 128 bits RAM b) 4 KB ROM and 128 bits RAM c) 4 KB ROM and 128 bytes RAM d) 8 KB ROM and 128 bytes RAM 	
5) When 8051 finishes the transfer of 8 bit character it raises a) RI flag b) TI flag c) Both RI and TI flags d) None of	f these
6) In mod2, the counter rolls over when counter goes up to H.	

c) 7F

d) 00



7)			-				used is
	,	,	MOVX	,	MOVC	d)	None
8)	8051 timer are						
	a) 4	,	8	c)	16	d)	32
9)	8051 has			,	_		•
	a) 4	,		c)	/	d)	8
10)	What is the address a) 82H			c)	80H	d)	90H
11)	To transfer the da	ata	serially, it mu	st b	e placed in th	e re	egister
·	a) IE	b)	PCON	c)	SCON	d)	SUBF
12)	Which bit of regis	ter	IE is used to	ena	able all interru	ıpts	?
	a) D7	b)	D6	c)	D5	d)	D4
13)	The ADC in the P	IC	16f877 is of		bit.		
	a) 8	b)	10	c)	12	d)	16
14)	CCP means						
	a) Compare, Col				•		•
	c) Compliment, (Cor	npare and Pul	se	d) Collect, C	Con	trol and PWM
15)	The architecture						
	a) Harvard	b)	CISC	c)	Von-Numan	d)	None of these
16)	In 8051 which into			_			
	a) IE0	b)	TF0	c)	IE1	d)	TF1
17)	Which of the follo		•				
	a) IE	,	TCON	•	P0	d)	TMOD
18)	MODE0 of timer					_	
	a) 8 bit auto reload mode			-	16 bit timer m		
	c) 13 bit timer mo			•	Split timer mo		
19)	Serial port vector	ad	dress is	P.	_ and causes	an	interrupt when
	a) 0013H, eitherc) 0023H, either			,	0013H, eithe		
OO)	,			,	·		and Hi set
∠U)	The PORT3 pins a) P3.0 and P3.1	uS	eu io access f		nory are P3.2 and P3.3	Q	
	c) P3.4 and P3.5				P3.6 and P3.		
	-,			/	2.2 3 0.1		



Seat	
No.	

Day and Date: Friday, 19-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

Instructions: 1) **All** questions are **compulsory**.

- 2) Figures to right indicate full marks.
- 3) Assume suitable data wherever necessary.
- 2. Solve any four. (4×5=20)
 - a) Explain the different addressing modes of 8051 with example.
 - b) Draw and explain the timer/counter logic circuit.
 - c) Draw and explain the PSW register format of 8051.
 - d) Explain the internal memory organization of 8051.
 - e) Describe the PORT1 structure of 8051.
- 3. a) Write a assembly language program to transfer a block of ten numbers from internal memory location 20 H to external memory location 8000 H on wards. **10**
 - b) Explain the stack of 8051 and its operation using PUSH and POP instructions.

b) Interface DAC0808 to 8051 and write a assembly language program to generate a square wave.

4. Solve any four.

 $(4 \times 5 = 20)$

10

- a) Explain the various pins of LCD.
- b) Explain the features of PIC 16f877.
- c) Explain the PORT structure of PIC16f877.

OR

- d) Explain the following instruction of PIC 16f877.
 - i) bsf f, b
 - ii) addlw k.
- e) Explain the memory organization of PIC 16f877.

5. Solve **any two**.

 $(2\times10=20)$

- a) Interface 8K×8 data RAM to 8051. Determine the initial and final address.
- b) Explain the interrupt structure of PIC16f877.
- c) Interface LCD to 8051 and write a assembly language program to display "INDIA" on it.

_____ Set S

A) 0.6

SLR-VB - 337

No. Set P	Seat No.
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B.E. (Electrical) (Part – I) (Old) Examination, 2017 FI FCTRICAL MACHINE DESIGN

ELECTRICAL N	WACHINE DESIGN
Day and Date : Monday, 22-5-2017 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks: 100
in Answer Book F 2) Answer MCQ/O b	ulsory. It should be solved in first 30 minutes Page No. 3. Each question carries one mark. bjective type questions on Page No. 3 only. nention, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective	re Type Questions
Duration: 30 Minutes 1. Choose the correct answer:	Marks : 20 (1×20=20)
 The percentage of silicon in the contract A) 1 to 2 percent B) 2 to 3 percent 	ore steel is ent C) 4 to 6 percent D) 8 to 10 percent
2) The stacking factor will be least foA) Square coreC) Three stepped core	or B) Cruciform core D) Four stepped core
 3) In static transformers mechanical A) Vibrations B) Gap between laminations C) Interaction of current flowing in D) None of the above 	forces are produced due to the conductor and leakage flux around it
4) The thickness of laminations of the A) 0.003 to 0.05 mmC) 0.03 to 0.5 mm	e core of a power transformer usually B) 0.03 to 0.05 mm D) 3 to 5 mm
5) The heat generated in the transforrA) Conduction B) Convection	mer is dissipated to the surroundings mainly by n C) Radiation D) All of the above
6) Power transformers should be desA) at one fourth loadC) at or near full load	signed to have maximum efficiency at B) at one half load D) any of the above
7) In induction motors, small air gap noise level.A) increases, reducesC) reduces, also reduces	B) reduces, increases D) increases, also increases

8) For small induction motors, the ratio of length to pole pitch is taken as

B) 1.5

C) 2.0

D) None of these



9)	Which type of slots are generally use A) Open type C) Closed type	B)	induction moto Semi-closed ty None of the abo	ре	
10)	For avoiding cogging in induction mot stator and rotor slots should not be A) P B) 3P		ne difference be 5P		en the number of any of the above
11)	The slip rings of wound rotor machine A) Electrolytic copper C) Cast iron	B)	re made from Brass Mild steel	,	•
12)	In case of induction motors the ratio of is taken as A) 1.0 B) 2 to 3		ngth to pole pito		or minimum cost, 3 to 5
13)	In induction motor if the number of ro	B)	slots is equal to the motor will r the motor may	nil a	t zero slip
14)	Which of the following is the most ecomotor? A) Resistance start method C) Capacitance start method	B)	mical method of Inductance star Split-phase me	rt m	ethod
15)	Out of the following motors, which wil A) Universal motor C) Shaded pole motor	B)	ve the highest s Capacitor start All have zero s	mo	tor
16)	The motor used in household refrigera A) dc series motor C) universal motor	B)	rs is dc shunt motor single phase in		tion motor
17)	Short circuit ratio for turbo-alternators A) 0.1 to 0.2 B) 0.2 to 0.4		usually 0.5 to 0.7	D)	0.8 to 0.95
18)	A synchronous machine having largeA) Higher noise levelC) Lower limit of stability	B)	Smaller unbala	nce	
19)	If synchronous motor fails to start, the A) Single phasing C) Low voltage	B)	obable cause co Over loading a Any of these		
20)	Turbo generators have A) Large diameter and large core length B) Large diameter and small core length C) Small diameter and small core length D) Small diameter and large core length	gth gth			



Seat	
No.	

B.E. (Electrical) (Part – I) (Old) Examination, 2017 ELECTRICAL MACHINE DESIGN

-3-

Day and Date: Monday, 22-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

2. Solve any four: (5×4=20)

a) Distinguish between core type and shell type transformer.

- b) For transformer show that Et = $K\sqrt{S}$.
- c) Explain choice of specific magnetic loading for induction motor.
- d) Derive how dispersion co-efficient affects maximum power factor of induction motor.
- e) Determine the dimensions of core and yoke for a 200 KVA, 50 Hz, single phase core type transformer. A cruciform core is used with distance between adjacent limbs equal to 1.6 times the width of core laminations. Assume voltage per turn is 14, maximum flux density 1.1 web/m², window space factor 0.32, current density 3 A/mm² and stacking factor = 0.9.

3. Solve any two: (10×2=20)

- a) Determine the main dimensions of the core, the number of turns and the cross-section of the conductors for 5 KVA, 11000 V/400 V, 50 Hz, 1-phase core type distribution t/f. 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 of the core, a flux density 1 wb/m². A current density 1.4 A/mm² and the window space factor 0.2. The height of the window is 3 times its width.
- b) Find the main dimensions of a 15 kW, 3-phase, 400 V, 50 Hz, 2810 rpm squirrel cage I.M. having an efficiency of 0.88 and a full load power factor of 0.9. Specific magnetic loading = 0.5 wb/m², specific electric loading = 25000 A/m. Take the peripheral speed as approximately 20 m/s at synchronous speed.



c) Determine the main dimensions of 3 phase, 3 leg core type transformer, the number of turns and the cross-section of the conductors for a 350 KVA, 11000/3300 v, star-delta, 50 Hz transformer. Assume volt per turn = 11, maximum flux density = 1.25 wb/m². Net cross-section of core = 0.6 d². Window space factor = 0.27, window proportions = 3:1, current density = 250 Amp/cm².

SECTION - II

4. Solve any four: (5×4=20)

- a) Draw the equivalent circuit diagram of single phase induction motor on the basis of double revolving field theory.
- b) Explain capacitor start phase single phase induction motor with circuit and vector diagram.
- c) Explain double revolving field theory of single phase induction motor.
- d) Derive the output equation of single phase induction motor.
- e) Explain salient pole synchronous machine with neat diagram.

5. Solve any two: (10×2=20)

- a) Derive an expression for power in smooth cylindrical synchronous machine.
- b) A 500 KVA, 3.3 KV, 50 Hz, 600 rpm, 3 phase salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 wb/m². The ratio of pole arc to pole pitch = 0.66, the short circuit ratio = 1.2 and the gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.
- c) Find the main dimensions of a 2500 KVA, 187.5 rpm, 50 Hz, 3-phase, 3 kV, salient pole synchronous machine. The alternator is to be vertical, water wheel type. The specific magnetic loading is 0.6 wb/m² and the specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. Specify the type of pole conduction used if the run-away speed is about 2 times the normal speed.

Seat No.	t Q
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	AACHINE DESIGN
Day and Date : Monday, 22-5-2017 Time : 10.00 a.m. to 1.00 p.m.	Max. Marks : 100
in Answer Book F 2) Answer MCQ/O b	ulsory. It should be solved in first 30 minutes Page No. 3. Each question carries one mark. Diective type questions on Page No. 3 only. Diention, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective	e Type Questions
Duration: 30 Minutes 1. Choose the correct answer:	Marks : 20 (1×20=20)
 The motor used in household refrig A) dc series motor C) universal motor 	gerators is B) dc shunt motor D) single phase induction motor
2) Short circuit ratio for turbo-alternation A) 0.1 to 0.2 B) 0.2 to 0.4	tors is usually C) 0.5 to 0.7 D) 0.8 to 0.95
3) A synchronous machine having landA) Higher noise levelC) Lower limit of stability	rge length of the air gap will have B) Smaller unbalanced magnetic pull D) Higher value of inherent regulation
4) If synchronous motor fails to start,A) Single phasingC) Low voltage	the probable cause could be B) Over loading at start D) Any of these
 5) Turbo generators have A) Large diameter and large core le B) Large diameter and small core le C) Small diameter and large core le D) Small diameter and large core le 	length length
6) The percentage of silicon in the co	ore steel is ent C) 4 to 6 percent D) 8 to 10 percent

B) Cruciform core

D) Four stepped core

7) The stacking factor will be least for

A) Square core

C) Three stepped core



8)	In static transformers mechanical force A) Vibrations B) Gap between laminations C) Interaction of current flowing in the D) None of the above		·	
9)	The thickness of laminations of the co A) 0.003 to 0.05 mm C) 0.03 to 0.5 mm	B)	of a power trans 0.03 to 0.05 mr 3 to 5 mm	
10)	The heat generated in the transformer A) Conduction B) Convection			
11)	Power transformers should be design A) at one fourth load C) at or near full load	ed B) D)	to have maximu at one half load any of the abov	rm efficiency at re
12)	In induction motors, small air gap noise level.		power	factor and
	A) increases, reducesC) reduces, also reduces	B) D)	reduces, increasincreases, also	ases increases
13)	For small induction motors, the ratio of A) 0.6 B) 1.5			ch is taken as D) None of these
14)	Which type of slots are generally use A) Open type C) Closed type	B)	induction moto Semi-closed ty None of the abo	ре
15)	For avoiding cogging in induction mot stator and rotor slots should not be			
4.0\	A) P B) 3P	,	5P	D) any of the above
16)	The slip rings of wound rotor machine A) Electrolytic copper C) Cast iron	B)	re made from Brass Mild steel	
17)	In case of induction motors the ratio of is taken as			
	,	,		D) 3 to 5
18)	In induction motor if the number of ro A) the motor will run smoothly C) the noise level will be low	B)		nil at zero slip
19)	Which of the following is the most ecomotor?	no	mical method of	starting a single phase
	A) Resistance start methodC) Capacitance start method	,	Inductance star Split-phase me	
20)	Out of the following motors, which wil A) Universal motor	B)	Capacitor start	motor
	C) Shaded pole motor	D)	All have zero st	tarting torque



Seat	
No.	

B.E. (Electrical) (Part – I) (Old) Examination, 2017 ELECTRICAL MACHINE DESIGN

-3-

Day and Date: Monday, 22-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

a) Distinguish between core type and shell type transformer.

- b) For transformer show that Et = $K\sqrt{S}$.
- c) Explain choice of specific magnetic loading for induction motor.
- d) Derive how dispersion co-efficient affects maximum power factor of induction motor.
- e) Determine the dimensions of core and yoke for a 200 KVA, 50 Hz, single phase core type transformer. A cruciform core is used with distance between adjacent limbs equal to 1.6 times the width of core laminations. Assume voltage per turn is 14, maximum flux density 1.1 web/m², window space factor 0.32, current density 3 A/mm² and stacking factor = 0.9.

3. Solve any two: (10×2=20)

- a) Determine the main dimensions of the core, the number of turns and the cross-section of the conductors for 5 KVA, 11000 V/400 V, 50 Hz, 1-phase core type distribution t/f. 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 of the core, a flux density 1 wb/m². A current density 1.4 A/mm² and the window space factor 0.2. The height of the window is 3 times its width.
- b) Find the main dimensions of a 15 kW, 3-phase, 400 V, 50 Hz, 2810 rpm squirrel cage I.M. having an efficiency of 0.88 and a full load power factor of 0.9. Specific magnetic loading = 0.5 wb/m², specific electric loading = 25000 A/m. Take the peripheral speed as approximately 20 m/s at synchronous speed.



c) Determine the main dimensions of 3 phase, 3 leg core type transformer, the number of turns and the cross-section of the conductors for a 350 KVA, 11000/3300 v, star-delta, 50 Hz transformer. Assume volt per turn = 11, maximum flux density = 1.25 wb/m². Net cross-section of core = 0.6 d². Window space factor = 0.27, window proportions = 3:1, current density = 250 Amp/cm².

SECTION - II

4. Solve any four: (5×4=20)

- a) Draw the equivalent circuit diagram of single phase induction motor on the basis of double revolving field theory.
- b) Explain capacitor start phase single phase induction motor with circuit and vector diagram.
- c) Explain double revolving field theory of single phase induction motor.
- d) Derive the output equation of single phase induction motor.
- e) Explain salient pole synchronous machine with neat diagram.

5. Solve any two: (10×2=20)

- a) Derive an expression for power in smooth cylindrical synchronous machine.
- b) A 500 KVA, 3.3 KV, 50 Hz, 600 rpm, 3 phase salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 wb/m². The ratio of pole arc to pole pitch = 0.66, the short circuit ratio = 1.2 and the gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.
- c) Find the main dimensions of a 2500 KVA, 187.5 rpm, 50 Hz, 3-phase, 3 kV, salient pole synchronous machine. The alternator is to be vertical, water wheel type. The specific magnetic loading is 0.6 wb/m² and the specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. Specify the type of pole conduction used if the run-away speed is about 2 times the normal speed.

Seat No.	Set	R
	1	

	B.E. (Electrical) (Part – I) (ELECTRICAL MA	•	7
-	d Date : Monday, 22-5-2017 10.00 a.m. to 1.00 p.m.	M	ax. Marks : 100
,	2) Answer MCQ/Object	ory. It should be solved in firm to the No. 3. Each question care trive type questions on Payotion, Q.P. Set (P/Q/R/S) on	ries one mark. ge No. 3 only.
	MCQ/Objective T	ype Questions	
	n : 30 Minutes oose the correct answer :		Marks : 20 (1×20=20)
1)	The slip rings of wound rotor machine A) Electrolytic copper C) Cast iron	es are made from B) Brass D) Mild steel	
2)	In case of induction motors the ratio of is taken as A) 1.0 B) 2 to 3	of length to pole pitch for m C) 1.5 to 2 D) 3 to	·
3)	In induction motor if the number of ro A) the motor will run smoothly C) the noise level will be low	B) the motor will mil at ze	ro slip
4)	Which of the following is the most eco motor? A) Resistance start method C) Capacitance start method	onomical method of starting B) Inductance start method D) Split-phase method	
5)	Out of the following motors, which wil A) Universal motor C) Shaded pole motor		·
6)	The motor used in household refrigera A) dc series motor C) universal motor	ators is B) dc shunt motor D) single phase induction	motor
7)	Short circuit ratio for turbo-alternators A) 0.1 to 0.2 B) 0.2 to 0.4	s is usually C) 0.5 to 0.7 D) 0.8	to 0.95
8)	A synchronous machine having largeA) Higher noise levelC) Lower limit of stability	length of the air gap will ha B) Smaller unbalanced ma D) Higher value of inherer	agnetic pull



9)	If synchronous motor fails to start, the A) Single phasing C) Low voltage	B)	obable cause co Over loading at Any of these		
10)	Turbo generators have A) Large diameter and large core length B) Large diameter and small core length C) Small diameter and small core length D) Small diameter and large core length	gth gth			
11)	The percentage of silicon in the core A) 1 to 2 percent B) 2 to 3 percent			D)	8 to 10 percent
12)	The stacking factor will be least for A) Square core C) Three stepped core		Cruciform core Four stepped co		
13)	In static transformers mechanical for A) Vibrations B) Gap between laminations C) Interaction of current flowing in the D) None of the above				
14)	The thickness of laminations of the co A) 0.003 to 0.05 mm C) 0.03 to 0.5 mm	B)	of a power trans 0.03 to 0.05 mn 3 to 5 mm		mer usually
15)	The heat generated in the transformer A) Conduction B) Convection				
16)	Power transformers should be design A) at one fourth load C) at or near full load	B)	to have maximu at one half load any of the abov		fficiency at
17)	In induction motors, small air gap noise level. A) increases, reduces C) reduces, also reduces	B)	reduces, increa	ses	3
18)	For small induction motors, the ratio (A) 0.6 B) 1.5		ength to pole pito 2.0		s taken as None of these
19)	Which type of slots are generally use A) Open type C) Closed type	B)	induction moto Semi-closed typ None of the abo	ре	
20)	For avoiding cogging in induction mot stator and rotor slots should not be A) P B) 3P		he difference be 5P		en the number of any of the above
	7) 1 0) 31	U)	JI	וט	arry or trie above



Seat	
No.	

B.E. (Electrical) (Part – I) (Old) Examination, 2017 ELECTRICAL MACHINE DESIGN

-3-

Day and Date: Monday, 22-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

2. Solve any four: (5×4=20)

a) Distinguish between core type and shell type transformer.

- b) For transformer show that Et = $K\sqrt{S}$.
- c) Explain choice of specific magnetic loading for induction motor.
- d) Derive how dispersion co-efficient affects maximum power factor of induction motor.
- e) Determine the dimensions of core and yoke for a 200 KVA, 50 Hz, single phase core type transformer. A cruciform core is used with distance between adjacent limbs equal to 1.6 times the width of core laminations. Assume voltage per turn is 14, maximum flux density 1.1 web/m², window space factor 0.32, current density 3 A/mm² and stacking factor = 0.9.

3. Solve any two: (10×2=20)

- a) Determine the main dimensions of the core, the number of turns and the cross-section of the conductors for 5 KVA, 11000 V/400 V, 50 Hz, 1-phase core type distribution t/f. 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 of the core, a flux density 1 wb/m². A current density 1.4 A/mm² and the window space factor 0.2. The height of the window is 3 times its width.
- b) Find the main dimensions of a 15 kW, 3-phase, 400 V, 50 Hz, 2810 rpm squirrel cage I.M. having an efficiency of 0.88 and a full load power factor of 0.9. Specific magnetic loading = 0.5 wb/m², specific electric loading = 25000 A/m. Take the peripheral speed as approximately 20 m/s at synchronous speed.



c) Determine the main dimensions of 3 phase, 3 leg core type transformer, the number of turns and the cross-section of the conductors for a 350 KVA, 11000/3300 v, star-delta, 50 Hz transformer. Assume volt per turn = 11, maximum flux density = 1.25 wb/m². Net cross-section of core = 0.6 d². Window space factor = 0.27, window proportions = 3:1, current density = 250 Amp/cm².

SECTION - II

4. Solve any four: (5×4=20)

- a) Draw the equivalent circuit diagram of single phase induction motor on the basis of double revolving field theory.
- b) Explain capacitor start phase single phase induction motor with circuit and vector diagram.
- c) Explain double revolving field theory of single phase induction motor.
- d) Derive the output equation of single phase induction motor.
- e) Explain salient pole synchronous machine with neat diagram.

5. Solve any two: (10×2=20)

- a) Derive an expression for power in smooth cylindrical synchronous machine.
- b) A 500 KVA, 3.3 KV, 50 Hz, 600 rpm, 3 phase salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 wb/m². The ratio of pole arc to pole pitch = 0.66, the short circuit ratio = 1.2 and the gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.
- c) Find the main dimensions of a 2500 KVA, 187.5 rpm, 50 Hz, 3-phase, 3 kV, salient pole synchronous machine. The alternator is to be vertical, water wheel type. The specific magnetic loading is 0.6 wb/m² and the specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. Specify the type of pole conduction used if the run-away speed is about 2 times the normal speed.

Seat No.	S
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B.E. (Electrical) (Part – I) (Old) Examination, 2017 FLECTRICAL MACHINE DESIGN

	EL	ECTRICAL MA	CH	INE DESIGN	ŕ		
-	d Date : Monday, 22 10.00 a.m. to 1.00 p					Max. N	Marks : 100
,	2) A	D. No. 1 is compulse Answer Book Pag nswer MCQ/Object on't forget to men	e N ctiv	lo. 3 . Each ques e type question	tion s o i	carries c 1 Page N	ne mark. o. 3 only.
		MCQ/Objective T	уре	Questions			
	n : 30 Minutes oose the correct an	swer:					Marks : 20 (1×20=20)
1)	Power transformer A) at one fourth loa C) at or near full lo	ad	B)	to have maximu at one half load any of the abov		efficiency	at
2)	In induction motors	s, small air gap		power	fac	tor and ₋	
	A) increases, reduC) reduces, also re		,	reduces, increasincreases, also			
3)	For small induction A) 0.6	motors, the ratio (B) 1.5		ength to pole pit 2.0		s taken a None of	
4)	Which type of slots A) Open type C) Closed type	are generally use	B)	induction moto Semi-closed ty None of the abo	ре		
5)	For avoiding coggii stator and rotor slo A) P	_		he difference be 5P		en the nu	
6)	The slip rings of work A) Electrolytic copp C) Cast iron	ound rotor machine	s a B)		,	,	
7)	In case of induction is taken as	n motors the ratio	of le	ngth to pole pite	ch fo	or minimi	ım cost,
	A) 1.0	B) 2 to 3	C)	1.5 to 2	D)	3 to 5	

8) In induction motor if the number of rotor slots is equal to the stator slots then

B) the motor will mil at zero slip
D) the motor may refuse to start

A) the motor will run smoothlyC) the noise level will be low



9)	Which of the following is the most ecomotor?	no	mical method of starting a single phase
	A) Resistance start method C) Capacitance start method	,	Inductance start method Split-phase method
10)	Out of the following motors, which wil A) Universal motor C) Shaded pole motor	B)	ve the highest starting torque ? Capacitor start motor All have zero starting torque
11)	The motor used in household refrigera A) dc series motor C) universal motor	B)	rs is dc shunt motor single phase induction motor
12)	Short circuit ratio for turbo-alternators A) 0.1 to 0.2 B) 0.2 to 0.4		usually 0.5 to 0.7 D) 0.8 to 0.95
13)	A synchronous machine having large A) Higher noise level C) Lower limit of stability	B)	gth of the air gap will have Smaller unbalanced magnetic pull Higher value of inherent regulation
14)	If synchronous motor fails to start, the A) Single phasing C) Low voltage	B)	obable cause could be Over loading at start Any of these
15)	Turbo generators have A) Large diameter and large core length B) Large diameter and small core length C) Small diameter and small core length D) Small diameter and large core length	gth gth	
16)	The percentage of silicon in the core (A) 1 to 2 percent B) 2 to 3 percent		
17)	The stacking factor will be least for A) Square core C) Three stepped core	,	Cruciform core Four stepped core
18)	In static transformers mechanical force A) Vibrations B) Gap between laminations C) Interaction of current flowing in the D) None of the above		
19)	The thickness of laminations of the co A) 0.003 to 0.05 mm C) 0.03 to 0.5 mm	B)	of a power transformer usually 0.03 to 0.05 mm 3 to 5 mm
20)	_		dissipated to the surroundings mainly by Radiation D) All of the above



Seat	
No.	

B.E. (Electrical) (Part – I) (Old) Examination, 2017 ELECTRICAL MACHINE DESIGN

-3-

Day and Date: Monday, 22-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four: (5×4=20)

a) Distinguish between core type and shell type transformer.

- b) For transformer show that Et = $K\sqrt{S}$.
- c) Explain choice of specific magnetic loading for induction motor.
- d) Derive how dispersion co-efficient affects maximum power factor of induction motor.
- e) Determine the dimensions of core and yoke for a 200 KVA, 50 Hz, single phase core type transformer. A cruciform core is used with distance between adjacent limbs equal to 1.6 times the width of core laminations. Assume voltage per turn is 14, maximum flux density 1.1 web/m², window space factor 0.32, current density 3 A/mm² and stacking factor = 0.9.

3. Solve any two: (10×2=20)

- a) Determine the main dimensions of the core, the number of turns and the cross-section of the conductors for 5 KVA, 11000 V/400 V, 50 Hz, 1-phase core type distribution t/f. 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 of the core, a flux density 1 wb/m². A current density 1.4 A/mm² and the window space factor 0.2. The height of the window is 3 times its width.
- b) Find the main dimensions of a 15 kW, 3-phase, 400 V, 50 Hz, 2810 rpm squirrel cage I.M. having an efficiency of 0.88 and a full load power factor of 0.9. Specific magnetic loading = 0.5 wb/m², specific electric loading = 25000 A/m. Take the peripheral speed as approximately 20 m/s at synchronous speed.



c) Determine the main dimensions of 3 phase, 3 leg core type transformer, the number of turns and the cross-section of the conductors for a 350 KVA, 11000/3300 v, star-delta, 50 Hz transformer. Assume volt per turn = 11, maximum flux density = 1.25 wb/m². Net cross-section of core = 0.6 d². Window space factor = 0.27, window proportions = 3:1, current density = 250 Amp/cm².

SECTION - II

4. Solve any four: (5×4=20)

- a) Draw the equivalent circuit diagram of single phase induction motor on the basis of double revolving field theory.
- b) Explain capacitor start phase single phase induction motor with circuit and vector diagram.
- c) Explain double revolving field theory of single phase induction motor.
- d) Derive the output equation of single phase induction motor.
- e) Explain salient pole synchronous machine with neat diagram.

5. Solve any two: (10×2=20)

- a) Derive an expression for power in smooth cylindrical synchronous machine.
- b) A 500 KVA, 3.3 KV, 50 Hz, 600 rpm, 3 phase salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 wb/m². The ratio of pole arc to pole pitch = 0.66, the short circuit ratio = 1.2 and the gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.
- c) Find the main dimensions of a 2500 KVA, 187.5 rpm, 50 Hz, 3-phase, 3 kV, salient pole synchronous machine. The alternator is to be vertical, water wheel type. The specific magnetic loading is 0.6 wb/m² and the specific electric loading is 34000 A/m. Use circular poles with ratio of core length to pole pitch = 0.65. Specify the type of pole conduction used if the run-away speed is about 2 times the normal speed.

Seat	Set	Р
No.		

140.							<u></u>
	B.E. (Part -		(Electrical Er WER PLANT I	_	neering) Exami GINEERING	nat	ion, 2017
•	Date : Wednesda 0.00 a.m. to 1.00 p	•	017				Total Marks : 100
1	Instructions :	Answe 2) Answ forget	er Book Page No er MCQ/Objectiv to mention, Q.I	. 3. ve ty P. S	Each question cal	rries Pag	ge No. 3 only. Don't
Duration	: 30 Minutes	M	CQ/Objective T	ype	Questions		Marks : 20
1. Cho	oose the correct a	answer:					(20×1=20)
1)	Boiling water read A) Nuclear read		oressurized wate Solar reactor		actors are OTEC	D)	Biogas reactor
2)	In a hydro-electr turbine is known A) Dam	as	conduct system Reservoir		aking water from the Penstock		ntake works to the Surge tank
3)	Photovoltaic sola A) fuel cell		conversion syste		nakes use of solar pond	D)	none of the above
4)	The horse powe A) 100 to 200		sel locomotive is 6 500 to 1000		e order of 2000 to 2500	D)	10,000 to 12,000
5)	Fuel cells are A) Carbon cell C) Nuclear cell				Hydrogen battery Chromium cell	′	
6)	Which auxiliary (A) Compressor (C) Burner	•	oine consumes m	B)	of the power ? Combustion char Fuel pump	nber	
7)	C) pressure ren	es, temper es, temper nains cons	ature remains co	atur	e rises		
8)	Diesel engines for A) horizontal		olants are usually supercharged		slow speed	D)	air cooled
9)	Which power pla A) Diesel engine C) Stem turbine	e plant	ly operates at hiç	B)	peeds ? Petrol engine plar Hydro-electric po		plant
10)	Which variety of					D)	Anthropito
	A) Steam-coal	B)	Bituminous coal	U)	Lignite	U)	Anthracite



11)	Which of the followingA) Highly pollutingC) Unreliable supply	f most of the renewable energy sources ? B) High waste disposal cost D) High running cost				
12)	In a steam turbine cy A) turbine inlet	cle, the lowest pressons B) condenser		pressure occurs in boiler		super heater
13)	Particles having the sa A) Positrons C) Isotopes	ame atomic number b	B)	lifferent mass num Beta particles Decayed panicles		are called
14)	Maximum efficiency of			-		/
	A) 30%	B) 40%	C)	50%	D)	60%
	Which among the followA) Interference with sB) Pollution and heal into the seaC) Navigational hazarD) None of the above	spawing and migration th hazard in the estua r	of of	fish		
16)	Outward radial flow tu A) are impulses turbin B) are reaction turbin C) are partly impulse D) may be impulse or	nes es partly reaction turbine	es			
17)	Dam: Hydro plant :: A) Chimney : Gases C) Reactor : Nuclear	plant	•	Coal : Steam plan Gas turbine : Stea		urbine
18)	In a thermal power pla A) condense low pres B) cool condensed st C) cool the water use D) cool feed water of	ant cooling towers are ssure steam eam ed in condenser for co	use	ed to		
19)	Photovoltaic energy is A) Chemical energy C) Electricity	the conversion of su	B)	ht into Biogas Geothermal enerç	ЭУ	
20)	In kaplan turbine runn A) 16 – 24	er, the number of blac B) 8 – 10		is usually of the ord 6 – 8		of 3 – 6



Seat	
No.	

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Wednesday, 24-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four:

- 1) With neat sketch explain working of solar cell.
- 2) Draw typical layout of nuclear power plant.
- 3) State different types of boilers and explain any one among them.
- 4) Define the following.

Diversity factor, Demand factor, Load factor, Utilization factor.

5) What are the factors affecting the power plant design?

3. Solve any two:

- 1) With neat sketches explain briefly the Tidal power plant and Geo thermal power plant.
- 2) Explain different methods to calculate the efficiency of boiler.
- 3) What are the effects of power plant type on cost, tariffs and customer elements?

SECTION - II

4. Solve any four:

1) Explain the following with reference to atomic structure.

Atomic number, mass number, isotopes.

Set P



- 2) Explain super heaters and re-heaters used in boilers.
- 3) What are the safety measures for operation of nuclear power plant?
- 4) Discuss the harmful effect of emission and steps taken for and their impact.
- 5) With neat diagram explain diesel power plant.

5. Solve any two:

- 1) Draw typical layout of thermal power plant and explain it briefly.
- 2) With a neat diagram explain CANDU type reactor and gas cooled reactor.
- 3) Draw and explain different types of Hydro turbines.

Seat	Set	
No.	Set	_

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017 POWER PLANT ENGINEERING

Day and Date : Wednesday, 24-5-2017	Total Marks : 100
T: 10.00 I 1.00	

Time: 10.00 a.m. to 1.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Assume the suitable data whenever necessary.

MCQ/Objective Type Questions

Duration : 30 Minutes

1. Choose the correct answer :

(20×1=20)

- 1) Outward radial flow turbines
 - A) are impulses turbines
 - B) are reaction turbines
 - C) are partly impulse partly reaction turbines
 - D) may be impulse or reaction turbines
- 2) Dam: Hydro plant ::

A) Chimney: Gases B) Coal: Steam plant

C) Reactor: Nuclear plant D) Gas turbine: Steam turbine

- 3) In a thermal power plant cooling towers are used to
 - A) condense low pressure steam
 - B) cool condensed steam
 - C) cool the water used in condenser for condensing steam
 - D) cool feed water of boiler
- 4) Photovoltaic energy is the conversion of sunlight into
 - A) Chemical energy

B) Biogas

C) Electricity

- D) Geothermal energy
- 5) In kaplan turbine runner, the number of blades is usually of the order of
 - A) 16-24
- B) 8 10
- C) 6 8
- D) 3-6
- 6) Boiling water reactor and pressurized water reactors are
 - A) Nuclear reactor
- B) Solar reactor
- C) OTEC
- D) Biogas reactor
- 7) In a hydro-electric plant a conduct system for taking water from the intake works to the turbine is known as
 - A) Dam
- B) Reservoir
- C) Penstock
- D) Surge tank

8)	Photovoltaic solar energy conversion system A) fuel cell B) solar cell	em makes use of C) solar pond	D)	none of the above
9)	The horse power of a Diesel locomotive is a A) 100 to 200 B) 500 to 1000	of the order of C) 2000 to 2500	D)	10,000 to 12,000
10)	Fuel cells are A) Carbon cell C) Nuclear cell	B) Hydrogen battery D) Chromium cell	,	
11)	Which auxiliary of gas turbine consumes m A) Compressor C) Burner	ost of the power ? B) Combustion chan D) Fuel pump	nber	
12)	In a super-heater A) pressure rises, temperature drops B) pressure rises, temperature remains co C) pressure remains constant and tempera D) both pressure and temperature remains	ature rises		
13)	Diesel engines for power plants are usually A) horizontal B) supercharged		D)	air cooled
14)	Which power plant normally operates at hig A) Diesel engine plant C) Stem turbine plant	nh speeds ? B) Petrol engine plar D) Hydro-electric po		plant
15)	Which variety of coal has lowest calorific val. A) Steam-coal B) Bituminous coal		D)	Anthracite
16)	Which of the following is a disadvantage of A) Highly polluting C) Unreliable supply	most of the renewable B) High waste dispo D) High running cost	sal	•
17)	In a steam turbine cycle, the lowest pressi	ure pressure occurs in	I	
	A) turbine inlet B) condenser	C) boiler	D)	super heater
18)	Particles having the same atomic number back A) Positrons C) Isotopes	out different mass num B) Beta particles D) Decayed panicles		s are called
19)	Maximum efficiency of an open cycle gas to A) 30% B) 40%	urbine is nearly C) 50%	D)	60%
20)	 Which among the following is not an adverse of A) Interference with spawing and migration B) Pollution and health hazard in the estudinto the sea C) Navigational hazar D) None of the above 	n of fish		



Seat	
No.	

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Wednesday, 24-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four:

- 1) With neat sketch explain working of solar cell.
- 2) Draw typical layout of nuclear power plant.
- 3) State different types of boilers and explain any one among them.
- 4) Define the following.

Diversity factor, Demand factor, Load factor, Utilization factor.

5) What are the factors affecting the power plant design?

3. Solve any two:

- 1) With neat sketches explain briefly the Tidal power plant and Geo thermal power plant.
- 2) Explain different methods to calculate the efficiency of boiler.
- 3) What are the effects of power plant type on cost, tariffs and customer elements?

SECTION - II

4. Solve any four:

1) Explain the following with reference to atomic structure.

Atomic number, mass number, isotopes.

Set Q



- 2) Explain super heaters and re-heaters used in boilers.
- 3) What are the safety measures for operation of nuclear power plant?
- 4) Discuss the harmful effect of emission and steps taken for and their impact.
- 5) With neat diagram explain diesel power plant.

5. Solve any two:

- 1) Draw typical layout of thermal power plant and explain it briefly.
- 2) With a neat diagram explain CANDU type reactor and gas cooled reactor.
- 3) Draw and explain different types of Hydro turbines.

B) are reaction turbines

C) are partly impulse partly reaction turbines

D) may be impulse or reaction turbines

SLR-VB - 338

Seat	Set	R
No.		

	B.E. (Part	, , , , ,	Electrical Engi ER PLANT ENG	neering) Exami GINEERING	nation, 2017
•	Date: Wedneso 0.00 a.m. to 1.00	•	7		Total Marks : 100
1	Instructions :	Answer E 2) Answer forget to	Book Page No. 3 . MCQ/Objective t o mention, Q.P. S	Each question cal	Page No. 3 only. Don't op of Page.
Duration	: 30 Minutes	MCC	Q/Objective Type	Questions	Marks : 20
1. Cho	ose the correct	answer:			(20×1=20)
1)	Which of the fol A) Highly pollut C) Unreliable s	ting	В)	st of the renewable High waste dispo High running cos	
2)	In a steam turb A) turbine inlet	-	•	pressure occurs ir boiler	n D) super heater
3)	Particles having A) Positrons C) Isotopes	the same ato	В)	lifferent mass num Beta particles Decayed panicle	
4)	Maximum efficie A) 30%	ency of an op B) 40	en cycle gas turbi	ne is nearly 50%	D) 60%
5)	A) Interference	with spawing d health haza I hazar	g and migration of	fish	of tidal power generation
6)	Outward radial f				

7)	Dam: Hydro plant :: A) Chimney : Gases C) Reactor : Nuclear	plant	B) Coal : Steam plar D) Gas turbine : Steam		urbine	
8)	In a thermal power plant cooling towers are used to A) condense low pressure steam B) cool condensed steam C) cool the water used in condenser for condensing steam D) cool feed water of boiler					
9)	Photovoltaic energy is A) Chemical energy C) Electricity	the conversion of su	nlight into B) Biogas D) Geothermal ener	ду		
10)	In kaplan turbine runne A) 16 – 24	er, the number of blace $B) 8-10$	des is usually of the or $C) 6-8$		of 3 – 6	
11)	Boiling water reactor a A) Nuclear reactor	nd pressurized wate B) Solar reactor	r reactors are C) OTEC	D)	Biogas reactor	
12)	In a hydro-electric plan turbine is known as	nt a conduct system	for taking water from t	he i	ntake works to the	
	A) Dam	B) Reservoir	C) Penstock	D)	Surge tank	
13)	Photovoltaic solar ene	rgy conversion syste B) solar cell	em makes use of C) solar pond	D)	none of the above	
14)	The horse power of a A) 100 to 200	Diesel locomotive is on B) 500 to 1000	of the order of C) 2000 to 2500	D)	10,000 to 12,000	
15)	Fuel cells are A) Carbon cell C) Nuclear cell		B) Hydrogen battery D) Chromium cell	,		
16)	Which auxiliary of gas A) Compressor C) Burner	turbine consumes m	ost of the power? B) Combustion char D) Fuel pump	nber		
17)	In a super-heater A) pressure rises, ten B) pressure rises, ten C) pressure remains of D) both pressure and	nperature remains co constant and tempera	ature rises			
18)	Diesel engines for pov A) horizontal	ver plants are usually B) supercharged		D)	air cooled	
19)	Which power plant nor A) Diesel engine plan C) Stem turbine plant	mally operates at hig	•		plant	
20)	Which variety of coal h	nas lowest calorific va B) Bituminous coal		D)	Anthracite	



Seat	
No.	

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Wednesday, 24-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four:

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- 2) Explain different methods to calculate the efficiency of boiler.
- 3) What are the effects of power plant type on cost, tariffs and customer elements?

SECTION - II

4. Solve any four:

1) Explain the following with reference to atomic structure.

Atomic number, mass number, isotopes.

Set R



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- 4) Discuss the harmful effect of emission and steps taken for and their impact.
- 5) With neat diagram explain diesel power plant.

5. Solve any two:

- 1) Draw typical layout of thermal power plant and explain it briefly.
- 2) With a neat diagram explain CANDU type reactor and gas cooled reactor.
- 3) Draw and explain different types of Hydro turbines.

Seat	
No.	

	B.E. (Part		(Electrical En	_	•	nat	ion, 2017
•	Date : Wedneso 0.00 a.m. to 1.00	•	2017				Total Marks : 100
	Instructions :	Answe 2) Answe forget	er Book Page No.	3. E e ty: P. Se	Each question can pe questions on et (P/Q/R/S) on T	rries Pag	ge No. 3 only. Don't
. .:	00.14"	M	ICQ/Objective Ty	ype (Questions		M 1 00
Duration	: 30 Minutes						Marks : 20
1. Cho	oose the correct	answer :					(20×1=20)
1)	Which auxiliary A) Compresso C) Burner	_	oine consumes m	B)	of the power ? Combustion char Fuel pump	nber	
2)	C) pressure rer	es, temper es, temper mains cons	rature drops rature remains co stant and tempera perature remains	ature	rises		
3)	Diesel engines (A) horizontal		olants are usually supercharged		slow speed	D)	air cooled
4)	Which power place A) Diesel engin C) Stem turbine	ne plant	ly operates at hig	B)	eeds ? Petrol engine plaı Hydro-electric po		plant
5)	Which variety o	f coal has	lowest calorific va	alue	?		
	A) Steam-coal	B)	Bituminous coal	C)	Lignite	D)	Anthracite
6)	Which of the fol A) Highly pollut C) Unreliable s	ing	disadvantage of	B)	t of the renewable High waste dispo High running cos	sal	••
7)	In a steam turb A) turbine inlet	•	the lowest pressu	•	ressure occurs ir boiler		super heater
C \	•	,		,		,	·
8)	Particles having A) Positrons	tne same	atomic number b		tterent mass num Beta particles	pers	s are called
	C) Isotopes			-	Decayed panicle	s	
	, ,			,			



9)	Maximum efficiency of A) 30%	an open cycle gas t B) 40%	urbine is nearly C) 50%	D) 60%
10)	Which among the follow A) Interference with s	pawing and migration th hazard in the estu	n of fish	of tidal power generation of flow of polluted water
11)	Outward radial flow turn A) are impulses turbin B) are reaction turbin C) are partly impulse D) may be impulse or	nes es partly reaction turbin	es	
12)	Dam: Hydro plant :: A) Chimney : Gases C) Reactor : Nuclear	plant	B) Coal: Steam pla D) Gas turbine: Ste	
13)	In a thermal power pla A) condense low pres B) cool condensed st C) cool the water use D) cool feed water of	ssure steam eam d in condenser for co		
14)	Photovoltaic energy is A) Chemical energy C) Electricity	the conversion of su	nlight into B) Biogas D) Geothermal ene	rgy
15)	In kaplan turbine runne A) 16 – 24	er, the number of blace B) 8 – 10	des is usually of the o C) $6-8$	rder of D) 3-6
16)	Boiling water reactor a A) Nuclear reactor	ind pressurized wate	r reactors are	D) Biogas reactor
17)	In a hydro-electric plan turbine is known as A) Dam	nt a conduct system B) Reservoir	for taking water from C) Penstock	the intake works to the
18)	Photovoltaic solar ene A) fuel cell	,	,	D) Surge tankD) none of the above
19)	The horse power of a A) 100 to 200	,	, ·	D) 10,000 to 12,000
20)	Fuel cells are A) Carbon cell C) Nuclear cell	,	B) Hydrogen batter D) Chromium cell	



Seat	
No.	

B.E. (Part – I) (Old) (Electrical Engineering) Examination, 2017 POWER PLANT ENGINEERING

Day and Date: Wednesday, 24-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION - I

2. Solve any four:

- 1) With neat sketch explain working of solar cell.
- 2) Draw typical layout of nuclear power plant.
- 3) State different types of boilers and explain any one among them.
- 4) Define the following.

Diversity factor, Demand factor, Load factor, Utilization factor.

5) What are the factors affecting the power plant design?

3. Solve any two:

- 1) With neat sketches explain briefly the Tidal power plant and Geo thermal power plant.
- 2) Explain different methods to calculate the efficiency of boiler.
- 3) What are the effects of power plant type on cost, tariffs and customer elements?

SECTION - II

4. Solve any four:

1) Explain the following with reference to atomic structure.

Atomic number, mass number, isotopes.

Set S





- 2) Explain super heaters and re-heaters used in boilers.
- 3) What are the safety measures for operation of nuclear power plant?
- 4) Discuss the harmful effect of emission and steps taken for and their impact.
- 5) With neat diagram explain diesel power plant.

5. Solve **any two**:

20

- 1) Draw typical layout of thermal power plant and explain it briefly.
- 2) With a neat diagram explain CANDU type reactor and gas cooled reactor.
- 3) Draw and explain different types of Hydro turbines.

No. Set P	Seat No.	Set]
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B.F. (Flectrical Engineering) (Part – II) Examination 2017

FLE	•	•	• .	M AND HVDO	TRANSMISSION	ON
•	d Date : Tuesda 3.00 p.m. to 6.0	•			Total Marks	: 100
ı	Instructions :	Answer Bo 2) Assume s 3) Non-Progr 4) Answer M	ook Page No. 3 suitable data w rammable calc l CQ/Objective	. Each question ca herever necessa ulators are permi	ry. itted. n Page No. 3 only.	
Duration	n : 30 Minutes	MCQ/C	bjective Type	Questions	Mark	ks : 20
1. Ch	oose the correc	t answer:				20
1)	substraction.		r power transm -C c)	_	nt in a multi-maching	е
2)	In SVC the Isn a) Same	n and Isr are	erent c)		d) None	
3)	a) SSSC	s operated with b) TCE	nout an externa BR c)	al electric energy SVS	source. d) IPFC	
4)		f using synchro _ characteristic	s. b)	ource of series co F vs Z δ vs Z	mpensation is base	d
5)		ne so as to im	prove its voltag b)	ion at the receivir ge profile. Resistor Condensor, Res		
6)	The power flow a) α c) δ	w increased w	b)	X (transmission All the above	line reactance)	
7)			n method is oເ		resonance present d) All the above	t,



8)	As the degree of series compensation in a) Voltage stability c) Transmission line reactance	b)	Power factor	increase.
0)	•	•		U. d. e. e
9)	Sustained oscillations below the fundama) Subsynchronous oscillations c) Power oscillations	b)	tal frequency is ca Damped oscillation None	
10)	The SSSC injects the compensating a) Current, series c) Voltage, series	b)	in Impedance, series Voltage, shunt	
11)	Arc-back is a fault and results a) Self clearing c) Commutation failure	b)	severe stress on tra Non-self clearing Both a) and b)	ansformer winding.
12)	Misfire occurs a) The presence of an unwanted signal b) Because of duplicated converter con c) The required gate pulse is missing d) Both a) and b)		s	
13)	Protection of MTDC system can be done a) High speed disconnecting switches c) Differential type protection	b)		ol
14)	The AC system is said to week if SCR is a) Equal to 3 b) Less than 3		Greater than 3	d) None of the above
15)	CCC stands for a) Capacitor Compressed Converter c) Capacitor Commutated Converter		Capacitor Commu None of the above	
16)	Harmonic instability problem particularly a) IPC schemec) Current controller	b)	n low short circuit ra EPC scheme Current extinguish	
17)	The bypassing of the bridge can be don a) Replacing a single valve in the arm c) Activating a bypass pair in the bridge	e w b)	ith the help of Replacing both va	llve in same arm
18)	For damped filter, the quality factor (Q) is	S		
	a) $\frac{X_0}{R}$ b) $\frac{1}{GX_0}$	c)	$\frac{X_0}{X}$	$\frac{X_0}{Z}$
19)	During switching in, the filter currents of times the harmonics current in normal of a) 10 to 20 b) 20 to 40	per	ation.	ranging
20)	For slow variations in the load,a) Switched capacitors c) TCR	b)		,



Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-Programmable calculators are **permitted**.

SECTION - I

2. Solve any four of the following:

20

- 1) Compare TCR, TSC and TSC.
- 2) Explain static VAR SYSTEM.
- 3) Explain TCSC.
- 4) Explain switching converter based voltage and phase angle regulator.
- 5) Explain direct voltage control STATCOM.
- 3. Solve any two:

20

- 1) Compare V-I and V-Q characteristics of statcom and SVC compensating devices.
- 2) Describe how to improve the transient stability with static series compensation.
- 3) Write short notes on the following:
 - i) Benefits from FACTS Controllers.
 - ii) Objectives of static series compensation.



SECTION - II

4. Solve any four of the following:

20

- 1) Explain planning for HVDC transmission system.
- 2) Explain the special feature of converter transformers.
- 3) Write basic operating principles and characteristics for IPFC.
- 4) Explain Phase Angle Regulator.
- 5) Explain the function BI-polar DC link.
- 5. Solve any two:

20

- 1) Give detailed comparison between HVDC and AC transmission.
- 2) Explain the significance of commutation margin angle and extinction angle.
- 3) Draw the basic converter control hierarchy and explain firing angle control in detail.

				SLK-VD -	339
Seat No.				Set	Q
FLE	•	•	ing) (Part – II) Ex SYSTEM AND H	amination, 2017	ION
•	nd Date : Tuesda 3.00 p.m. to 6.0	• •		Total Mark	s:100
	Instructions:	Answer Book P 2) Assume suitals 3) Non-Programn 4) Answer MCQ/	age No. 3. Each ques ble data wherever ne nable calculators are j	permitted. ons on Page No. 3 only	
Duratio	on : 30 Minutes	MCQ/Object	tive Type Questions		rks : 20
Duranc	on . 30 Minutes			iviai	NS . 20
1. Cł	noose the correc	t answer :			20
1]) Harmonic insta a) IPC schem c) Current cor	е	b) EPC schei	circuit ratios, is the drawb me tinguish angle controlle	
2	a) Replacing	a single valve in th	,	of both valve in same arm ig same arm from conve	
3) For damped fil	ter, the quality facto	or (Q) is		
	a) $\frac{X_0}{R}$	b) $\frac{1}{GX_0}$	c) $\frac{X_0}{X}$	d) $\frac{X_0}{Z}$	
4		nonics current in no		itudes rangingd) 20 to 1000	_
5) For slow variation (a) Switched control (c) TCR	tions in the load,	provide co b) Inverters d) All of the a	ontrol.	
6) Following contraction.a) IPFC	roller is used for pow b) UPFC	ver transmission mana c) SVC	gement in a multi-machii d) TCSC	ne
7) In SVC the Isn a) Same		c) Unity	d) None	
8) is a) SSSC	operated without by TCBR	an external electric er c) SVS	nergy source. d) IPFC	



9)		e source of series compensation is based
	on characteristics. a) Z vs F	b) F vs Z
	c) I vs Z	d) δ vs Z
10)	are used to provide compen	,
10)	transmission line so as to improve its vo	
	a) Condensor	b) Resistor
	c) Reactors	d) Condensor, Resistor or Reactors
11)	The power flow increased with increase	d in
	a) α	b) X (transmission line reactance)
	c) δ	d) All the above
12)	At high degree of compensation and deg the compensation method is	s out used.
	a) TSSC b) GCSC	c) TCSC d) All the above
13)	As the degree of series compensation in	
		b) Power factor
4.4\	c) Transmission line reactance	,
14)	Sustained oscillations below the fundam	, ,
	a) Subsynchronous oscillationsc) Power oscillations	
15)	The SSSC injects the compensating	,
.0,	a) Current, series	b) Impedance, series
	c) Voltage, series	d) Voltage, shunt
16)	Arc-back is a fault and results	s in severe stress on transformer winding.
	a) Self clearing	b) Non-self clearing
	c) Commutation failure	d) Both a) and b)
17)	Misfire occurs	
	a) The presence of an unwanted signal	
	b) Because of duplicated converter conc) The required gate pulse is missing	irois
	d) Both a) and b)	
18)	Protection of MTDC system can be done	e hv
. 0,	a) High speed disconnecting switches	
	c) Differential type protection	d) All of the above
19)	The AC system is said to week if SCR is	3
-	a) Equal to 3 b) Less than 3	c) Greater than 3 d) None of the above
20)	CCC stands for	
	a) Capacitor Compressed Converter	b) Capacitor Commutator Converter
	c) Capacitor Commutated Converter	d) None of the above



Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-Programmable calculators are **permitted**.

SECTION - I

2. Solve any four of the following:

20

- 1) Compare TCR, TSC and TSC.
- 2) Explain static VAR SYSTEM.
- 3) Explain TCSC.
- 4) Explain switching converter based voltage and phase angle regulator.
- 5) Explain direct voltage control STATCOM.
- 3. Solve any two:

20

- 1) Compare V-I and V-Q characteristics of statcom and SVC compensating devices.
- 2) Describe how to improve the transient stability with static series compensation.
- 3) Write short notes on the following:
 - i) Benefits from FACTS Controllers.
 - ii) Objectives of static series compensation.



SECTION - II

4. Solve any four of the following:

20

- 1) Explain planning for HVDC transmission system.
- 2) Explain the special feature of converter transformers.
- 3) Write basic operating principles and characteristics for IPFC.
- 4) Explain Phase Angle Regulator.
- 5) Explain the function BI-polar DC link.
- 5. Solve any two:

20

- 1) Give detailed comparison between HVDC and AC transmission.
- 2) Explain the significance of commutation margin angle and extinction angle.
- 3) Draw the basic converter control hierarchy and explain firing angle control in detail.

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	l .	<u>+</u>	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date: Tuesday, 16-5-2017	Total Marks : 100
Time: 3.00 p.m. to 6.00 p.m.	
Instructions: 1) Q. No. 1 is compuls	sory. It should be solved in first 30 minutes in

Answer Book Page No. 3. Each question carries one mark. 2) Assume suitable data wherever necessary.

- 3) Non-Programmable calculators are permitted.
- 4) Answer MCO/Objective type questions on Page No. 3 only. Don't

		· · · · · · · · · · · · · · · · · · ·		• • • • • • • • • • • • • • • • • • • •
		MCQ/Objective Ty	/pe	Questions
Dur	MCQ/Objective Type Questions Marks: 20 1. Choose the correct answer: 20 1. Arc-back is a fault and results in severe stress on transformer winding. a) Self clearing			
1.	Cho	oose the correct answer :		20
	1)	a) Self clearing	b)	Non-self clearing
	2)	a) The presence of an unwanted signalb) Because of duplicated converter conc) The required gate pulse is missing		ls
	3)	a) High speed disconnecting switches	b)	Fast current control
	4)			Greater than 3 d) None of the above
	5)	a) Capacitor Compressed Converter	,	•
	6)	a) IPC scheme	b)	EPC scheme
	7)	a) Replacing a single valve in the arm	b)	Replacing both valve in same arm



8)	For damped filter, the	quality factor (Q) i	S			
	a) $\frac{X_0}{R}$	b) $\frac{1}{GX_0}$	c)	$\frac{X_0}{X}$	d)	$\frac{X_0}{Z}$
9)	During switching in, times the harmonics	current in normal o	per	ation.		
40\	a) 10 to 20	·				20 to 1000
10)	For slow variations in a) Switched capacito c) TCR	n the load, ors	b)	_ provide control. Inverters All of the above		
11)	Following controller is substraction.	·		_		
4.0\	•	b) UPFC	C)	SVC	a)	TCSC
,	·	b) Different	-		-	
13)	a) SSSC	ated without an exte	erna	al electric energy	sou	rce.
14)	The concept of using on chara		je s	ource of series co	mpe	ensation is dased
	a) Z vs F		b)	F vs Z		
	c) I vs Z		d)	δ vs Z		
15)	are used				ng e	end of a
	transmission line so a a) Condensor	as to improve its vo		ge prollie. Resistor		
	c) Reactors		,	Condensor, Res	isto	r or Reactors
16)	The power flow incre	ased with increase				
	a) α			X (transmission	line	reactance)
4 =\	c) δ		•	All the above		
17)	At high degree of conthe compa) TSSC		s ou			All the above
18)	As the degree of seri a) Voltage stability c) Transmission line	·	b)	eases, the Power factor All of these		_ increase.
19)	Sustained oscillation		,		alle	d as
10)	a) Subsynchronousc) Power oscillation	oscillations	b)	Damped oscillat		
20)	The SSSC injects the	e compensating	-	in		with the line.
	a) Current, seriesc) Voltage, series		,	Impedance, serie Voltage, shunt	es	



Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-Programmable calculators are **permitted**.

SECTION - I

2. Solve any four of the following:

20

- 1) Compare TCR, TSC and TSC.
- 2) Explain static VAR SYSTEM.
- 3) Explain TCSC.
- 4) Explain switching converter based voltage and phase angle regulator.
- 5) Explain direct voltage control STATCOM.
- 3. Solve any two:

20

- 1) Compare V-I and V-Q characteristics of statcom and SVC compensating devices.
- 2) Describe how to improve the transient stability with static series compensation.
- 3) Write short notes on the following:
 - i) Benefits from FACTS Controllers.
 - ii) Objectives of static series compensation.



SECTION - II

4. Solve any four of the following:

20

- 1) Explain planning for HVDC transmission system.
- 2) Explain the special feature of converter transformers.
- 3) Write basic operating principles and characteristics for IPFC.
- 4) Explain Phase Angle Regulator.
- 5) Explain the function BI-polar DC link.
- 5. Solve any two:

20

- 1) Give detailed comparison between HVDC and AC transmission.
- 2) Explain the significance of commutation margin angle and extinction angle.
- 3) Draw the basic converter control hierarchy and explain firing angle control in detail.

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Seat No.	Set	S
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B.E. (Electrical Engineering) (Part – II) Examination, 2017 FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date: Tuesday, 16-5-2017	Total Marks: 100
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Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

- 2) Assume suitable data wherever necessary.
- 3) Non-Programmable calculators are **permitted**.
- 4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective T	ype Questions
Duration: 30 Minutes	Marks : 20
1. Choose the correct answer:	20
1) The power flow increased with increase a) α c) δ	ed in b) X (transmission line reactance) d) All the above
2) At high degree of compensation and degree the compensation method is a) TSSC b) GCSC	gree subsynchronous resonance present, s out used.
3) As the degree of series compensation in	ncreases, the increase. b) Power factor
4) Sustained oscillations below the fundara) Subsynchronous oscillationsc) Power oscillations	, ,
5) The SSSC injects the compensatinga) Current, seriesc) Voltage, series	b) Impedance, series d) Voltage, shunt
6) Arc-back is a fault and resulta) Self clearingc) Commutation failure	ts in severe stress on transformer winding. b) Non-self clearing d) Both a) and b)
 7) Misfire occurs a) The presence of an unwanted signal b) Because of duplicated converter corc c) The required gate pulse is missing d) Both a) and b) 	



8)	Protection of MTDC system can be don a) High speed disconnecting switches c) Differential type protection	b)	Fast current conf	trol	
9)	The AC system is said to week if SCR i a) Equal to 3 b) Less than 3		Greater than 3	d)	None of the above
10)	CCC stands for a) Capacitor Compressed Converter c) Capacitor Commutated Converter				tor Converter
11)	Harmonic instability problem particularly a) IPC scheme c) Current controller	b)	n low short circuit EPC scheme Current extinguis		
12)	The bypassing of the bridge can be don a) Replacing a single valve in the arm c) Activating a bypass pair in the bridge	b)	Replacing both v		
13)	For damped filter, the quality factor (Q) i	S			
	a) $\frac{X_0}{R}$ b) $\frac{1}{GX_0}$	c)	$\frac{X_0}{X}$	d)	$\frac{X_0}{Z}$
14)	During switching in, the filter currents of times the harmonics current in normal of a) 10 to 20 b) 20 to 40	per	ation.		
15)	For slow variations in the load,a) Switched capacitors c) TCR	b)	_ provide control. Inverters All of the above	ŕ	
16)	Following controller is used for power tran	nsm	ission manageme	nt ir	n a multi-machine
	substraction. a) IPFC b) UPFC	c)	SVC	d)	TCSC
	In SVC the Ism and Isr are	٥)	Lloity	۹/	None
18)	a) Same b) Different is operated without an exte	,	-	•	
10)	a) SSSC b) TCBR		SVS		IPFC
19)	The concept of using synchronous voltage on characteristics.	je s	ource of series co	mpe	ensation is based
	a) Z vs F	,	F vs Z		
	c) I vs Z	,	δ vs Z		
20)	are used to provide comper			ıg e	end of a
	transmission line so as to improve its vo a) Condensor		ge profile. Resistor		
	c) Reactors	,	Condensor, Res	isto	r or Reactors



Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 FLEXIBLE AC TRANSMISSION SYSTEM AND HVDC TRANSMISSION

Day and Date: Tuesday, 16-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Assume suitable data wherever necessary.

2) Non-Programmable calculators are **permitted**.

SECTION - I

2. Solve any four of the following:

20

- 1) Compare TCR, TSC and TSC.
- 2) Explain static VAR SYSTEM.
- 3) Explain TCSC.
- 4) Explain switching converter based voltage and phase angle regulator.
- 5) Explain direct voltage control STATCOM.
- 3. Solve any two:

20

- 1) Compare V-I and V-Q characteristics of statcom and SVC compensating devices.
- 2) Describe how to improve the transient stability with static series compensation.
- 3) Write short notes on the following:
 - i) Benefits from FACTS Controllers.
 - ii) Objectives of static series compensation.



SECTION - II

4. Solve any four of the following:

20

- 1) Explain planning for HVDC transmission system.
- 2) Explain the special feature of converter transformers.
- 3) Write basic operating principles and characteristics for IPFC.
- 4) Explain Phase Angle Regulator.
- 5) Explain the function BI-polar DC link.
- 5. Solve any two:

20

- 1) Give detailed comparison between HVDC and AC transmission.
- 2) Explain the significance of commutation margin angle and extinction angle.
- 3) Draw the basic converter control hierarchy and explain firing angle control in detail.

Seat	
No.	

B.E. (Part - II) (Electrical) Examination, 2017 **ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Max. Marks: 100 Day and Date: Thursday, 18-5-2017

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the right indicate full marks.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

			MCQ/Objective T	ype	Questions		
Dur	atio	n : 30 Minutes			4.1		Marks:
1.	Ch	oose the correct ans	swer:				
	1)	Brake test isa) Regenerative				d)	All of these
	2)	Swinburne test is a a) Load test		c)	No load test	d)	Full load test
	3)	In fire extinguisher a) CO ₂	we use b) SO ₂	c)	O ₂	d)	H ₂ O
	4)	Do's and Don'ts are a) IS 5216-1962		-	• •		•
	5)	The torque of induct a) Directly proportion inversly proport	ional to V				
	6)	While conducting n of excess load 50 l a) 2 sec.	H.P. motor is				tor, the duration 9.5 sec.
	7)	In moisture proofne a) 70%	ess test, humidity i b) 80%		naintained to 90%	d)	110%

20

SLR-VB-3	340		-2-		
,	stance is			minimum insulation	
, ,			c) 75 MΩ		
nor	mal operating va	alue	ned by operating lev	vel is times d) 7 to 9	
•		kv system vol b) 150 kv	tage, the impulse wi c) 220 kv	ith stand voltage is d) 325 kv	
at r	egular interval of	on test by using f and b) 12 hours	g megger, insulation r d recorded. c) 30 min.	resistance is measured d) 5 min.	
,	class A insulatir 60°C	ng material, ma b) 90°C	aximum operating te c) 95°C	emperature is d) 105°C	,
	larization index i 1	s greater than b) 1.5	c) 2	A insulation. d) 2.5	
a)	nich of the follow Temperature Impurities	ing factors affe	ects on life of insulat b) Deposition o d) All of these	ing material ? of dust	
•	ead acid battery PbO ₂	positive plate b) Pb	(anode) made up of c) SO ₂	d) PbO ₃	
a)	e type of ELCB a Voltage operated Both a) and b)		b) Current oper d) Frequency o		
is t	nile installing ele to be carried out Spirit level	then, we use	es, checking of foun itor c) Bearing pull	dation for correct level er d) Filler gauge	
lar	r rotating machin ger in length and 5 cms		te foundation should c) 25 cms	be about d) None of the above	Э
19) Fo a)		H.P. rating ma	o, 20 cms achine, depth of foun b) 5 cms to 20 d) 35 cms to 6	idation is cms	
is a)	hen motor arrang also called as Direct coupling Both a)and b)	ged in the same	e line as that of driver b) Indirect cou d) None of the	• •	et l
and the second s	· ·				



B.E. (Part – II) (Electrical) Examination, 2017 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date: Thursday, 18-5-2017

Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Assume suitable data if necessary and mention it clearly.

3) Figures to the right indicate full marks.

SECTION-I

II. Attempt any four:

 $(4 \times 5 = 20)$

- a) Define the following terms in connection with safety
 - i) Safety
 - ii) Hazard
 - iii) Accident
 - iv) Major accident hazard
 - v) Responsibility.
- b) Compare preventive maintenance and breakdown maintenance.
- c) What is the need of parallel operation of alternator? What are the conditions for satisfactory parallel operation of alternator?
- d) Explain with neat sketch open delta method in case of transformer.
- e) A brake test was carried out on shunt motor and following the observations for one reading.

Voltage	Current	Speed (rpm)	Spring B	alance
			W ₁ (kg)	W_2 (kg)
250V	2A	1500	3	0.2

The radius of break pulley = 7.5 cm. Calculate:

i) Input

ii) Torque

iii) Output

- iv) Efficiency
- f) Two single phase transformers with equal voltage ratio have impedance of $(0.819 + j\ 2.503)_{\Omega}$ and $(0.8 + j\ 2.31)_{\Omega}$ with respect to secondary. If they operate in parallel, how they will share a total load of 2000 kw at 0.8 power factor lagging?



III. Attempt any two:

 $(10 \times 2 = 20)$

- a) Explain in detail temperature rise test by loading the induction motor with generator and by direct application of mechanical load in case of induction motor.
- b) Explain any two method of measurement of winding resistance in case of transformer.
- c) 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 = 200Ω

Find full load efficiency, if the machine was tested as D.C. motor.

SECTION - II

IV. Attempt any four:

 $(4 \times 5 = 20)$

- a) Classify insulating materials as per I.S. 8504 (Part III) 1994.
- b) Explain the procedure for drying electrical insulation by using external heat and internal heat.
- c) Explain with neat sketch dial indicator.
- d) Write a short note on internal and external causes of failure of equipment.
- e) State factors involved in designing machine foundation.
- f) Explain with neat sketch requirement of different dimensions of foundations for static machines.

V. Attempt any two:

(10×2=20)

- 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) Discuss in detail electrical fault and mechanical fault on the basis of reasons for development of faults and remedial measures.
- c) Explain with neat sketch procedure for levelling and alignment of two shafts of directly and indirectly coupled drives.

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	ectrical) Examination, 2017 ON, TESTING AND MAINTENANCE
Day and Date : Thursday, 18-5-2017 Time : 3.00 p.m. to 6.00 p.m.	Max. Marks: 100
3) Figures to the 4) Q. No. 1 is cor in Answer Boo 5) Answer MCQ	are compulsory. The ble data if necessary and mention it clearly. The right indicate full marks. The pulsory. It should be solved in first 30 minutes ok Page No. 3. Each question carries one mark. The pulsory of Page No. 3 only. The mention, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Object Duration: 30 Minutes	ctive Type Questions Marks : 20
Choose the correct answer:	
1) The type of ELCB are a) Voltage operated c) Both a) and b)	b) Current operatedd) Frequency operated
While installing electrical mach is to be carried out then, we us	nines, checking of foundation for correct level
3) For rotating machinery, the cond larger in length and breadth.a) 5 cmsb) 15 cms	crete foundation should be about c) 25 cms d) None of the above
4) For 75 H.P. to 100 H.P. rating ra) 1 cm to 10 cmsc) 20 cms to 35 cms	machine, depth of foundation is b) 5 cms to 20 cms d) 35 cms to 60 cms
is also called as	me line as that of driven machine this coupling b) Indirect coupling
a) Direct couplingc) Both a)and b)	d) None of these

6) Brake test is _____ method of testing machine. b) Direct

a) Regenerative

c) Indirect

d) All of these

P.T.O

7)	Swinburne test is a a) Load test	lso called as b) Brake test	c) No load test	d) Full load test
8)	In fire extinguisher a) CO ₂		c) O ₂	d) H ₂ O
9)	Do's and Don'ts are a) IS 5216-1962	e observed carefu b) IS 5216-1964	lly in safety precau c) IS 5216-1966	itions as per d) IS 5216-1969
	The torque of induct a) Directly proport c) Inversly proport	ional to V ional to V	d) Inversly propo	ortional to V ²
11)	While conducting r of excess load 50 l a) 2 sec.	H.P. motor is		n motor, the duration d) 9.5 sec.
12)	In moisture proofna) 70%	ess test, humidity b) 80%	is maintained to c) 90%	d) 110%
13)	resistance is		•	minimum insulation
			c) 75 MΩ	
14)	The impulse test I normal operating	value		el is times
	a) 1 to 2	·	c) 4 to 5	
	As per I.E.C. for 6 a) 100 kv	b) 150 kv	c) 220 kv	d) 325 kV
16)	at regular interval	tion test by using mofand reb) 12 hours	ecorded.	esistance is measured d) 5 min.
17)	For class A insula a) 60°C	ting material, maxi b) 90°C	imum operating ter c) 95°C	mperature is d) 105°C
18) Polarization index a) 1	is greater than b) 1.5	for class A c) 2	Ainsulation. d) 2.5
19) Which of the follogala) Temperaturec) Impurities	wing factors affect	ts on life of insulati b) Deposition o d) All of these	ng material ? f dust
20) In lead acid batter		node) made up of c) SO ₂	d) PbO ₃



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No.	•	

B.E. (Part – II) (Electrical) Examination, 2017 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date: Thursday, 18-5-2017

Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

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

SECTION - I

II. Attempt any four:

 $(4 \times 5 = 20)$

- a) Define the following terms in connection with safety
 - i) Safety
 - ii) Hazard
 - iii) Accident
 - iv) Major accident hazard
 - v) Responsibility.
- b) Compare preventive maintenance and breakdown maintenance.
- c) What is the need of parallel operation of alternator? What are the conditions for satisfactory parallel operation of alternator?
- d) Explain with neat sketch open delta method in case of transformer.
- e) A brake test was carried out on shunt motor and 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:

i) Input

ii) Torque

iii) Output

iv) Efficiency

f) Two single phase transformers with equal voltage ratio have impedance of $(0.819 + \text{j}\ 2.503)_\Omega$ and $(0.8 + \text{j}\ 2.31)_\Omega$ with respect to secondary. If they operate in parallel, how they will share a total load of 2000 kw at 0.8 power factor lagging?



III. Attempt any two:

 $(10 \times 2 = 20)$

- a) Explain in detail temperature rise test by loading the induction motor with generator and by direct application of mechanical load in case of induction motor.
- b) Explain any two method of measurement of winding resistance in case of transformer.
- c) 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 = 200Ω

Find full load efficiency, if the machine was tested as D.C. motor.

SECTION-II

IV. Attempt any four:

 $(4 \times 5 = 20)$

- a) Classify insulating materials as per I.S. 8504 (Part III) 1994.
- b) Explain the procedure for drying electrical insulation by using external heat and internal heat.
- c) Explain with neat sketch dial indicator.
- d) Write a short note on internal and external causes of failure of equipment.
- e) State factors involved in designing machine foundation.
- f) Explain with neat sketch requirement of different dimensions of foundations for static machines.

V. Attempt any two:

- a) Explain any two methods of measuring temperature of internal parts of windings/machines and apply the correction factor when the machine is hot.
- b) Discuss in detail electrical fault and mechanical fault on the basis of reasons for development of faults and remedial measures.
- c) Explain with neat sketch procedure for levelling and alignment of two shafts of directly and indirectly coupled drives.

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B.E. (Part – II) (Electrical) Examination, 2017 **ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Dayand	Data	Thuraday	10 5 2017
Jav anu	Date.	mursuav.	18-5-2017

Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the right indicate full marks.
- 4) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only.

	Don't forget to mention, Q.P. Set (P/Q/R/S) on Top	of Page.
	MCQ/Objective Type Questions	
u	ration : 30 Minutes	Marks: 2
١.	Choose the correct answer:	
	In dielectric absorption test by using megger, insulation resistance is meat regular interval of and recorded.	easured
	a) 24 hours b) 12 hours c) 30 min. d) 5 min.	
•	2) For class A insulating material, maximum operating temperature is a) 60°C b) 90°C c) 95°C d) 105°C	
	3) Polarization index is greater than for class A insulation. a) 1 b) 1.5 c) 2 d) 2.5	
	 4) Which of the following factors affects on life of insulating material? a) Temperature b) Deposition of dust c) Impurities d) All of these 	
	5) In lead acid battery positive plate (anode) made up of a) PbO ₂ b) Pb c) SO ₂ d) PbO ₃	
	6) The type of ELCB are a) Voltage operated b) Current operated c) Both a) and b) d) Frequency operated	
	7) While installing electrical machines, checking of foundation for corresponding to be carried out then, we use a) Spirit level b) Dial indicator c) Bearing puller d) Filler as	



8)	For rotating machine larger in length and	breadth.	•	
	a) 5 cms	b) 15 cms	c) 25 cms	d) None of the above
9)	For 75 H.P. to 100 ha) 1 cm to 10 cms c) 20 cms to 35 cm		e, depth of foundat b) 5 cms to 20 cm d) 35 cms to 60 c	is .
10)	When motor arrange is also called as	ed in the same line	as that of driven materials b) Indirect coupling	•
	a) Direct couplingc) Both a)and b)		d) None of these	
11)	Brake test isa) Regenerative		sting machine. c) Indirect	d) All of these
12)	Swinburne test is a a) Load test		c) No load test	d) Full load test
13)	In fire extinguisher a) CO ₂		c) O ₂	d) H ₂ O
14)	Do's and Don'ts are a) IS 5216-1962			
15)	The torque of induction a) Directly proportion of the control of t	onal to V	b) Directly propord) Inversly propor	tional to V ² tional to V ²
16)	While conducting mof excess load 50 H	I.P. motor is		
	a) 2 sec.	b) 5 sec.		d) 9.5 sec.
17)	In moisture proofne a) 70%			d) 110%
18)	resistance is			ninimum insulation
	a) 25 MΩ	b) 50 MΩ	c) 75 MΩ	d) 100 MΩ
19)	normal operating v	alue		is times
.	a) 1 to 2	•	*	d) 7 to 9
20)	As per I.E.C. for 66 a) 100 kv	6 kv system voltag b) 150 kv		d) 325 kv



Seat	
No.	

B.E. (Part - II) (Electrical) Examination, 2017 **ELECTRICAL INSTALLATION. TESTING AND MAINTENANCE**

Day and Date: Thursday, 18-5-2017

Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

- Instructions: 1) All questions are compulsory.
 - 2) Assume suitable data if necessary and mention it clearly.
 - 3) Figures to the right indicate full marks.

SECTION-I

II. Attempt any four:

 $(4 \times 5 = 20)$

- a) Define the following terms in connection with safety
 - i) Safety
 - ii) Hazard
 - iii) Accident
 - iv) Major accident hazard
 - v) Responsibility.
- b) Compare preventive maintenance and breakdown maintenance.
- c) What is the need of parallel operation of alternator? What are the conditions for satisfactory parallel operation of alternator?
- d) Explain with neat sketch open delta method in case of transformer.
- e) A brake test was carried out on shunt motor and following the observations for one reading.

Voltage	Current	Speed (rpm)	Spring B	salance
			W ₁ (kg)	$W_2(kg)$
250V	2A	1500	3	0.2

The radius of break pulley = 7.5 cm. Calculate:

i) Input

ii) Torque

iii) Output

iv) Efficiency

f) Two single phase transformers with equal voltage ratio have impedance of $(0.819 + j \ 2.503)_{\Omega}$ and $(0.8 + j \ 2.31)_{\Omega}$ with respect to secondary. If they operate in parallel, how they will share a total load of 2000 kw at 0.8 power factor lagging?



III. Attempt any two:

 $(10 \times 2 = 20)$

- a) Explain in detail temperature rise test by loading the induction motor with generator and by direct application of mechanical load in case of induction motor.
- b) Explain any two method of measurement of winding resistance in case of transformer.
- c) 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 = 200Ω

Find full load efficiency, if the machine was tested as D.C. motor.

SECTION - II

IV. Attempt any four:

 $(4 \times 5 = 20)$

- a) Classify insulating materials as per I.S. 8504 (Part III) 1994.
- b) Explain the procedure for drying electrical insulation by using external heat and internal heat.
- c) Explain with neat sketch dial indicator.
- d) Write a short note on internal and external causes of failure of equipment.
- e) State factors involved in designing machine foundation.
- f) Explain with neat sketch requirement of different dimensions of foundations for static machines.

V. Attempt any two:

- a) Explain any two methods of measuring temperature of internal parts of windings/machines and apply the correction factor when the machine is hot.
- b) Discuss in detail electrical fault and mechanical fault on the basis of reasons for development of faults and remedial measures.
- c) Explain with neat sketch procedure for levelling and alignment of two shafts of directly and indirectly coupled drives.

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	E	B.E. ELECTRICAL		li) (Elec LLATIO			•		E
-		d Date : Thursd 3.00 p.m. to 6.0		-2017				Max. Ma	ırks : 100
		· · · · · · · · · · · · · · · · · · ·	2) Assui 3) Figuro 4) Q. No in Ans 5) Ans w	me suitables to the rest to the rest. 1 is composwer Book 1 is MCQ/C	e data if ight indi bulsory . Page No bjective	necessar cate full n It should b o. 3. Each e type que	narks. De solved i question Pstions or	ntion it clea n first 30 m carries on n Page No . n) on Top o	ninutes e mark. 3 only.
			МС	Q/Objecti	ve Type	Question	าร		
Dur	atio	n : 30 Minutes				•		· M	larks : 20
1.	Ch	oose the correc	ct answe	r:		* . •		·	
		While conduct of excess load a) 2 sec. In moisture pro	l 50 H.P. b)	motor is 5 sec.	c)	8 sec.	d)	or, the dur	ation
	<i>)</i>	a) 70%		80%	_	90%		110%	
	3)	In insulation resistance is a) $25 \mathrm{M}\Omega$		•	11 kv c)	**		num insul $100\mathrm{M}\Omega$	ation
-	4)	The impulse to normal operat a) 1 to 2	ing value		-	operating 4 to 5		7 to 9	imes
	5)	As per I.E.C. f a) 100 kv	or 66 kv		oltage, th		e with star		is
	6)	In dielectric aboat regular inter a) 24 hours	val of		nd record	ded.		nce is meas 5 min.	sured
	7)	For class A ins	,		,		,		

c) 95°C

b) 90°C

a) 60°C

d) 105°C



8)	Polarization index is a) 1	greater than o) 1.5				2.5
9)	Which of the followir a) Temperature c) Impurities		b)	ife of insulating Deposition of do All of these		terial?
10)	In lead acid battery μ a) PbO_2	•		made up of SO ₂	d)	PbO ₃
11)	The type of ELCB ar a) Voltage operated c) Both a) and b)	e	,	Current operate Frequency oper		d ·
12)	While installing elecisto be carried out to a) Spirit level	nen, we use				•
13)	For rotating machine larger in length and tags 5 cms					
14)	For 75 H.P. to 100 H a) 1 cm to 10 cms c) 20 cms to 35 cm		b)	lepth of foundat 5 cms to 20 cm 35 cms to 60 c	าร	is
15)	When motor arrange is also called as a) Direct coupling c) Both a)and b)	ed in the same line	b)	that of driven ma Indirect couplin None of these		ine this coupling
16)	Brake test isa) Regenerative				d)	All of these
17)	Swinburne test is al a) Load test		c)	No load test	d)	Full load test
18)	In fire extinguisher va) CO ₂	we use b) SO ₂	c)	O ₂	d)	H ₂ O
19)	Do's and Don'ts are a) IS 5216-1962					
20)	The torque of induction a) Directly proportion (c) Inversly proportion	onal to V		Directly propor		_



Seat		
No.		

B.E. (Part – II) (Electrical) Examination, 2017 ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date: Thursday, 18-5-2017

Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

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

SECTION - I

II. Attempt any four:

 $(4 \times 5 = 20)$

- a) Define the following terms in connection with safety
 - i) Safety
 - ii) Hazard
 - iii) Accident
 - iv) Major accident hazard
 - v) Responsibility.
- b) Compare preventive maintenance and breakdown maintenance.
- c) What is the need of parallel operation of alternator? What are the conditions for satisfactory parallel operation of alternator?
- d) Explain with neat sketch open delta method in case of transformer.
- e) A brake test was carried out on shunt motor and 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 :

i) Input

ii) Torque

iii) Output

iv) Efficiency

f) Two single phase transformers with equal voltage ratio have impedance of $(0.819 + j\ 2.503)_{\Omega}$ and $(0.8 + j\ 2.31)_{\Omega}$ with respect to secondary. If they operate in parallel, how they will share a total load of 2000 kw at 0.8 power factor lagging?



III. Attempt any two:

 $(10 \times 2 = 20)$

- a) Explain in detail temperature rise test by loading the induction motor with generator and by direct application of mechanical load in case of induction motor.
- b) Explain any two method of measurement of winding resistance in case of transformer.
- c) 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 = 200Ω

Find full load efficiency, if the machine was tested as D.C. motor.

SECTION-II

IV. Attempt any four:

 $(4 \times 5 = 20)$

- a) Classify insulating materials as per I.S. 8504 (Part III) 1994.
- b) Explain the procedure for drying electrical insulation by using external heat and internal heat.
- c) Explain with neat sketch dial indicator.
- d) Write a short note on internal and external causes of failure of equipment.
- e) State factors involved in designing machine foundation.
- f) Explain with neat sketch requirement of different dimensions of foundations for static machines.

V. Attempt any two:

- a) Explain any two methods of measuring temperature of internal parts of windings/ machines and apply the correction factor when the machine is hot.
- Discuss in detail electrical fault and mechanical fault on the basis of reasons for development of faults and remedial measures.
- c) Explain with neat sketch procedure for levelling and alignment of two shafts of directly and indirectly coupled drives.

SLR-VB - 341

Seat	
No.	

a) Hz

Set P

	B.E. (Electrical Engineering) (POWER SYSTEM OPERA	•
-	Date : Saturday, 20-5-2017 .00 p.m. to 6.00 p.m.	Max Marks : 100
ı	Answer Book Page No. 2) Answer MCQ/Objectiv	
	MCQ/Objective T	ype Questions
Duration	: 30 Minutes	Marks : 20
1. Cho	pose the correct answer :	(1×20=20)
1)	The diversity factor a) is always more than 1 c) may be less or more than 1	b) is always less than 1d) may be as high as 100
2)	The fuel cost is included in a) annual fixed cost c) both the annual fixed cost and operating	b) annual operating cost g cost d) either fixed cost or operating cost
3)	economy a) the incremental fuel cost should be theb) the two stations should share the load inc) the more efficient plant should supply m	n the ratio of their installed capacities
4)		dings P_1 and P_2 . The transmission loss P_L is
	a) $P_1^2 B_{11} + P_1 P_2 B_{12} + P_2^2 B_{22}$ c) $P_1^2 B_{11} + 2 P_1 P_2 B_{12} + P_2^2 B_{22}$	b) $2P_1^2B_{11} + P_1P_2B_{12} + 2P_2^2B_{22}$ d) None of the above
5)	The units for heat rate are a) k cal/k Wh b) k Wh/k cal	c) k cal/hour d) kW
6)	The successful parallel operation of alterna a) resistancec) reluctance	tor is due to the presence of b) reactance d) armature reaction
7)	Modern alternators use a) electromechanical voltage regulators c) electronic regulators	b) magnetic amplifier regulatorsd) none of the above
8)	The units for speed regulation of governor a	are

b) Hz per MVA

c) Hz per MW

d) None of above



9)	Which of the following plants takes least tim condition?	e in	starting	g from cold	conditions to full loa	ad
	a) nuclear plant c) hydro electric plant		•	steam plan		
10)	A synchronous condenser is a a) dc generator c) over excited synchronous motor	,	inducti	on motor	chronous motor	
11)	An alternator is connected to infinite bus. If a) real power output of generator increases b) power factor of alternator decreases c) power factor of alternator increases d) both (a) and (c)		itation c	of alternator	is increased	
12)	For stable operation of interconnected syste as interconnecting element is a) reactor b) resistor		the pas		nt which can be used) none of these	ed
13)	Phase shift occurs between the sending an	•	•		•	as
	a result ofa) reactance of linesc) voltage at which the lines operate	,		nce of lines	;	
14)	Var flows in a circuit a) from a point of higher voltage to that of lob) from a point of lower voltage to that of hc) without any effect on the voltage of term d) none of these	igh	er volta	f		
15)	In economic dispatch including transmissiona) increase load on that generatorc) keep the load on that generator constan		b)		oad on that generator	
16)	Two synchronous generators are operating drop and the other has 8% drop. The general a) tend to take less load c) take the same load as the other generating	ator	with high	gher droop v	will e more load	or
17)	Automatic Generation Control (AGC) a) always requires a special an separate c b) can be provided by a special program in c) cannot include transmission losses d) cannot be relied in some cases)A master u	nit computer	
18)	The voltage drop across a series capacitor a) line current c) size of conductor	b)	line vo			
19)	Security analysis is executed a) real time analysis c) post contingency analysis		pre co	ntingency a f them	nalysis	
20)	Real power is affected due to	b)	Dower	factor		
	a) Voltage at receiving endc) Rotor angle	•	Power Resista		smission line	<u> </u>
						Set P





Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER SYSTEM OPERATION AND CONTROL

-3-

Day and Date: Saturday, 20-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to **right** indicate **full** marks.

3) Assume suitable data if necessary.

SECTION - I

2. Solve any 4 of the following:

 $(5 \times 4 = 20)$

- a) What are the constraints of Unit Commitment?
- b) Why is it necessary to consider transmission loss in optimum scheduling?
- c) Why is it necessary to operate hydro and steam plants in combination? Discuss.
- d) Write a short note on 'Automatic Load Dispatching'.
- e) Explain the merits of the interconnection of power system network.
- 3. Solve any 2 of the following:

 $(10 \times 2 = 20)$

a) The fuel inputs F_1 and F_2 in kcal/hour for two units having output P_1 and P_2 MW are as under

$$F_1 = P_1 + 0.02P_1^2 + 20$$

$$F_2 = 1.2P_2 + 0.015P_2^2 + 10$$

The maximum and minimum loads on the two units are 250 MW and 25 MW respectively. Find and pot the variation of load on each unit as a function of the total load which varies from 50 MW to 500 MW. Also plot incremental cost against total load.

- b) Discuss the dynamic programming method to solar unit commitment program.
- c) Explain the necessity of maintaining a constant frequency in a power system operation.



SECTION - II

4. Solve any 4 of the following:

 $(5 \times 4 = 20)$

- a) Draw a block diagram, with illustrative transfer functions, of a single area load frequency control system.
- b) Write a short note on 'Automatic Load Dispatching.
- c) Explain the mechanism of load frequency control.
- d) What is voltage collapse?
- e) Explain the effect of rotor angle on voltage stability.

5. Solve any 2 of the following:

- a) Describe the effect of thyristor-controlled static shunt compensation to meet the reactive power requirement in the power system.
- b) Explain security analysis and sensitivity factors.
- c) Explain the mathematical formulation of voltage stability problem.

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SLR-VB - 341

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B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER SYSTEM OPERATION AND CONTROL

Day and Date : Saturday,	20-5-2017	Max Marks: 1	00
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Time: 3.00 p.m. to 6.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to right indicate full marks.
- 4) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

1. Choose the correct answer:

 $(1 \times 20 = 20)$

- Two synchronous generators are operating in parallel. One of them has a 5% governor drop and the other has 8% drop. The generator with higher droop will
 - a) tend to take less load

- b) tend to take more load
- c) take the same load as the other generator
- d) either (b) or (c)
- 2) Automatic Generation Control (AGC)
 - a) always requires a special an separate computer
 - b) can be provided by a special program in the SCADA master unit computer
 - c) cannot include transmission losses
 - d) cannot be relied in some cases
- 3) The voltage drop across a series capacitor bank is proportional to
 - a) line current

b) line voltage

c) size of conductor

- d) both line current and voltage
- 4) Security analysis is executed
 - a) real time analysis

- b) pre contingency analysis
- c) post contingency analysis
- d) none of them
- 5) Real power is affected due to
 - a) Voltage at receiving end
 - iu
- b) Power factor

c) Rotor angle

d) Resistance of transmission line

- 6) The diversity factor
 - a) is always more than 1

b) is always less than 1

c) may be less or more than 1

d) may be as high as 100

- 7) The fuel cost is included in
 - a) annual fixed cost

- b) annual operating cost
- c) both the annual fixed cost and operating cost
- d) either fixed cost or operating cost



8)	economy a) the incremental fuel cost should be the s b) the two stations should share the load in c) the more efficient plant should supply me	n the ratio of their installed capacities
	the plants	at the load centre should be the same for both
9)	A system has two sources having plant load a) $P_1^2 B_{11} + P_1 P_2 B_{12} + P_2^2 B_{22}$	dings P_1 and P_2 . The transmission loss P_L is b) $2P_1^2B_{11} + P_1P_2B_{12} + 2P_2^2B_{22}$
	c) $P_1^2 B_{11} + 2P_1 P_2 B_{12} + P_2^2 B_{22}$	d) None of the above
10)	The units for heat rate are	
11\	a) k cal/k Whb) k Wh/k calThe successful parallel operation of alternat	•
11)	a) resistance c) reluctance	b) reactance d) armature reaction
12)	Modern alternators use a) electromechanical voltage regulators c) electronic regulators	b) magnetic amplifier regulatorsd) none of the above
13)	The units for speed regulation of governor a a) Hz b) Hz per MVA	are c) Hz per MW d) None of above
14)	condition?	ne in starting from cold conditions to full load
	a) nuclear plantc) hydro electric plant	b) steam plantd) gas turbine plant
15)	A synchronous condenser is a a) dc generator c) over excited synchronous motor	b) induction motord) under excited synchronous motor
16)	An alternator is connected to infinite bus. If a) real power output of generator increases b) power factor of alternator decreases c) power factor of alternator increases d) both (a) and (c)	
17)	as interconnecting element is	tem, the passive element which can be used
10\	a) reactor b) resistor Phase shift occurs between the conding an	c) capacitor d) none of these nd receiving ends of ac transmission lines as
10)	a result of a) reactance of lines	b) resistance of lines
	c) voltage at which the lines operate	d) conductor size
19)	Var flows in a circuit a) from a point of higher voltage to that of le b) from a point of lower voltage to that of h c) without any effect on the voltage of term d) none of these	nigher voltage
20)	a) increase load on that generator	b) decrease load on that generator
	c) keep the load on that generator constan	, , , , ,
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B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER SYSTEM OPERATION AND CONTROL

Day and Date: Saturday, 20-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to **right** indicate **full** marks.

3) Assume suitable data if necessary.

SECTION - I

2. Solve any 4 of the following:

 $(5 \times 4 = 20)$

- a) What are the constraints of Unit Commitment?
- b) Why is it necessary to consider transmission loss in optimum scheduling?
- c) Why is it necessary to operate hydro and steam plants in combination? Discuss.
- d) Write a short note on 'Automatic Load Dispatching'.
- e) Explain the merits of the interconnection of power system network.
- 3. Solve any 2 of the following:

 $(10 \times 2 = 20)$

a) The fuel inputs F_1 and F_2 in kcal/hour for two units having output P_1 and P_2 MW are as under

$$F_1 = P_1 + 0.02P_1^2 + 20$$

$$F_2 = 1.2P_2 + 0.015P_2^2 + 10$$

The maximum and minimum loads on the two units are 250 MW and 25 MW respectively. Find and pot the variation of load on each unit as a function of the total load which varies from 50 MW to 500 MW. Also plot incremental cost against total load.

- b) Discuss the dynamic programming method to solar unit commitment program.
- c) Explain the necessity of maintaining a constant frequency in a power system operation.



SECTION - II

4. Solve any 4 of the following:

 $(5 \times 4 = 20)$

- a) Draw a block diagram, with illustrative transfer functions, of a single area load frequency control system.
- b) Write a short note on 'Automatic Load Dispatching.
- c) Explain the mechanism of load frequency control.
- d) What is voltage collapse?
- e) Explain the effect of rotor angle on voltage stability.

5. Solve any 2 of the following:

- a) Describe the effect of thyristor-controlled static shunt compensation to meet the reactive power requirement in the power system.
- b) Explain security analysis and sensitivity factors.
- c) Explain the mathematical formulation of voltage stability problem.

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SLR-VB - 341

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B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER SYSTEM OPERATION AND CONTROL

Day and Date : Saturday, 20-5-2017 Max Marks : 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions:

- 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.
- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to **right** indicate **full** marks.
- 4) Assume suitable data if necessary.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer:

- 1) An alternator is connected to infinite bus. If excitation of alternator is increased
 - a) real power output of generator increases
 - b) power factor of alternator decreases
 - c) power factor of alternator increases
 - d) both (a) and (c)
- 2) For stable operation of interconnected system, the passive element which can be used as interconnecting element is
 - a) reactor
- b) resistor
- c) capacitor
- d) none of these
- 3) Phase shift occurs between the sending and receiving ends of ac transmission lines as a result of
 - a) reactance of lines

- b) resistance of lines
- c) voltage at which the lines operate
- d) conductor size

- 4) Var flows in a circuit
 - a) from a point of higher voltage to that of lower voltage
 - b) from a point of lower voltage to that of higher voltage
 - c) without any effect on the voltage of terminals
 - d) none of these
- 5) In economic dispatch including transmission losses, the effect of increased penalty factor is to
 - a) increase load on that generator
- b) decrease load on that generator
- c) keep the load on that generator constant
- d) either (a) or (b)
- 6) Two synchronous generators are operating in parallel. One of them has a 5% governor drop and the other has 8% drop. The generator with higher droop will
 - a) tend to take less load

- b) tend to take more load
- c) take the same load as the other generator
- d) either (b) or (c)
- 7) Automatic Generation Control (AGC)
 - a) always requires a special an separate computer
 - b) can be provided by a special program in the SCADA master unit computer
 - c) cannot include transmission losses
 - d) cannot be relied in some cases



8)	The voltage drop across a series capacitor a) line current		k is prop line volta				
	c) size of conductor	,		age e current an	d volta	age	
9)	Security analysis is executed a) real time analysis c) post contingency analysis	•	pre cont	tingency an them	alysis		
10)	Real power is affected due to a) Voltage at receiving end c) Rotor angle	,	Power for Resistan	actor nce of trans	smissio	on line	
11)	The diversity factor a) is always more than 1 c) may be less or more than 1		•	s always le may be as h			
12)	The fuel cost is included in a) annual fixed cost c) both the annual fixed cost and operating	CO	•	annual oper either fixed	•	cost or operating co	si
13)	Two generating plants feed a load centre threeconomy a) the incremental fuel cost should be the set to the two stations should share the load in c) the more efficient plant should supply med) the incremental cost of power delivered at the plants	sam the	e for the ratio of load	two station their install	s ed cap	pacities	
14)	A system has two sources having plant load a) $P_1^2 B_{11} + P_1 P_2 B_{12} + P_2^2 B_{22}$		•	P ₂ . The tra + P ₁ P ₂ B ₁₂		_	3
	c) $P_1^2 B_{11} + 2P_1 P_2 B_{12} + P_2^2 B_{22}$	d)	None of	the above			
15)	The units for heat rate are a) k cal/k Wh b) k Wh/k cal	c)	k cal/ho	ur (d) kW	I	
16)	The successful parallel operation of alternat a) resistance c) reluctance	b)	reactan	-	e of		
17)	Modern alternators use a) electromechanical voltage regulators c) electronic regulators			ic amplifier i the above	egula	tors	
18)	The units for speed regulation of governor a a) Hz b) Hz per MVA		Hz per l	MW (d) No	ne of above	
19)	Which of the following plants takes least tim condition? a) nuclear plant c) hydro electric plant	e in	b) s	from cold c steam plant gas turbine		ons to full load	k
20)	A synchronous condenser is a a) dc generator c) over excited synchronous motor	,	inductio			us motor	







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B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER SYSTEM OPERATION AND CONTROL

Day and Date: Saturday, 20-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to **right** indicate **full** marks.

3) Assume suitable data if necessary.

SECTION - I

2. Solve any 4 of the following:

 $(5 \times 4 = 20)$

- a) What are the constraints of Unit Commitment?
- b) Why is it necessary to consider transmission loss in optimum scheduling?
- c) Why is it necessary to operate hydro and steam plants in combination? Discuss.
- d) Write a short note on 'Automatic Load Dispatching'.
- e) Explain the merits of the interconnection of power system network.
- 3. Solve any 2 of the following:

 $(10 \times 2 = 20)$

a) The fuel inputs F_1 and F_2 in kcal/hour for two units having output P_1 and P_2 MW are as under

$$F_1 = P_1 + 0.02P_1^2 + 20$$

$$F_2 = 1.2P_2 + 0.015P_2^2 + 10$$

The maximum and minimum loads on the two units are 250 MW and 25 MW respectively. Find and pot the variation of load on each unit as a function of the total load which varies from 50 MW to 500 MW. Also plot incremental cost against total load.

- b) Discuss the dynamic programming method to solar unit commitment program.
- c) Explain the necessity of maintaining a constant frequency in a power system operation.



SECTION - II

4. Solve any 4 of the following:

 $(5 \times 4 = 20)$

- a) Draw a block diagram, with illustrative transfer functions, of a single area load frequency control system.
- b) Write a short note on 'Automatic Load Dispatching.
- c) Explain the mechanism of load frequency control.
- d) What is voltage collapse?
- e) Explain the effect of rotor angle on voltage stability.

5. Solve any 2 of the following:

- a) Describe the effect of thyristor-controlled static shunt compensation to meet the reactive power requirement in the power system.
- b) Explain security analysis and sensitivity factors.
- c) Explain the mathematical formulation of voltage stability problem.

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	•	OWER SYSTEM OPER	•	•
-	Date : Saturday .00 p.m. to 6.00			Max Marks: 100
1	Instructions :	Answer Book Page No	o. 3. Each question on the control of the control o	on Page No. 3 only. Don't
		MCQ/Objective T	ype Questions	
	: 30 Minutes			Marks : 20
	oose the correct			(1×20=20)
1)	The successful a) resistance c) reluctance	parallel operation of alterna	ator is due to the prest b) reactance d) armature reaction	
2)	Modern alterna a) electromech c) electronic re	nanical voltage regulators	b) magnetic amplif d) none of the abo	
3)	The units for sp a) Hz	eed regulation of governor b) Hz per MVA	are c) Hz per MW	d) None of above
4)	Which of the fol condition? a) nuclear pla	lowing plants takes least tir	ne in starting from co b) steam p	
	c) hydro electr		d) gas turb	
5)	A synchronous a) dc generato c) over excited		b) induction motor d) under excited s	
6)	a) real power ofb) power factor	connected to infinite bus. If output of generator increase r of alternator decreases r of alternator increases I (c)		tor is increased
7)	For stable oper as interconnect a) reactor	ation of interconnected sys ing element is b) resistor	tem, the passive eler	ment which can be used d) none of these
8)	•	urs between the sending a	, .	ac transmission lines as

d) conductor size

c) voltage at which the lines operate



- 9) Var flows in a circuit
 - a) from a point of higher voltage to that of lower voltage
 - b) from a point of lower voltage to that of higher voltage
 - c) without any effect on the voltage of terminals
 - d) none of these
- 10) In economic dispatch including transmission losses, the effect of increased penalty factor is to
 - a) increase load on that generator
- b) decrease load on that generator
- c) keep the load on that generator constant
- d) either (a) or (b)
- 11) Two synchronous generators are operating in parallel. One of them has a 5% governor drop and the other has 8% drop. The generator with higher droop will
 - a) tend to take less load

- b) tend to take more load
- c) take the same load as the other generator
- d) either (b) or (c)
- 12) Automatic Generation Control (AGC)
 - a) always requires a special an separate computer
 - b) can be provided by a special program in the SCADA master unit computer
 - c) cannot include transmission losses
 - d) cannot be relied in some cases
- 13) The voltage drop across a series capacitor bank is proportional to
 - a) line current

b) line voltage

c) size of conductor

- d) both line current and voltage
- 14) Security analysis is executed
 - a) real time analysis
 - b) pre contingency analysis
 - c) post contingency analysis
- d) none of them
- 15) Real power is affected due to
 - a) Voltage at receiving end
 - c) Rotor angle

- b) Power factor
- d) Resistance of transmission line

- 16) The diversity factor
 - a) is always more than 1
 - c) may be less or more than 1

- b) is always less than 1
- d) may be as high as 100

- 17) The fuel cost is included in
 - a) annual fixed cost

- b) annual operating cost
- c) both the annual fixed cost and operating cost
- d) either fixed cost or operating cost
- 18) Two generating plants feed a load centre through a transmission network. For maximum economy
 - a) the incremental fuel cost should be the same for the two stations
 - b) the two stations should share the load in the ratio of their installed capacities
 - c) the more efficient plant should supply more load
 - d) the incremental cost of power delivered at the load centre should be the same for both the plants
- 19) A system has two sources having plant loadings P₁ and P₂. The transmission loss P₁ is

 - a) $P_1^2 B_{11} + P_1 P_2 B_{12} + P_2^2 B_{22}$ b) $2P_1^2 B_{11} + P_1 P_2 B_{12} + 2P_2^2 B_{22}$
 - c) $P_1^2 B_{11} + 2 P_1 P_2 B_{12} + P_2^2 B_{22}$ d) None of the above

- 20) The units for heat rate are
 - a) k cal/k Wh
- b) k Wh/k cal c) k cal/hour d) kW







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B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER SYSTEM OPERATION AND CONTROL

-3-

Day and Date: Saturday, 20-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions are compulsory.

2) Figures to **right** indicate **full** marks.

3) Assume suitable data if necessary.

SECTION - I

2. Solve any 4 of the following:

 $(5 \times 4 = 20)$

- a) What are the constraints of Unit Commitment?
- b) Why is it necessary to consider transmission loss in optimum scheduling?
- c) Why is it necessary to operate hydro and steam plants in combination? Discuss.
- d) Write a short note on 'Automatic Load Dispatching'.
- e) Explain the merits of the interconnection of power system network.
- 3. Solve any 2 of the following:

 $(10 \times 2 = 20)$

a) The fuel inputs F_1 and F_2 in kcal/hour for two units having output P_1 and P_2 MW are as under

$$F_1 = P_1 + 0.02P_1^2 + 20$$

$$F_2 = 1.2P_2 + 0.015P_2^2 + 10$$

The maximum and minimum loads on the two units are 250 MW and 25 MW respectively. Find and pot the variation of load on each unit as a function of the total load which varies from 50 MW to 500 MW. Also plot incremental cost against total load.

- b) Discuss the dynamic programming method to solar unit commitment program.
- c) Explain the necessity of maintaining a constant frequency in a power system operation.



SECTION - II

4. Solve any 4 of the following:

 $(5 \times 4 = 20)$

- a) Draw a block diagram, with illustrative transfer functions, of a single area load frequency control system.
- b) Write a short note on 'Automatic Load Dispatching.
- c) Explain the mechanism of load frequency control.
- d) What is voltage collapse?
- e) Explain the effect of rotor angle on voltage stability.

5. Solve any 2 of the following:

 $(10 \times 2 = 20)$

- a) Describe the effect of thyristor-controlled static shunt compensation to meet the reactive power requirement in the power system.
- b) Explain security analysis and sensitivity factors.
- c) Explain the mathematical formulation of voltage stability problem.

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B.E. (Electrical Engineering) (Part – II) Examination, 2017 Elective - II: POWER SYSTEM DYNAMICS

Day and Date: Tuesday, 23-5-2017 Total Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

- 2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.
- 3) Figures to the **right** indicate **full** marks.
- 4) Assume data, if necessary.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

- 1. Choose the correct answer:
- $(20 \times 1 = 20)$
 - 1) Governors of controlling the speed of electric generating units normally provide
 - A) A flat-speed load characteristic
 - B) An increase in speed with an increasing load
 - C) A decrease in speed with an increasing load
 - D) None
 - 2) In a power system stability
 - A) Steady state stability limit is equal to transient stability limit
 - B) Steady state stability limit is less than transient stability limit
 - C) Steady state stability limit is greater than transient stability limit
 - D) Transient stability limit with governor control mechanism will be more than steady state stability limit
 - 3) The linearity of the electro-hydraulic controlled type speed governing system can be improved by means of
 - A) Providing speed relay and hydraulic servomotor
 - B) Providing excitation control signals
 - C) Providing feedback loops of steam flow and servomotors
 - D) Providing linear components
 - 4) Steady state limit 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
 - 5) The critical clearing time of a fault in a power system is related to
 - A) Steady state stability limit
- B) Short circuit current limit

C) Transient stability limit

- D) Reactive power limit
- 6) Linkage mechanism provides
 - A) The moment of control valve is proportional to the inlet steam B) The feedback from the control valve moment

 - C) Both A) and B) D) None of these



7)	The relation between r P is the number of pol	mech les.	nanical angle (δ_{m}) an	nd electrical angle (δ_{e}	iswhere
	A) $\delta_e = (P/2) \delta_m$	B)	$\delta_{m} = (P/2) \delta_{e}$	C)	$\delta_e = P \delta_m$	D)	$\delta_{m} = P \delta_{e}$
8)	Swing equation is a A) linear equation C) geometric			,	non linear equation both A) and B)	n	
9)	Park's transformation	matı	rix is				
	A) Linear	B)	Time dependent	C)	Power varient	D)	All of these
10)	Reactive-power balan						
	A) Voltage	B)	Frequency	C)	Both	D)	None
11)	For stability and economic the range	omic	reasons, we oper	rate	the transmission li	ine v	vith power angle in
	A) 10° to 25°	B)	30° to 45°	C)	60° to 75°	D)	65° to 80°
12)	A synchronous general excitation is increased		connected to an	infir	nite bus delivers p	owe	r at a lag p.f. If its
	A) The terminal voltageC) Current delivered	-			Voltage angle inc Both B) and C)	reas	es
13)	When a system is dyn A) Oscillations may in B) Governor action ha C) Energy input to the D) All of these	ncrea as n	ase until generatii o effect	Ū			•
14)	The speed relay in me	echa	nical hydraulic sp	eec	d governing systen	n pro	ovides
,	A) An indirect feedbaC) No feedback			B)	A direct feedback None of these	-	
15)	The value of the steam	n tur	bine time constar	nt is	bout		
	A) 0.05 sec	B)	1.5 sec	C)	5.2 sec	D)	none
16)	The excitation system A) An exciter			C)	Both A) and B)	D)	None of these
17)	 The function of exciter is the structure of excitation A) To supply terminal voltage to the rotor circuit B) To supply current to the rotor field circuit of a synchronous generator C) To supply current to the stator circuit of a synchronous generator D) All of these 						
18)	The synchronous mad	chine	e has				
·	A) Three windings onC) Either A) or B)	n stat	tor carrying AC	•	One winding on rote Both A) and B)	or ca	rrying DC excitation
19)	The self inductance of but varies the position	f any	stator phase of	a sy	nchronous machir	ne a	lways,
	A) Positive, rotor	B)	Negative, rotor	C)	Positive, stator	D)	Negative, stator
20)	The unit of inertia cons A) MJ/MW.		t H is MJ/MVA.	C)	MJ/s.	D)	MW-s.



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B.E. (Electrical Engineering) (Part – II) Examination, 2017 Elective – II: POWER SYSTEM DYNAMICS

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the **right** indicate **full** marks.

- 2) Assume data, if necessary.
- 3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Why Park's transformation is required? Apply it to transform electrical and mechanical equations of synchronous machine.
- b) Draw the block diagram of IEEE type-1 model for excitation control and explain the same.
- c) Write comparison between transient and dynamic stability.
- d) What is meant by steady stability? Write steady state equations with the help of phasor diagrams.
- e) Explain the operation of AC excitation system for an alternator with the help block diagram.
- f) Derive the steady state equations by using phasor diagrams.

3. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain the function of an excitation system and develop the block diagram for voltage regulation scheme. Develop the transfer function.
- b) Draw the stator and rotor circuits of a synchronous machine and formulate the various basic equations governing synchronous machine and also write the basic assumptions necessary to develop basic equations.
- c) Write notes on:
 - i) Importance of stability in power system operation and design.
 - ii) Stability problem in large interconnected system.



SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Derive swing equation and discuss its application in the study of power system stability.
- b) Compare: coherent and non-coherent machines.
- c) Explain mechanical-hydraulic governor for a hydro turbine with schematic diagram.
- d) Explain how to improve stability by series capacitor compensation lines.
- e) Compare mechanical-hydraulic governor with electrical-hydraulic governor for a hydro and steam turbines.
- f) Explain auto-reclosing circuit breaker.

5. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain state stability of single machine connected to an infinite bus system with relevant diagrams and equations.
- b) What are the major components of speed governing mechanism and explain with the help of linkage mechanism diagram.
- c) Differentiate between steady state stability and transient stability of a power system. Discuss the factors that affect
 - i) steady state stability and
 - ii) transient stability of a power system.

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B.E. (Electrical Engineering) (Part – II) Examination, 2017 Elective – II: POWER SYSTEM DYNAMICS

	` Elect	ive – II : POWER	SYSTEM DYNA	MICS
-	Date : Tuesday, 23 00 p.m. to 6.00 p.m			Total Marks: 100
	2)	Q. No. 1 is compulso. Answer Book Page No. Answer MCQ/Objecti forget to mention, Q. Figures to the right ind Assume data, if neces	o. 3. Each question ca ve type questions of P. Set (P/Q/R/S) on T dicate full marks.	arries one mark. n Page No. 3 only. Don't
Duration	: 30 Minutes	MCQ/Objective T	ype Questions	Marks : 20
1. Cho	oose the correct and	swer:		(20×1=20)
1)	The excitation sys	tem consists of B) An AVR	C) Both A) and B)	D) None of these
2)	A) To supply termB) To supply curre	citer is the structure of e inal voltage to the rotor ent to the rotor field circuent to the stator circuit o	circuit uit of a synchronous g	
3)	The synchronous (A) Three windings (C) Either A) or B)	machine has s on stator carrying AC	B) One winding on ro D) Both A) and B)	otor carrying DC excitation
4)	The self inductance but varies the positive, rotor	e of any stator phase of ion of B) Negative, rotor	•	•
5)	The unit of inertia	,	,	D) MW-s.
6)	A) A flat-speed losB) An increase in	rolling the speed of elect ad characteristic speed with an increasin speed with an increasing	g load	ormally provide
7)	B) Steady state st	stability ability limit is equal to tra ability limit is less than t ability limit is greater tha	ransient stability limit	nit

D) Transient stability limit with governor control mechanism will be more than steady

state stability limit



8)	The linearity of the elimproved by means of		draulic contr	olled	d type speed gov	ernir	ng system can be	
	 A) Providing speed relay and hydraulic servomotor B) Providing excitation control signals C) Providing feedback loops of steam flow and servomotors D) Providing linear components 							
ŕ	 Steady state limit 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 							
10)	The critical clearing tim A) Steady state stabil C) Transient stability I	ity limit	•	B)	stem is related to Short circuit curre Reactive power li		mit	
11)	Linkage mechanism property A) The moment of correct B) The feedback from C) Both A) and B) D) None of these	ntrol valv	e is proportio trol valve mo	onal mer	to the inlet steam nt			
	The relation between n P is the number of pole A) $\delta_e = (P/2) \delta_m$	es.	- 111	ır				
	Swing equation is a A) linear equation C) geometric		0	B)	non linear equation both A) and B)		0	
14)	Park's transformation	matrix is						
	A) Linear	B) Time	e dependent	C)	Power varient	D)	All of these	
15)	Reactive-power balance A) Voltage				n in Both	D)	None	
	For stability and econo the range							
	A) 10° to 25°	-		-		-		
17)	A synchronous general excitation is increased	itor conr	nected to an	ıntır	nite bus delivers p	owei	r at a lag p.f. If its	
	A) The terminal voltagC) Current delivered i	•		•	Voltage angle inc Both B) and C)	reas	es	
18)	When a system is dyn A) Oscillations may in B) Governor action ha C) Energy input to the D) All of these	crease u as no eff	ıntil generatiı ect				•	
19)	The speed relay in me	chanical	hydraulic sn	eed	l governina svsten	n pra	ovides	
,	A) An indirect feedbac		, 00		A direct feedback	•		
	C) No feedback			,	None of these			
20)	The value of the steam					Β,		
	A) 0.05 sec	B) 1.5	sec 	C)	5.2 sec	ט)	none	



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B.E. (Electrical Engineering) (Part – II) Examination, 2017 Elective - II: POWER SYSTEM DYNAMICS

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

- **Instructions**: 1) Figures to the **right** indicate **full** marks.
 - 2) Assume data, if necessary.
 - 3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Why Park's transformation is required? Apply it to transform electrical and mechanical equations of synchronous machine.
- b) Draw the block diagram of IEEE type-1 model for excitation control and explain the same.
- c) Write comparison between transient and dynamic stability.
- d) What is meant by steady stability? Write steady state equations with the help of phasor diagrams.
- e) Explain the operation of AC excitation system for an alternator with the help block diagram.
- f) Derive the steady state equations by using phasor diagrams.

3. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain the function of an excitation system and develop the block diagram for voltage regulation scheme. Develop the transfer function.
- b) Draw the stator and rotor circuits of a synchronous machine and formulate the various basic equations governing synchronous machine and also write the basic assumptions necessary to develop basic equations.
- c) Write notes on:
 - i) Importance of stability in power system operation and design.
 - ii) Stability problem in large interconnected system.



SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Derive swing equation and discuss its application in the study of power system stability.
- b) Compare: coherent and non-coherent machines.
- c) Explain mechanical-hydraulic governor for a hydro turbine with schematic diagram.
- d) Explain how to improve stability by series capacitor compensation lines.
- e) Compare mechanical-hydraulic governor with electrical-hydraulic governor for a hydro and steam turbines.
- f) Explain auto-reclosing circuit breaker.

5. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain state stability of single machine connected to an infinite bus system with relevant diagrams and equations.
- b) What are the major components of speed governing mechanism and explain with the help of linkage mechanism diagram.
- c) Differentiate between steady state stability and transient stability of a power system. Discuss the factors that affect
 - i) steady state stability and
 - ii) transient stability of a power system.

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	•	trical Engine ective – II : P	• .	•		017
	Date : Tuesday, 00 p.m. to 6.00 p				To	otal Marks : 100
	Instructions :	2) Answer MC	k Page No. 3. Q/ Objective t ention, Q.P. S e right indica	Each questions type questions Set (P/Q/R/S) o te full marks.	carries one ma	ark. 3 only. Don't
Duration	: 30 Minutes	MCQ/OI	ojective Type	Questions		Marks : 20
	oose the correct					(20×1=20)
1)	the range A) 10° to 25°	l economic reasor	•	e the transmissi 60° to 75°	•	_
2)	•	generator conne	•		,	
۷)	excitation is incl	reased	cieu io an iiii	illite bus delive	is power at a la	ag p.i. ii iis
	•	ll voltage increase vered increases		Voltage angle Both B) and C		
3)	A) OscillationsB) Governor ac	is dynamically un may increase und ction has no effect at to the system a	til generating t	· ·	·	•
4)	The speed relay A) An indirect f C) No feedback		B)	d governing sys A direct feedb None of these	oack	
5)	The value of the A) 0.05 sec	e steam turbine tir B) 1.5 se		s bout 5.2 sec	D) none	
6)	The excitation s A) An exciter	system consists o B) An AV		Both A) and E	B) D) None (of these
7)	A) To supply to B) To supply or	exciter is the struerminal voltage to urrent to the rotor urrent to the state	the rotor circ	uit f a synchronou:	~	
8)	The synchronou A) Three windin C) Either A) or	ngs on stator car		One winding on Both A) and E	n rotor carrying D 3)	C excitation



9)	The self inductance of but varies the position	of	-			•
	A) Positive, rotor	B) Negative, rotor	C)	Positive, state	or D)	Negative, stator
10)	The unit of inertia cons A) MJ/MW.	stant H is B) MJ/MVA.	C)	MJ/s.	D)	MW-s.
11)	Governors of controlling A) A flat-speed load of B) An increase in speed C) A decrease in speed D) None	characteristic ed with an increasing	j loa	ıd	s normal	ly provide
12)	In a power system sta A) Steady state stabil B) Steady state stabil C) Steady state stabil D) Transient stability state stability limit	ity limit is equal to tra ity limit is less than tr ity limit is greater thai	ans n tra	ient stability lir ansient stability	nit / limit	more than steady
13)	The linearity of the elimproved by means of A) Providing speed re B) Providing excitatio C) Providing feedback D) Providing linear co	elay and hydraulic sei n control signals k loops of steam flow	rvor	notor		ng system can be
14)	Steady state limit of a A) Reducing fault clea B) Using double circu C) Single pole switchi D) Decreasing genera	aring time it line instead of singl ng		•		
15)	The critical clearing tin A) Steady state stabil C) Transient stability I	ity limit	B)	stem is relate Short circuit o Reactive pow	current li	mit
16)	Linkage mechanism p A) The moment of cor B) The feedback from C) Both A) and B) D) None of these	ntrol valve is proportio	onal ome	to the inlet ste nt	eam	
17)	The relation between r P is the number of pole	es.	•			
	A) $\delta_e = (P/2) \delta_m$	B) $\delta_{\rm m} = (P/2) \delta_{\rm e}$	C)	$\delta_e = P\delta_m$	D)	$\delta_{\rm m} = P \delta_{\rm e}$
18)	Swing equation is a A) linear equation C) geometric		•	non linear equ		
19)	Park's transformation		٠.			A.II. 6.II
:	A) Linear	B) Time dependent	•		t D)	All of these
20)	Reactive-power balance A) Voltage	ce will control the var B) Frequency			D)	None



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B.E. (Electrical Engineering) (Part – II) Examination, 2017 Elective – II: POWER SYSTEM DYNAMICS

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the **right** indicate **full** marks.

- 2) Assume data, if necessary.
- 3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Why Park's transformation is required? Apply it to transform electrical and mechanical equations of synchronous machine.
- b) Draw the block diagram of IEEE type-1 model for excitation control and explain the same.
- c) Write comparison between transient and dynamic stability.
- d) What is meant by steady stability? Write steady state equations with the help of phasor diagrams.
- e) Explain the operation of AC excitation system for an alternator with the help block diagram.
- f) Derive the steady state equations by using phasor diagrams.

3. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain the function of an excitation system and develop the block diagram for voltage regulation scheme. Develop the transfer function.
- b) Draw the stator and rotor circuits of a synchronous machine and formulate the various basic equations governing synchronous machine and also write the basic assumptions necessary to develop basic equations.
- c) Write notes on:
 - i) Importance of stability in power system operation and design.
 - ii) Stability problem in large interconnected system.



SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Derive swing equation and discuss its application in the study of power system stability.
- b) Compare: coherent and non-coherent machines.
- c) Explain mechanical-hydraulic governor for a hydro turbine with schematic diagram.
- d) Explain how to improve stability by series capacitor compensation lines.
- e) Compare mechanical-hydraulic governor with electrical-hydraulic governor for a hydro and steam turbines.
- f) Explain auto-reclosing circuit breaker.

5. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain state stability of single machine connected to an infinite bus system with relevant diagrams and equations.
- b) What are the major components of speed governing mechanism and explain with the help of linkage mechanism diagram.
- c) Differentiate between steady state stability and transient stability of a power system. Discuss the factors that affect
 - i) steady state stability and
 - ii) transient stability of a power system.

D) All of these

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B.E. (Electrical Engineering) (Part – II) Examination, 2017

	Ele	ctive –	II : POWER		•	AMIC	S	
•	Date : Tuesday, 00 p.m. to 6.00 p		7				Total	Marks: 100
	Instructions :	Answer 2) Answer forget 3) Figure	. 1 is compulsorer Book Page No. er MCQ/Objective to mention, Q.Besto the right industrial	. 3. l ve ty P. Se licate	Each question c pe questions c et (P/Q/R/S) on e full marks.	arries on Pag	one mark. ge No. 3 o	
Duration	: 30 Minutes	M	ICQ/Objective T	ype	Questions			Marks : 20
1. Cho	oose the correct a	answer:						(20×1=20)
1)	•	t of control ck from the B)	des valve is proportion control valve mo			m		, ,
2)	P is the number	of poles.	nanical angle (δ_{m}) $\delta_{m} = (P/2) \delta_{e}$					
3)	Swing equation A) linear equation C) geometric	is a		B)	non linear equaboth A) and B)			
4)	Park's transform	nation mat	rix is					
	A) Linear	B)	Time dependent	C)	Power varient	D)	All of thes	e
5)	Reactive-power	balance w	ill control the var	iatio	n in			
	A) Voltage	B)	Frequency	C)	Both	D)	None	
6)	the range		reasons, we ope 30° to 45°				•	_
7)	·	generator reased	connected to an	infir		powe	r at a lag p	
	C) Current deliv	vered incre	eases		Both B) and C)			
8)	B) Governor ac	may increa	ase until generati		•	•		•



9)	The speed relay in me A) An indirect feedbac C) No feedback		B)	d governing system A direct feedback None of these		ovides
10)	The value of the steam A) 0.05 sec			bout 5.2 sec	D)	none
11)	The excitation system A) An exciter	consists of B) An AVR	C)	Both A) and B)	D)	None of these
12)	The function of exciter A) To supply terminal B) To supply current t C) To supply current t D) All of these	voltage to the rotor on the rotor of the rotor field circuits	ircu it of	it a synchronous ge		ator
13)	The synchronous mad A) Three windings on C) Either A) or B)		•	One winding on roto Both A) and B)	orca	rrying DC excitation
14)	The self inductance of but varies the position A) Positive, rotor	of	-			ways, Negative, stator
15)	The unit of inertia cons A) MJ/MW.	, , ,	,	·	•	MW-s.
16)	Governors of controlling A) A flat-speed load of B) An increase in speed C) A decrease in speed D) None	haracteristic ed with an increasing	loa	ad	mal	ly provide
17)	In a power system sta A) Steady state stabil B) Steady state stabil C) Steady state stabil D) Transient stability state stability limit	ity limit is equal to tra ity limit is less than tr ity limit is greater than	ans 1 tra	ient stability limit ansient stability limi		more than steady
18)	The linearity of the elimproved by means of A) Providing speed re B) Providing excitation C) Providing feedback D) Providing linear co	elay and hydraulic sen n control signals k loops of steam flow	vor	notor	ernir	ng system can be
19)	Steady state limit of a A) Reducing fault clea B) Using double circu C) Single pole switchi D) Decreasing genera	nring time it line instead of singl ng		•		
20)	The critical clearing tin A) Steady state stabil C) Transient stability I	ity limit	B)	stem is related to Short circuit curre Reactive power lir		mit



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B.E. (Electrical Engineering) (Part – II) Examination, 2017 Elective – II: POWER SYSTEM DYNAMICS

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Figures to the **right** indicate **full** marks.

2) Assume data, if necessary.

3) All questions are compulsory.

SECTION - I

2. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Why Park's transformation is required? Apply it to transform electrical and mechanical equations of synchronous machine.
- b) Draw the block diagram of IEEE type-1 model for excitation control and explain the same.
- c) Write comparison between transient and dynamic stability.
- d) What is meant by steady stability? Write steady state equations with the help of phasor diagrams.
- e) Explain the operation of AC excitation system for an alternator with the help block diagram.
- f) Derive the steady state equations by using phasor diagrams.

3. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain the function of an excitation system and develop the block diagram for voltage regulation scheme. Develop the transfer function.
- b) Draw the stator and rotor circuits of a synchronous machine and formulate the various basic equations governing synchronous machine and also write the basic assumptions necessary to develop basic equations.
- c) Write notes on:
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 - ii) Stability problem in large interconnected system.



SECTION - II

4. Attempt any four of the following:

 $(4 \times 5 = 20)$

- a) Derive swing equation and discuss its application in the study of power system stability.
- b) Compare: coherent and non-coherent machines.
- c) Explain mechanical-hydraulic governor for a hydro turbine with schematic diagram.
- d) Explain how to improve stability by series capacitor compensation lines.
- e) Compare mechanical-hydraulic governor with electrical-hydraulic governor for a hydro and steam turbines.
- f) Explain auto-reclosing circuit breaker.

5. Attempt any two of the following:

 $(2 \times 10 = 20)$

- a) Explain state stability of single machine connected to an infinite bus system with relevant diagrams and equations.
- b) What are the major components of speed governing mechanism and explain with the help of linkage mechanism diagram.
- c) Differentiate between steady state stability and transient stability of a power system. Discuss the factors that affect
 - i) steady state stability and
 - ii) transient stability of a power system.

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c) Less than 10^{-1} torr

Set P

	B.E. (Electrical) (Part – II Elective – II : HIGH VOLT	I) Examination, TAGE ENGINEE	2017 ERING
-	Date: Tuesday, 23-5-2017 .00 p.m. to 6.00 p.m.		Max. Marks : 100
	Instructions: 1) All questions compulsory. 2) Assume suitable data if ne 3) Figures to the right indicate 4) Q. No. 1 is compulsory. If Book Page No. 3. Each que 5) Answer MCQ/Objective ty mention, Q.P. Set (P/Q/R/	cessary and mention i e full marks. It should be solved in t estion carries one mark rpe questions on Page	first 30 minutes in Answer k.
Duration	MCQ/Objective Typa: 30 Minutes	oe Questions	Marks : 20
I Cho	oose correct alternatives :		(20×1=20)
) The process of ionisation is brought about by		(20×1-20)
-,		c) Metastables only	d) All of the above
2)) The value of Townsends second ionization coeffic	cient has	
	a) High value for low E/p ratio	b) Low value for low E	Ē∕p ratio
	•	d) No application if the	• .
3)	 If p is the pressure of gas and d the distance of se voltage according to Paschen's law is directly pro 	•	electrodes, the discharge
	a) p b) d	c) pd	d) None of the above
4)) The breakdown voltage of a specimen is 65 kV pressure and 35° C is	at STP. The breakdo	wn voltage at 73 cm Hg
	a) 69 kV b) 63.25 kV	c) 64.33 kV	d) 60.39 kV
5)) All parameters remaining same, the breakdown vo	-	
	a) Higher with negative polarity at all pressures		e polarity at all pressures
6)	c) Higher with negative polarity at low pressures	d) None of the above	
0)	 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 immers	ed in a liquid of permit	tivity $\varepsilon_{_{\mathbf{z}}}$ is
	a) Higher than that of the field in the liquid	b) Lower than that of t	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 oil using filtrations under vacuum, the vapour pres 		onditioning of transformer
		h) Less than 10^{-2} torr	

d) None of the above



9)	During reconditioning of transformer oil it is eccontent of oil is	ono	mical to use electrostatic filters if the water
	a) Greater than 4 ppm	b)	Greater than 2 ppm
	c) Less than 2 ppm		Electrostatic filters are never used
10)	The breakdown of solid materials is roughly given	ı by	,
,	a) $V_b t_b = constant$	-	V _b In t _b = constant
	c) $l_b l_b V_b = constant$		None of the above
11)	While conducting intrinsic dielectric strength on a	sp	ecimen, 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 sam	ple	
	d) No definite consideration		
12)	In case of impulse thermal breakdown of solid ins	sula	ating materials, the critical electric filed is
	a) Proportional to critical absolute temperature		
	b) Proportional to square of critical absolute tem	per	ature
	c) Proportional to square of T ₀		
	d) None of the above is true		
13)	The insulation of the modern EHV lines is designed	ed b	pased on
	a) The lightening voltage		The switching voltage
	c) Corona	,	RI
14)	High voltage d.c. testing for HV machines is reso		
	a) Certain conclusions regarding the continuous	_	_
	b) The stress distribution is a representation of the		
	c) Standardisation on the magnitude of voltage		
4 =\	d) The stresses do not damage the coil and insu		
15)	The velocity of a travelling wave through a cable a) 9×10^8 m/sec b) 3×10^8 m/sec		relative permittivity 9 is 10^8 m/sec d) $2 \times 10^8 \text{ m/sec}$
10\	,	C)	10° m/sec a) 2 x 10° m/sec
10)	Partial discharge can be detected by	b)	A high top S
	a) Listening to hissing sound Ontical methods	,	A high tan δ All of the above
17\	c) Optical methods		
17)	Non-destructive testing methods require measure a) dielectric strength		insulation resistance
	c) tan δ	-	a) and b)
	e) b) and c)	u,	a, and b,
18)	The mechanism responsible for dielectric loss in	a di	ielectric are
,	a) Conduction		Polarisation
	c) Ionisation	,	a) and b)
	e) b) and c)	,	,
19)	Protective resistance to be connected between the	ne s	phere gap and the test equipment is required
,	while measuring		
	a) Power frequency and higher frequency a.c. vo	olta	ge
	b) Power frequency and impulse voltage		
	c) Higher frequency a.c. voltages and impulse v	olta	age
	d) All kinds of voltages		
20)	High frequency and impulse currents are measure		-
	a) Resistive shunts	,	Inductive elements
	c) Hall and Farady effect devices	d)	All of the above



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B.E. (Electrical) (Part – II) Examination, 2017 Elective – II: HIGH VOLTAGE ENGINEERING

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m to 6.00 p.m.

Instructions: 1) All questions compulsory.

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

SECTION - I

II. Solve any four: (4×5=20)

- a) Explain surge voltages and their distribution.
- b) Explain practical considerations in using gases for insulation purposes.
- c) Write a short note on conduction and breakdown in commercial liquids.
- d) Write a short note on break-down of composite insulation.
- e) A steady current of 600 μ A flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μ A flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value.

III. Solve any two: (2×10=20)

- a) Derive the following expression by using townsend second ionisation coefficient $n = \frac{n_0 e^{\alpha d}}{1 v (e^{\alpha d} 1)}$.
- b) i) Write a short note on liquids as insulators.
 - ii) Write a short note on conduction and break-down in pure liquids.
- c) Explain electromechanical break-down and break-downs of solid dielectrics in practice.

SECTION - II

IV. Solve any four: (4×5=20)

- a) Explain in short generation of HVDC/HVAC.
- b) Explain sphere gap.
- c) Explain briefly various tests to be carried out on a bushing.
- d) Write a short note on grounding of impulse testing laboratories.
- e) Write a short note on CRO for impulse voltage and current.

V. Solve any two: (2×10=20)

- a) Explain tripping and control of impulse generators.
- 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.

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a) p

b) d

B.E. (Electrical) (Part - II) Examination, 2017

	Elective – II : HIGH VOL	•	· ·
•	Date : Tuesday, 23-5-2017 00 p.m. to 6.00 p.m.		Max. Marks : 100
	Book Page No. 3 . Each qu	ece te f It s uest ype	ull marks. hould be solved in first 30 minutes in Answer ion carries one mark. questions on Page No. 3 only. Don't forget to
Dunatian	MCQ/Objective Ty	/pe	
Duration	: 30 Minutes		Marks : 20
	oose correct alternatives :		(20×1=20)
1)	Partial discharge can be detected by		
	a) Listening to hissing sound	,	A high tan δ
0)	c) Optical methods	,	All of the above
2)	Non-destructive testing methods require measure a) dielectric strength		insulation resistance
	c) tan δ		a) and b)
	e) b) and c)	u)	a) and b)
3)	The mechanism responsible for dielectric loss in	a d	electric are
٠,	a) Conduction		Polarisation
	c) Ionisation	d)	a) and b)
	e) b) and c)		
4)	Protective resistance to be connected between the	he s	phere gap and the test equipment is required
	while measuring a) Power frequency and higher frequency a.c. v	nlta	CO.
	b) Power frequency and impulse voltage	Oita	ge
	c) Higher frequency a.c. voltages and impulse v	volta	age
	d) All kinds of voltages		
5)	High frequency and impulse currents are measur		_
	a) Resistive shunts		
	c) Hall and Farady effect devices	d)	All of the above
6)	The process of ionisation is brought about by a) Positive ions only b) Photons only	c)	Metastables only d) All of the above
7)	The value of Townsends second ionization coeff		·
,	a) High value for low E/p ratio	b)	Low value for low E/p ratio
	c) No relation with <i>E/p</i> ratio		No application if the gas pressure is low
8)	If p is the pressure of gas and d the distance of s voltage according to Paschen's law is directly pro		

c) pd

d) None of the above



9)	The breakdown voltage pressure and 35° C is	e of a specimen is 65 l	κV a	t STP. Th	ne breakdov	vn v	oltage at 73	cm Hg
	a) 69 kV	b) 63.25 kV	c)	64.33 k\	V	d)	60.39 kV	
10)	All parameters remaining	g same, the breakdown	volta	age is				
		e polarity at all pressure		_	ith negative	pola	arity at all pre	ssures
	c) Higher with negative	polarity at low pressure	s d)	None of	the above			
11)	Liquids with solid impuri	ties						
	a) Have higher dielecti	ric strength						
	b) Of large size have h	nigher dielectric strength	l					
	c) Has lower dielectric	strength as compared t	o pu	re liquids				
	d) None of the above							
12)	The electric field in a ga	s bubble which is imme	ersec	l in a liqui	d of permitti	ivity	$\varepsilon_{_{7}}$ is	
	a) Higher than that of	the field in the liquid	b)	Lower th	nan that of tl	he fie	eld in the liqui	id
	c) Same as that in the	liquid	d)	None of	the above i	s alv	vays true	
13)	In order to prevent an exoil using filtrations unde	· ·			-	nditi	oning of trans	sformer
	a) Less than 10^{-4} torr				an 10 ^{–2} torr			
	c) Less than 10 ⁻¹ torr		,		the above			
14)	During reconditioning of	of transformer oil it is e	cond	mical to	use electro	stati	c filters if the	e water
,	content of oil is							
	a) Greater than 4 ppm		b)	Greater	than 2 ppm			
	c) Less than 2 ppm		d)	Electros	static filters a	are n	ever used	
15)	The breakdown of solid	materials is roughly give	en by	/				
	a) $V_b t_b = constant$		b)	V _b ln t _b	= constant			
	c) $t_b ln V_b = constant$		d)	None of	the above			
16)	While conducting intrins	sic dielectric strength on	a sp	ecimen, i	ts shape sh	ould	be so prepar	ed that
	a) The electric stress	is high at its centre						
	b) The electric stress i	~						
	c) The electric stress i	s same all along the sa	mple)				
	d) No definite consider	ation						
17)	In case of impulse therr	nal breakdown of solid i	nsul	ating mat	erials, the c	ritica	l electric filed	si k
	, .	al absolute temperature						
		are of critical absolute te	mpe	rature				
	c) Proportional to squa	•						
	d) None of the above i							
18)	The insulation of the mo	_						
	a) The lightening volta	ge			tching volta	ge		
	c) Corona		,	RI				
19)	High voltage d.c. testing							
	•	regarding the continuo	_	-		can I	be drawn	
	,	on is a representation of						
		the magnitude of voltag			ıs available	9		
) ()		t damage the coil and in			a maratati di Co	:-		
20)	The velocity of a travelli a) 9×10^8 m/sec	ng wave through a cable b) 3×10^8 m/sec			-		$2 \times 10^{8} \text{ m/s}_{\odot}$	00
	aj a x 10° 111/sec	b) 3 x 10° III/SeC	C)	10-111/8	C U	u)	∠ x 10° 111/S(5 0



Seat	
No.	

B.E. (Electrical) (Part – II) Examination, 2017 Elective – II: HIGH VOLTAGE ENGINEERING

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m to 6.00 p.m.

Instructions: 1) All questions compulsory.

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

SECTION - I

II. Solve any four: (4×5=20)

- a) Explain surge voltages and their distribution.
- b) Explain practical considerations in using gases for insulation purposes.
- c) Write a short note on conduction and breakdown in commercial liquids.
- d) Write a short note on break-down of composite insulation.
- e) A steady current of 600 μ A flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μ A flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value.

III. Solve any two: (2×10=20)

- a) Derive the following expression by using townsend second ionisation coefficient $n = \frac{n_0 e^{\alpha d}}{1 v (e^{\alpha d} 1)}$.
- b) i) Write a short note on liquids as insulators.
 - ii) Write a short note on conduction and break-down in pure liquids.
- c) Explain electromechanical break-down and break-downs of solid dielectrics in practice.

SECTION - II

IV. Solve any four: (4×5=20)

- a) Explain in short generation of HVDC/HVAC.
- b) Explain sphere gap.
- c) Explain briefly various tests to be carried out on a bushing.
- d) Write a short note on grounding of impulse testing laboratories.
- e) Write a short note on CRO for impulse voltage and current.

V. Solve any two: (2×10=20)

- a) Explain tripping and control of impulse generators.
- 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.

Set Q



Seat	
No.	

Set R

B.E. (Electrical) (Part – II) Examination, 2017 Elective – II: HIGH VOLTAGE ENGINEERING

Day and Date: Tuesday, 23-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the right indicate full marks.
- 4) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

I. Choose correct alternatives:

 $(20 \times 1 = 20)$

- 1) 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 sample
 - d) No definite consideration
- 2) In case of impulse thermal breakdown of solid insulating materials, the critical electric filed is
 - a) Proportional to critical absolute temperature
 - b) Proportional to square of critical absolute temperature
 - c) Proportional to square of T₀
 - d) None of the above is true
- 3) The insulation of the modern EHV lines is designed based on
 - a) The lightening voltage

b) The switching voltage

c) Corona

- d) BI
- 4) 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) Standardisation on the magnitude of voltage to be applied is available
 - d) The stresses do not damage the coil and insulation
- 5) 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) 10⁸ m/sec
- d) 2×10^8 m/sec

- 6) Partial discharge can be detected by
 - a) Listening to hissing sound
- b) A high tan δ

c) Optical methods

- d) All of the above
- 7) Non-destructive testing methods require measurement of
 - a) dielectric strength

b) insulation resistance

c) tan δ

d) a) and b)

e) b) and c)

8) The mechanism responsible for dielectric loss in a dielectric are



	a) Conduction	b)	Polarisation		
	c) Ionisation	d)	a) and b)		
	e) b) and c)				
9)	Protective resistance to be connected between the	ne s	phere gap and the tes	st e	quipment is required
	while measuring				
	a) Power frequency and higher frequency a.c. v	olta	ge		
	b) Power frequency and impulse voltage				
	c) Higher frequency a.c. voltages and impulse v	olta/	age		
	d) All kinds of voltages				
10)	High frequency and impulse currents are measure	ed ι	using		
,	a) Resistive shunts		Inductive elements		
	c) Hall and Farady effect devices	d)	All of the above		
11)	The process of ionisation is brought about by				
	a) Positive ions only b) Photons only	c)	Metastables only	d)	All of the above
12)	The value of Townsends second ionization coeffi	icie	nt has		
,	a) High value for low E/p ratio		Low value for low E/	_{ບ ra}	tio
	c) No relation with <i>E/p</i> ratio		No application if the		
13)	If p is the pressure of gas and d the distance of s	epa	ration between the el	ectr	odes, the discharge
,	voltage according to Paschen's law is directly pro	•			
	a) p b) d	c)	pd	d)	None of the above
14)	The breakdown voltage of a specimen is 65 kV	/ at	STP. The breakdow	n v	oltage at 73 cm Hg
	pressure and 35° C is				
	a) 69 kV b) 63.25 kV	c)	64.33 kV	d)	60.39 kV
15)	All parameters remaining same, the breakdown v	olta	ıge is		
	a) Higher with negative polarity at all pressures	b)	Lower with negative	pola	arity at all pressures
	c) Higher with negative polarity at low pressures	d)	None of the above		
16)	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	pui	e liquids		
	d) None of the above				
17)	The electric field in a gas bubble which is immer-				_
	a) Higher than that of the field in the liquid	,	Lower than that of th		•
	c) Same as that in the liquid		None of the above is		•
18)	In order to prevent an excessive evaporation of the		_	ıditi	oning of transformer
	oil using filtrations under vacuum, the vapour pre				
	a) Less than 10 ⁻⁴ torr	,	Less than 10 ⁻² torr		
	c) Less than 10 ⁻¹ torr	,	None of the above		
19)	During reconditioning of transformer oil it is ec content of oil is	onc	mical to use electros	tatı	c filters if the water
	a) Greater than 4 ppm	b)	Greater than 2 ppm		
	c) Less than 2 ppm	d)	Electrostatic filters a	re n	ever used
20)	The breakdown of solid materials is roughly given	n by	•		
	a) $V_b t_b = constant$	b)	$V_b ln t_b = constant$		
	c) $l_b l_n V_b = constant$		None of the above		
					_



Seat	
No.	

B.E. (Electrical) (Part – II) Examination, 2017 Elective – II: HIGH VOLTAGE ENGINEERING

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m to 6.00 p.m.

Instructions: 1) All questions compulsory.

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

SECTION - I

II. Solve any four: (4×5=20)

- a) Explain surge voltages and their distribution.
- b) Explain practical considerations in using gases for insulation purposes.
- c) Write a short note on conduction and breakdown in commercial liquids.
- d) Write a short note on break-down of composite insulation.
- e) A steady current of 600 μ A flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μ A flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value.

III. Solve any two: (2×10=20)

- a) Derive the following expression by using townsend second ionisation coefficient $n = \frac{n_0 e^{\alpha d}}{1 v (e^{\alpha d} 1)}$.
- b) i) Write a short note on liquids as insulators.
 - ii) Write a short note on conduction and break-down in pure liquids.
- c) Explain electromechanical break-down and break-downs of solid dielectrics in practice.

SECTION - II

IV. Solve any four: (4×5=20)

- a) Explain in short generation of HVDC/HVAC.
- b) Explain sphere gap.
- c) Explain briefly various tests to be carried out on a bushing.
- d) Write a short note on grounding of impulse testing laboratories.
- e) Write a short note on CRO for impulse voltage and current.

V. Solve any two: (2×10=20)

- a) Explain tripping and control of impulse generators.
- 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.

Set R



Seat	
No.	

Set S

 $(20 \times 1 = 20)$

B.E. (Electrical) (Part – II) Examination, 2017 Elective – II: HIGH VOLTAGE ENGINEERING

Day and Date: Tuesday, 23-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) All questions compulsory.

- 2) Assume suitable data if necessary and mention it clearly.
- 3) Figures to the right indicate full marks.
- 4) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
- 5) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

- I. Choose correct alternatives:
 - 1) Liquids with solid impurities
 - i) Liquids with solid impunites
 - 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 $\epsilon_{_{7}}$ 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) $V_h t_h = constant$

b) $V_b ln t_b = constant$

c) $t_h ln V_h = constant$

- 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 sample
 - 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 T₀
 - d) None of the above is true

-2-



8)	The insulation of the modern EHV lines is designed	ed b	pased on				
	a) The lightening voltage	b)	The switching voltag	е			
	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 t	he	service condition				
	c) Standardisation on the magnitude of voltage t	to b	e applied is available				
	d) The stresses do not damage the coil and insulation						
10)	The velocity of a travelling wave through a cable	of ı	elative permittivity 9 i	s			
·	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	•	All of the above				
12)	Non-destructive testing methods require measurement of						
,	a) dielectric strength		insulation resistance				
	c) $tan \delta$	d)	a) and b)				
	e) b) and c)	,	, ,				
13)	The mechanism responsible for dielectric loss in a dielectric are						
,	a) Conduction		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. vo	olta	ge				
	b) Power frequency and impulse voltage						
	c) Higher frequency a.c. voltages and impulse voltage						
	d) All kinds of voltages						
15)	High frequency and impulse currents are measured using						
	a) Resistive shunts	b)	Inductive elements				
	c) Hall and Farady effect devices	d)	All of the above				
16)	The process of ionisation is brought about by						
	a) Positive ions only b) Photons only	c)	Metastables only	d)	All of the above		
17)	The value of Townsends second ionization coefficients	ciei	nt has				
	a) High value for low <i>E/p</i> ratio	b)	Low value for low E/	o ra	tio		
	c) No relation with <i>E/p</i> ratio	d)	No application if the	gas	pressure is low		
18)	If p is the pressure of gas and d the distance of se	•		ectr	odes, the discharge		
	voltage according to Paschen's law is directly pro	poi	rtional to				
	a) p b) d		pd	,	None of the above		
19)	9 1	at	STP. The breakdow	n v	oltage at 73 cm Hg		
	pressure and 35° C is						
	a) 69 kV b) 63.25 kV	,	64.33 kV	d)	60.39 kV		
20)							
	a) Higher with negative polarity at all pressures		-	pola	arıty at all pressures		
	c) Higher with negative polarity at low pressures	d)	None of the above				



Seat	
No.	

B.E. (Electrical) (Part – II) Examination, 2017 Elective – II: HIGH VOLTAGE ENGINEERING

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m to 6.00 p.m.

Instructions: 1) All questions compulsory.

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

SECTION - I

II. Solve any four: (4×5=20)

- a) Explain surge voltages and their distribution.
- b) Explain practical considerations in using gases for insulation purposes.
- c) Write a short note on conduction and breakdown in commercial liquids.
- d) Write a short note on break-down of composite insulation.
- e) A steady current of 600 μ A flows through the plane electrode separated by a distance of 0.5 cm when a voltage of 10 kV is applied. Determine the Townsend's first ionization coefficient if a current of 60 μ A flows when the distance of separation is reduced to 0.1 cm and the field is kept constant at the previous value.

III. Solve any two: (2×10=20)

- a) Derive the following expression by using townsend second ionisation coefficient $n = \frac{n_0 e^{\alpha d}}{1 v (e^{\alpha d} 1)}$.
- b) i) Write a short note on liquids as insulators.
 - ii) Write a short note on conduction and break-down in pure liquids.
- c) Explain electromechanical break-down and break-downs of solid dielectrics in practice.

SECTION - II

IV. Solve any four: (4×5=20)

- a) Explain in short generation of HVDC/HVAC.
- b) Explain sphere gap.
- c) Explain briefly various tests to be carried out on a bushing.
- d) Write a short note on grounding of impulse testing laboratories.
- e) Write a short note on CRO for impulse voltage and current.

V. Solve any two: (2×10=20)

- a) Explain tripping and control of impulse generators.
- 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	Р
	I		

B.E. (Electrical) (Part – II) Examination, 2017 RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date: Tuesday, 23-5-2017 Max. Marks: 100

Time: 3.00 p.m. to 6.00 p.m.

Instructions: 1) Q. No. 1 is compulsory. It should be solved in first 30 minutes in Answer Book Page No. 3. Each question carries one mark.

2) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration: 30 Minutes Marks: 20

1. Choose the correct answer:

20

- 1) A solar thermal collector
 - a) Collects the solar energy and reflects it back
 - b) Absorbs the solar radiation and dissipates it to the ambient
 - c) Collects and converts the solar energy into electrical energy
 - d) Collects and converts the solar energy into thermal energy and delivers it to the next stage of the system
- 2) Which process is responsible for production of energy in the sun?
 - a) Nuclear fission reaction
- b) Nuclear fusion reaction
- c) Exothermal chemical reaction
- d) All of the above
- 3) The temperature at the inner core of the earth is about
 - a) 1000° C
- b) 4000° C
- c) 40000° C
- d) 500° C
- 4) Increasing the pressure inside a biogas plant
 - a) Increases the gas production
- b) Decreases the gas production
- c) Has no effect on gas production
- d) Causes explosion
- 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) At solar noon, the hour angle is
 - a) $+90^{\circ}$
- b) -90°
- c) zero
- d) 180°
- 7) The value of concentration ratio of a flat-plate collector is
 - a) 1

- b) 10
- c) 100
- d) 1000



8)	In most hydrotherma a) 10 km	al fields, hot spots od b) 10 m	ccur at a depth c) 2 to 3 km	of about d) 30 km
9)	Use of booster mirro a) Increases the ref b) Decreases the re c) Increases the diff d) Increases the be	lection to the atmos eflection to the atmo- fused radiation com	phere sphere ponent on the	
10)	A two-blade wind tu equal to a) π	rbine produces max b) 2π	c) 3π	when the tip speed ratio is d) 0.593
11)	The minimum tidal ra a) 1 m	•	,	,
12)	The temperature in ta) 300° C/km		•	rate of about d) 30° C/km
13)	The percentage of the a) 10%	ne incoming radiatio b) 20%	n reflected ba c) 30%	ck to space by the earth is d) 40%
14)	Small Hydro Plants a) High head and s c) Low head and la	mall capacity	,	and small capacity d and large capacity
15)	A geothermal resour about a) 50 years	rce tapped for electr b) 1000 years		n could provide energy for d) 1 year
16)	, -	ed to produce potal		ilizing solar heat energy is
17)	In flat-plate collector a) 500° C	the temperatures o b) 100° C	f the working f c) 300° C	luid can be raised upto d) 50° C
18)	Which region of sun a) Solar interiorc) Solar atmosphere		ass of the sun b) Photosphod) Chromosp	ere
19)	It is estimated that 9 a) $0 - 0.7 R$	0% of the energy is b) $0.23 R - 0.7 R$	•	•
20)	The radiation received is called a) Terrestrial	ed on the earth's su b) Extra-terrestrial	•	vithout change in direction d) Beam



Seat	
No.	

B.E. (Electrical) (Part – II) Examination, 2017 RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date: Tuesday, 23-5-2017

Time: 3.00 p.m. to 6.00 p.m.

2. Solve any four:

 $(5 \times 4 = 20)$

Marks: 80

- 1) Define solar constant and find out its value from fundamental.
- 2) Draw the configuration of pyranometer and explain how it is used to measure global and diffuse radiation.
- 3) Draw and explain Flat-plate collector. What are the advantages and disadvantages of Flat-plate collector?
- 4) Draw and explain solar water heater with natural circulation.
- 5) With neat diagram explain solar crop drying.
- 6) Draw and describe the different types of horizontal axis wind mills.

3. Solve any two:

 $(10 \times 2 = 20)$

- 1) With the help of neat diagram explain terrestrial and extra-terrestrial solar radiation.
- 2) Draw and explain the performance characteristics of wind mill.
- 3) 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?

4. Solve any four:

 $(5 \times 4 = 20)$

- 1) With the help of block diagram explain utilization of biogas for cooking.
- 2) Draw and explain the double chamber types biogas plant.
- 3) Draw and describe the dry steam geothermal power plant.
- 4) Write short note on potential of geothermal resources in India.
- 5) Draw and explain the floating drum type biogas plant.
- 6) Draw and describe the working of open cycle OTEC system.

5. Solve any two:

 $(10 \times 2 = 20)$

- 1) What is Biomass? Explain the resources of biomass. With the help of bacterial reactions explain principle of biogas generation.
- 2) Draw and describe the general layout of small hydro plant. What are the advantages and limitations of SHP?
- 3) With neat diagram explain tidal energy conversion techniques.

	Set P

Seat No.	Set	Q

		-	trical) (Part – l LE ENERGY S	-			 I)	
•	d Date : Tuesda .00 p.m. to 6.00	•	017				Max. Marks:	100
,	Instructions:	in Ans 2) Answ	swer Book Page r er MCQ/Objec	No. 3. tive ty	. Each questions	on c on	first 30 minutes arries one mark. Page No. 3 only on Top of Page.	y.
D	00 Min 1 a	МС	Q/Objective T	ype Qı	uestions		NA. J.	00
Duratio	n : 30 Minutes						Marks	: 20
1. Ch	oose the correct	answer:						20
2)	A device which called a) Solar water c) Solar coolir In flat-plate coll a) 500° C Which region of	still ng system lector the b)	temperatures o	b) So d) So f the w c) 30	olar constant olar ponds orking fluid ca 0° C	n be	e raised upto	
0)	a) Solar interiorc) Solar atmost	or		b) Ph	notosphere nromosphere			
4)	It is estimated to a) $0 - 0.7 R$		of the energy is 0.23 R – 0.7 R	•	•		0.23 R – R	
5)	The radiation re is called a) Terrestrial		n the earth's su Extra-terrestria		·		ange in direction Beam	
6)	b) Absorbs thec) Collects and	e solar end e solar rad d convert d convert	ergy and reflect diation and diss s the solar ener s the solar ene	pates i gy into	it to the ambie electrical ene	rgy	and delivers it to	

7) Which process is responsible for production of energy in the sun?

b) Nuclear fusion reaction

d) All of the above

a) Nuclear fission reaction

c) Exothermal chemical reaction



8)	The temperature at tall 1000° C	he inner core of the b) 4000° C		th is about 40000° C	d)	500° C
9)	Increasing the press a) Increases the ga c) Has no effect on	s production	b)	Decreases the g		production
10)	Two-basin tidal sche a) Are more econor b) Operate on ebb o c) Produce less uni d) Produce more un	mical than single bas cycles in both basins form power		schemes		
11)	At solar noon, the hole $a) + 90^{\circ}$	our angle is b) – 90°	c)	zero	d)	180°
12)	The value of concena) 1	tration ratio of a flate b) 10	•	te collector is 100	d)	1000
13)	In most hydrotherma a) 10 km	al fields, hot spots oc b) 10 m		at a depth of abo 2 to 3 km		30 km
14)	Use of booster mirro a) Increases the ref b) Decreases the re c) Increases the diff d) Increases the be	lection to the atmospelection to the atmost flection to the atmost fused radiation com	ohe sph oor	re ere ent on the absort		
15)	A two-blade wind tu equal to	•		·		tip speed ratio is 0.593
\	a) π	b) 2 π	,	3π	,	
16)	The minimum tidal raa) 1 m	ange required for po b) 5 m		r generation is ab 10 m		20 m
17)	The temperature in tage a) 300° C/km	he crust increases v b) 10° C/km		depth at a rate of 1° C/km		out 30° C/km
18)	The percentage of that a) 10%	ne incoming radiatio b) 20%		eflected back to s	•	e by the earth is 40%
19)	Small Hydro Plants a) High head and s c) Low head and la	mall capacity	,	Low head and so Large head and		• •
20)	A geothermal resour	ce tapped for electr	icity	generation coul	d pr	rovide energy for
	about					



Seat	
No.	

B.E. (Electrical) (Part – II) Examination, 2017 RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date: Tuesday, 23-5-2017

Time: 3.00 p.m. to 6.00 p.m.

2. Solve any four:

 $(5 \times 4 = 20)$

Marks: 80

- 1) Define solar constant and find out its value from fundamental.
- 2) Draw the configuration of pyranometer and explain how it is used to measure global and diffuse radiation.
- 3) Draw and explain Flat-plate collector. What are the advantages and disadvantages of Flat-plate collector?
- 4) Draw and explain solar water heater with natural circulation.
- 5) With neat diagram explain solar crop drying.
- 6) Draw and describe the different types of horizontal axis wind mills.

3. Solve any two:

 $(10 \times 2 = 20)$

- 1) With the help of neat diagram explain terrestrial and extra-terrestrial solar radiation.
- 2) Draw and explain the performance characteristics of wind mill.
- 3) 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?

4. Solve any four:

 $(5 \times 4 = 20)$

- 1) With the help of block diagram explain utilization of biogas for cooking.
- 2) Draw and explain the double chamber types biogas plant.
- 3) Draw and describe the dry steam geothermal power plant.
- 4) Write short note on potential of geothermal resources in India.
- 5) Draw and explain the floating drum type biogas plant.
- 6) Draw and describe the working of open cycle OTEC system.

5. Solve any two:

 $(10 \times 2 = 20)$

- 1) What is Biomass? Explain the resources of biomass. With the help of bacterial reactions explain principle of biogas generation.
- 2) Draw and describe the general layout of small hydro plant. What are the advantages and limitations of SHP?
- 3) With neat diagram explain tidal energy conversion techniques.

 Set Q

Seat		
No.	Set	R

		•	ctrical) (Part BLE ENERGY	-		-	
•	d Date : Tuesda .00 p.m. to 6.00	•	2017			Max. Marks	s : 100
ı	Instructions :	in An 2) Ansv	swer Book Pa v er MCQ/Obj	ige No ective	. 3. Each qu type ques	solved in first 30 minute uestion carries one mar t ions on Page No. 3 o P/Q/R/S) on Top of Pag	k. nly.
		M	CQ/Objective	Туре	Questions		
Duration	n : 30 Minutes					Marl	ks : 20
1. Ch	oose the correc	t answer	:				20
1)	The minimum a) 1 m	_	e required for 5 m	•	r generation 10 m	is about d) 20 m	
2)	The temperatua) 300° C/km		crust increase 10° C/km		depth at a r 1° C/km	ate of about d) 30° C/km	
3)	The percentag a) 10%		ncoming radia 20%		eflected back 30%	to space by the earth i d) 40%	S
4)	Small Hydro P a) High head c) Low head	and sma	II capacity	,		and small capacity and large capacity	
5)	about					could provide energy for	or
	a) 50 years	,	1000 years	,	•	d) 1 year	
6)	A device which called	n is used	to produce po	table v	water by util	izing solar heat energy	is
	a) Solar watec) Solar cooling		n	,	Solar const Solar pond		
7)	In flat-plate co a) 500° C		e temperature: 100° C		e working flu 300° C	id can be raised upto d) 50° C	
8)	Which region (a) Solar interic) Solar atmo	or	nstitutes main	b)	of the sun? Photosphe Chromosph		



Set R

9)	It is estimated that 90 a) $0 - 0.7 R$	0% of the energy is b) 0.23 R – 0.7 R	•		0.23 R – R		
10)	The radiation received is called a) Terrestrial	ed on the earth's su b) Extra-terrestrial	·		ange in direction Beam		
11)	 A solar thermal collector a) Collects the solar energy and reflects it back b) Absorbs the solar radiation and dissipates it to the ambient c) Collects and converts the solar energy into electrical energy d) Collects and converts the solar energy into thermal energy and delivers it to the next stage of the system 						
12)	Which process is res a) Nuclear fission re c) Exothermal chem	action	tion of energy in the b) Nuclear fusion re d) All of the above				
13)	The temperature at the a) 1000° C	ne inner core of the b) 4000° C	earth is about c) 40000° C	d)	500° C		
14)	Increasing the presson a) Increases the gas c) Has no effect on g	production	s plant b) Decreases the gas production d) Causes explosion				
15)	 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 						
16)	At solar noon, the ho a) +90°	ur angle is b) – 90°	c) zero	d)	180°		
17)	The value of concent a) 1	tration ratio of a flate b) 10	-plate collector is c) 100	d)	1000		
18)	In most hydrotherma a) 10 km	l fields, hot spots oc b) 10 m	ccur at a depth of abo c) 2 to 3 km		30 km		
19)	Use of booster mirror a) Increases the refl b) Decreases the re c) Increases the diff d) Increases the bea	ection to the atmospection to the atmost flection to the atmost used radiation com	ohere sphere ponent on the absort				
20)	A two-blade wind ture equal to a) π	bine produces max b) 2π	timum power when to c) 3π		tip speed ratio is 0.593		



Seat	
No.	

B.E. (Electrical) (Part – II) Examination, 2017 RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date: Tuesday, 23-5-2017

Marks : 80

Time: 3.00 p.m. to 6.00 p.m.

2. Solve any four:

 $(5 \times 4 = 20)$

- 1) Define solar constant and find out its value from fundamental.
- 2) Draw the configuration of pyranometer and explain how it is used to measure global and diffuse radiation.
- 3) Draw and explain Flat-plate collector. What are the advantages and disadvantages of Flat-plate collector?
- 4) Draw and explain solar water heater with natural circulation.
- 5) With neat diagram explain solar crop drying.
- 6) Draw and describe the different types of horizontal axis wind mills.

3. Solve any two:

 $(10 \times 2 = 20)$

- 1) With the help of neat diagram explain terrestrial and extra-terrestrial solar radiation.
- 2) Draw and explain the performance characteristics of wind mill.
- 3) 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?

4. Solve any four:

 $(5 \times 4 = 20)$

- 1) With the help of block diagram explain utilization of biogas for cooking.
- 2) Draw and explain the double chamber types biogas plant.
- 3) Draw and describe the dry steam geothermal power plant.
- 4) Write short note on potential of geothermal resources in India.
- 5) Draw and explain the floating drum type biogas plant.
- 6) Draw and describe the working of open cycle OTEC system.

5. Solve any two:

 $(10 \times 2 = 20)$

- 1) What is Biomass? Explain the resources of biomass. With the help of bacterial reactions explain principle of biogas generation.
- 2) Draw and describe the general layout of small hydro plant. What are the advantages and limitations of SHP?
- 3) With neat diagram explain tidal energy conversion techniques.

	Set R

Seat		
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No.	Set	5

No.								;	Set S
						xamination RCES (Elec		I)	
-		d Date : Tuesda .00 p.m. to 6.00	-	17				Max. I	Marks : 100
	1	Instructions :	in Answe	ver Book e r MCQ/O	Page No bjective	t should be s . 3. Each qu type quest , Q.P. Set (P	estion d ions or	earries one 1 Page No	mark. . 3 only.
			МС	Q/Objecti	ve Type	Questions			
Dura	atior	n : 30 Minutes							Marks : 20
1.	Cho	oose the correc	t answer :						20
	1)	At solar noon, a) +90°		ngle is - 90°	c)	zero	d)	180°	
	2)	The value of ca) 1	oncentratio b) 1			te collector is 100		1000	
	3)	In most hydrot a) 10 km		ds, hot spo 10 m		at a depth o 2 to 3 km		30 km	
	4)	Use of booster a) Increases to b) Decreases c) Increases to d) Increases to	he reflection the reflection the diffused	on to the a on to the a I radiation	tmosphe atmosph compor	re ere ent on the al			
	5)	A two-blade w equal to				•			ratio is
	6)	a) π The minimum a) 1 m	b) 2 tidal range b) 5	required f	for powe	3 π r generation 10 m	is abou	0.593 t 20 m	
	7)	The temperatua) 300° C/km		ust increa I0° C/km		depth at a ra		out 30° C/km	
	8)	The percentag		coming rac 20%		flected back 30%	•	e by the e	arth is
	9)	Small Hydro F a) High head c) Low head	and small	capacity	•	Low head a Large head			y

P.T.O.

-2-



10)	 A geothermal resource tapped for electricity generation could provide energy for about 						
	a) 50 years	b) 1000 years	c) 5 years	d) 1 year			
11)	A device which is us called	ed to produce potal	ole water by utilizing	solar heat energy is			
	a) Solar water stillc) Solar cooling sys	stem	b) Solar constantd) Solar ponds				
12)	In flat-plate collector a) 500° C	the temperatures o b) 100° C	f the working fluid ca c) 300° C	an be raised upto d) 50° C			
13)	Which region of sun a) Solar interior c) Solar atmospher		ass of the sun? b) Photosphere d) Chromosphere				
14)	It is estimated that 9 a) $0 - 0.7 R$	• • • • • • • • • • • • • • • • • • • •	generated in the reg c) $0 - 0.23 R$				
15)	The radiation received is called	ed on the earth's su	rface directly withou	t change in direction			
	a) Terrestrial	b) Extra-terrestrial	c) Diffuse	d) Beam			
16)	 A solar thermal collector a) Collects the solar energy and reflects it back b) Absorbs the solar radiation and dissipates it to the ambient c) Collects and converts the solar energy into electrical energy d) Collects and converts the solar energy into thermal energy and delivers it to the next stage of the system 						
17)	Which process is res a) Nuclear fission re c) Exothermal chem	eaction .	b) Nuclear fusion r				
18)	The temperature at tall 1000° C	the inner core of the b) 4000° C	earth is about c) 40000° C	d) 500° C			
19)	Increasing the press a) Increases the ga c) Has no effect on	s production	b) Decreases the g	•			
20)	a) Increases the gas production b) Decreases the gas production c) Has no effect on gas production d) Causes explosion 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.	

B.E. (Electrical) (Part – II) Examination, 2017 RENEWABLE ENERGY SOURCES (Elective – II)

Day and Date: Tuesday, 23-5-2017

Time: 3.00 p.m. to 6.00 p.m.

2. Solve any four:

 $(5 \times 4 = 20)$

Marks: 80

- 1) Define solar constant and find out its value from fundamental.
- 2) Draw the configuration of pyranometer and explain how it is used to measure global and diffuse radiation.
- 3) Draw and explain Flat-plate collector. What are the advantages and disadvantages of Flat-plate collector?
- 4) Draw and explain solar water heater with natural circulation.
- 5) With neat diagram explain solar crop drying.
- 6) Draw and describe the different types of horizontal axis wind mills.

3. Solve any two:

 $(10 \times 2 = 20)$

- 1) With the help of neat diagram explain terrestrial and extra-terrestrial solar radiation.
- 2) Draw and explain the performance characteristics of wind mill.
- 3) 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?

4. Solve any four:

 $(5 \times 4 = 20)$

- 1) With the help of block diagram explain utilization of biogas for cooking.
- 2) Draw and explain the double chamber types biogas plant.
- 3) Draw and describe the dry steam geothermal power plant.
- 4) Write short note on potential of geothermal resources in India.
- 5) Draw and explain the floating drum type biogas plant.
- 6) Draw and describe the working of open cycle OTEC system.

5. Solve any two:

 $(10 \times 2 = 20)$

- 1) What is Biomass? Explain the resources of biomass. With the help of bacterial reactions explain principle of biogas generation.
- 2) Draw and describe the general layout of small hydro plant. What are the advantages and limitations of SHP?
- 3) With neat diagram explain tidal energy conversion techniques.

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Seat No.	Set	Р

B.F. (Flectrical Engineering) (Part – II) Examination, 2017

	D.L. (LICOL			-	Elective – I		011, 2017	
	Date : Tuesday 00 p.m. to 6.00)17				Max. Marks	: 100
In		Answe 2) Answ	er Book Page er MCQ/Obj	e No. 3 ective	. Each questi type question	ion carı ons on	first 30 minute ries one mark. Page No. 3 on on Top of Page	nly.
Duration	: 30 Minutes	MC	Q/Objective	Туре	Questions		Morle	s : 20
	ose the correct						(20×	1=20)
•	Sag is also kno a) Glitch		Brownout	c)	Outage	d)	Dip	
,	EEE standard a) Power Qua c) Harmonics			,	Flicker Grounding			
,	Fime duration f a) 30 cycles to c) 3 sec to 1 m	3 sec	aneous shor	b)	ion variations 0.5 to 30 cycl 1 min to 3 mi	les		
4) F	Percentage un	balance c	an be descri	bed as	;			
;	a) $\frac{v_0}{v_2} \times 100\%$	b)	$\frac{v_0}{v_1} \times 100\%$	c)	$\frac{v_2}{v_1} \times 100\%$	d)	Either b or c	
; ;	Minimum voltage 50% respective a) Equipment b) Equipment c) Both equipred) None of abo	ely. Which A B nents will	device will b	e mor	e immune to	voltage	d B are 80% and sag ?	t.
;	Main sources on a) Capacitor son c) Arc furnace		t overvoltage	b)	wer system ar Lighting Both a and b	re		
;	As we move from the second in	creasing	source the	b)	power quality Goes on dec None of abov	reasing		
,	erroresonant a) Step up		er is Step down		ansformer. One to one	d)	None of above	



9)) To have minimum transients due to capacitor switching; capacitor must be switched ON at the instant when a) Voltage across capacitor is zero b) Current through capacitor is zero c) Voltage across capacitor is maximum d) None of above 								
10)	Duration of transients produced by capa a) Capacitance c) Resistance	acitor switching depends on value of b) System inductance d) None of above							
11)	According to IEC definition, Individual F a) 100% c) More than 100%	Harmonic Distortion of fundamental is b) Less than 100% d) None of above							
12)	Which of the following is not a source of a) DC drives c) Incandescent lamp	f harmonics in a power system ? b) PWM drives d) Printers							
	Triplen harmonics have phase a) Positive b) Negative	c) Zero d) None of these							
14)	The dominant harmonics in a 6 pulse coa) Third b) Fifth	onverter is c) Seventh d) Ninth							
15)	Controlling harmonic current distortion i a) End-user b) Utility	s the responsibility of c) Both a and b d) None of these							
16)	Single tuned shunt passive filter will act a) Inductive b) Resistive	c) Capacitive d) None of these							
17)	In effectively grounded system; the ratio sequence reactance (X0/X1) is positive a) 2 b) 3	o of zero sequence reactance to positive and less than c) 1 d) 4							
18)	,	citor to improve the power factor of load							
	from $\cos \phi_1$ to $\cos \phi_2$ is given by								
	a) KW(tan ϕ_1 – tan ϕ_2)	b) KW(cos ϕ_1 – cos ϕ_2)							
	c) KVA(tan ϕ_1 – tan ϕ_2)	d) KVA($\cos \phi_1 - \cos \phi_2$)							
19)	Power quality monitoring instrument she a) Service entrance b) Primary side of distribution transform c) Equipment affected due to poor pow d) None of these	ner							
20)	In windowed FFT technique; to detect le will be	ow frequency event; the width of window							
	a) Increased	b) Decreased							
	c) Remains same	d) None of above							
									



Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER QUALITY (Elective – II)

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four questions:

 $(4 \times 5 = 20)$

- 1) Explain power quality susceptibility criteria.
- 2) With neat diagram, define; explain the causes and effects of undervoltage.
- 3) With neat diagram explain CBEMA curve.
- 4) Define power quality. What are the responsibilities of utility, consumer and equipment manufacturer's regarding power quality.
- 5) Explain with neat diagram working of rotary UPS.
- 6) Explain with neat diagram fundamental principle of protection of equipment against voltage sag.
- 3. Solve any two questions:

 $(2 \times 10 = 20)$

- 1) Explain with neat diagram working of following equipments.
 - a) Online UPS
- b) Voltage regulator
- 2) With neat waveform define, explain the causes and effects of the following power quality problems :
 - a) Noise

- b) Flicker
- 3) Explain with neat diagram transients produced by
 - a) Single capacitor switching
 - b) Back-to-back capacitor switching.

SECTION - II

4. Solve any four questions:

 $(4 \times 5 = 20)$

- 1) Explain with equation how following electric parameters get affected in presence of harmonics:
 - a) RMS voltage
- b) Active Power
- c) Reactive Power.

- 2) Define following terms:
 - a) Triplen harmonics
- b) Interharmonics
- c) K-factor of transformer.

Set P



- 3) Explain different drawbacks of poor power factor. Enlist different methods of improving power factor.
- 4) Define grounding. Explain reasons of grounding.
- 5) Define power quality monitoring. What is the cost of poor power quality?
- 6) 12 pulse PWM variable speed drive has following specifications:

Output : 0 to 250 V, 0 - 150 Hz, 10A, 6KVA Harmonic spectrum for the drive is as given in the table :

Order	1	3	11	13	15	17	23	25	35	37
Angle (Degree)	0 °	25°	32º	-34°	123º	45°	27º	-56°	15º	67°
Magnitude r.m.s. % of fundamental	100	4	40	30	5	3	20	15	5	4

Calculate total harmonic distortion in current.

5. Solve any two questions:

 $(2 \times 10 = 20)$

1) Voltage and currents are analyzed at the load center and are established as follows:

$$\begin{split} v(t) &= \sqrt{2} \{ 220 \, \sin \omega t + 10 \, \sin(3\omega t + 60^\circ) + 20 \, \sin(5\omega t + 160^\circ) \\ &\quad + 24 \, \sin(7\omega t - 84^\circ) + 30 \, \sin(11\,\omega t + 55^\circ) + 14 \, \sin(13\omega t - 65^\circ) \} \\ i(t) &= \sqrt{2} \{ 22 \, \sin(\omega t - 10^\circ) + 3 \, \sin(3\omega t - 90^\circ) + 5 \, \sin(5\omega t + 65^\circ) \\ &\quad + 4 \, \sin(7\omega t - 49^\circ) + 4.5 \, \sin(11\,\omega t - 99^\circ) + 3.5 \, \sin(13\omega t - 65^\circ) \} \end{split}$$

Calculate the following:

- a) RMS voltage due to harmonic components
- b) Equivalent rms current
- c) Displacement power factor
- d) Voltage distortion power
- e) Current distortion power
- f) Total Harmonic Distortion in current.
- 2) Explain with neat diagram following grounding systems:
 - a) Properly grounded electrical system.
 - b) Isolated grounded electrical system.
- 3) Define power quality monitoring. Enlist different power quality measurement equipments. Explain the windowed FFT technique for power quality monitoring and analysis.

P.T.O.

Seat No.	Set	Q
NO.		1

	B.E. (Electrical Engineering) (POWER QUALITY	•
•	I Date : Tuesday, 23-5-2017 .00 p.m. to 6.00 p.m.	Max. Marks : 100
I	Answer Book Page N 2) Answer MCQ/Objec	ry. It should be solved in first 30 minutes in lo. 3. Each question carries one mark. tive type questions on Page No. 3 only. tion, Q.P. Set (P/Q/R/S) on Top of Page.
	MCQ/Objective T	ype Questions
Duration	n : 30 Minutes	Marks : 20
1. Cho	pose the correct answer :	(20×1=20)
1)	Single tuned shunt passive filter will act a) Inductive b) Resistive	at fundamental frequency. c) Capacitive d) None of these
2)	In effectively grounded system; the rational sequence reactance (X0/X1) is positive a) 2 b) 3	o of zero sequence reactance to positive and less than c) 1 d) 4
3)	,	citor to improve the power factor of load
,	from $\cos \phi_1$ to $\cos \phi_2$ is given by	
	a) KW(tan ϕ_1 – tan ϕ_2)	b) KW($\cos \phi_1 - \cos \phi_2$)
	c) KVA(tan ϕ_1 – tan ϕ_2)	d) KVA($\cos \phi_1 - \cos \phi_2$)
4)	Power quality monitoring instrument sheat a) Service entrance b) Primary side of distribution transform c) Equipment affected due to poor power d) None of these	ould be located as close as possible to
5)		ow frequency event; the width of window
	will bea) Increasedc) Remains same	b) Decreasedd) None of above
6)	Sag is also known as a) Glitch b) Brownout	c) Outage d) Dip
7)	IEEE standard 1100 is related to a) Power Quality monitoring c) Harmonics	b) Flickerd) Grounding
8)	Time duration for instantaneous short d a) 30 cycles to 3 sec c) 3 sec to 1 min	uration variations is b) 0.5 to 30 cycles d) 1 min to 3 min



9)	Percentage unbalar	nce can be describe	ed as	
	a) $\frac{V_0}{V_2} \times 100\%$	b) $\frac{v_0}{v_1} \times 100\%$	c) $\frac{v_2}{v_1} \times 100\%$	d) Either b or c
10)	50% respectively. Wa) Equipment Ab) Equipment B	/hich device will be	ability of equipment A more immune to volu nsitivity to voltage sa	
11)	Main sources of trar a) Capacitor switch c) Arc furnace		•	
12)	As we move from lo a) Goes on increas c) Remains same		st of power quality pr b) Goes on decrea d) None of above	
13)	Ferroresonant trans a) Step up		transformer. c) One to one	d) None of above
14)	To have minimum tra ON at the instant wh a) Voltage across of b) Current through c) Voltage across of d) None of above	nen capacitor is zero capacitor is zero		citor must be switched
15)	Duration of transien a) Capacitancec) Resistance	ts produced by capa	acitor switching depe b) System inductar d) None of above	
16)	According to IEC de a) 100% c) More than 100%		Harmonic Distortion of b) Less than 100% d) None of above	
17)	Which of the following a) DC drives c) Incandescent larger	ng is not a source o		er system ?
18)	Triplen harmonics ha) Positive	ave phab) Negative	ase sequence. c) Zero	d) None of these
19)	The dominant harmal a) Third	onics in a 6 pulse co b) Fifth	onverter is c) Seventh	d) Ninth
20)	Controlling harmoni a) End-user	c current distortion i b) Utility	is the responsibility on contract contract contract contract contract the contract c	of d) None of these



Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER QUALITY (Elective – II)

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four questions:

 $(4 \times 5 = 20)$

- 1) Explain power quality susceptibility criteria.
- 2) With neat diagram, define; explain the causes and effects of undervoltage.
- 3) With neat diagram explain CBEMA curve.
- 4) Define power quality. What are the responsibilities of utility, consumer and equipment manufacturer's regarding power quality.
- 5) Explain with neat diagram working of rotary UPS.
- 6) Explain with neat diagram fundamental principle of protection of equipment against voltage sag.
- 3. Solve any two questions:

 $(2\times10=20)$

- 1) Explain with neat diagram working of following equipments.
 - a) Online UPS
- b) Voltage regulator
- 2) With neat waveform define, explain the causes and effects of the following power quality problems :
 - a) Noise

- b) Flicker
- 3) Explain with neat diagram transients produced by
 - a) Single capacitor switching
 - b) Back-to-back capacitor switching.

SECTION - II

4. Solve any four questions:

 $(4 \times 5 = 20)$

- 1) Explain with equation how following electric parameters get affected in presence of harmonics:
 - a) RMS voltage
- b) Active Power
- c) Reactive Power.

- 2) Define following terms:
 - a) Triplen harmonics
- b) Interharmonics
- c) K-factor of transformer.

Set Q



- 3) Explain different drawbacks of poor power factor. Enlist different methods of improving power factor.
- 4) Define grounding. Explain reasons of grounding.
- 5) Define power quality monitoring. What is the cost of poor power quality?
- 6) 12 pulse PWM variable speed drive has following specifications:

Output : 0 to 250 V, 0 - 150 Hz, 10A, 6KVA Harmonic spectrum for the drive is as given in the table :

Order	1	3	11	13	15	17	23	25	35	37
Angle (Degree)	O°	25°	32º	-34°	123º	45°	27º	-56°	15º	67°
Magnitude r.m.s. % of fundamental	100	4	40	30	5	3	20	15	5	4

Calculate total harmonic distortion in current.

5. Solve any two questions:

 $(2 \times 10 = 20)$

1) Voltage and currents are analyzed at the load center and are established as follows:

$$\begin{split} v(t) &= \sqrt{2} \{ 220 \, \sin \omega t + 10 \, \sin(3\omega t + 60^\circ) + 20 \, \sin(5\omega t + 160^\circ) \\ &\quad + 24 \, \sin(7\omega t - 84^\circ) + 30 \, \sin(11\omega t + 55^\circ) + 14 \, \sin(13\omega t - 65^\circ) \} \\ i(t) &= \sqrt{2} \{ 22 \, \sin(\omega t - 10^\circ) + 3 \, \sin(3\omega t - 90^\circ) + 5 \, \sin(5\omega t + 65^\circ) \\ &\quad + 4 \, \sin(7\omega t - 49^\circ) + 4.5 \, \sin(11\omega t - 99^\circ) + 3.5 \, \sin(13\omega t - 65^\circ) \} \end{split}$$

Calculate the following:

- a) RMS voltage due to harmonic components
- b) Equivalent rms current
- c) Displacement power factor
- d) Voltage distortion power
- e) Current distortion power
- f) Total Harmonic Distortion in current.
- 2) Explain with neat diagram following grounding systems:
 - a) Properly grounded electrical system.
 - b) Isolated grounded electrical system.
- 3) Define power quality monitoring. Enlist different power quality measurement equipments. Explain the windowed FFT technique for power quality monitoring and analysis.

SLR-VB - 345

Seat No.	Set	R

B.E. (Electrical Engineering) (Part – II) Examination, 2017

	B.E. (Elcoti	•	LITY (Elective – II)	
•	Date: Tuesday .00 p.m. to 6.00			Max. Marks: 100
1		Answer Book Pag 2) Answer MCQ/O l	ge No. 3. Each question bjective type question	ved in first 30 minutes in on carries one mark. ns on Page No. 3 only. N/R/S) on Top of Page.
		MCQ/Objective	ve Type Questions	
Duration	n: 30 Minutes			Marks : 20
1. Cho	oose the correct	answer:		(20×1=20)
1)	According to IE a) 100% c) More than 1		ual Harmonic Distortion b) Less than 100 d) None of above) %
2)	Which of the fol a) DC drives c) Incandescen	_	ce of harmonics in a po b) PWM drives d) Printers	ower system ?
3)	Triplen harmon a) Positive	ics have b) Negative	phase sequence. c) Zero	d) None of these
4)	The dominant ha) Third	armonics in a 6 puls b) Fifth	se converter is c) Seventh	d) Ninth
5)	Controlling harr a) End-user	monic current distort b) Utility	ion is the responsibility c) Both a and b	
6)	Single tuned sh a) Inductive	unt passive filter wil b) Resistive	I act at fun c) Capacitive	damental frequency. d) None of these
7)	, ,	ounded system; the ance (X0/X1) is pos b) 3	•	e reactance to positive d) 4
8)	•	,	•	e power factor of load
·	from $\cos \phi_1$ to $\cos \phi_2$	$\cos \phi_2$ is given by		•
	a) KW(tan φ ₁ -	- tan φ ₂)	b) KW(cos $\phi_1 - \phi_2$	cos ϕ_2)
	c) KVA(tan ϕ_1	$-\tan \phi_2$)	d) KVA(cos φ ₁ -	$\cos \phi_2$
9)	a) Service entrb) Primary side	ance of distribution trans affected due to poor	t should be located as former	



10)	In windowed FFT te will be	chnique; to detect lo	ow 1	requency event;	the	width of window
	a) Increased		,	Decreased		
4.4\	c) Remains same		d)	None of above		
11)	Sag is also known a a) Glitch	s b) Brownout	c)	Outage	٩)	Din
12)	IEEE standard 1100	•	U)	Odlage	u)	ыр
12)	a) Power Quality mc) Harmonics			Flicker Grounding		
13)	Time duration for ins					
	a) 30 cycles to 3 sec) 3 sec to 1 min	C	,	0.5 to 30 cycles 1 min to 3 min		
14)	Percentage unbalan	ce can be described	d as	3		
	a) $\frac{v_0}{v_2} \times 100\%$	b) $\frac{V_0}{V_1} \times 100\%$	c)	$\frac{v_2}{v_1} \times 100\%$	d)	Either b or c
15)	Minimum voltage sat 50% respectively. W a) Equipment A b) Equipment B c) Both equipments d) None of above	hich device will be i	mor	e immune to volta	age	
16)	Main sources of tran a) Capacitor switch c) Arc furnace		b)	wer system are Lighting Both a and b		
17)	As we move from loa a) Goes on increasi c) Remains same					
18)	Ferroresonant transf a) Step up	ormer is b) Step down	tı c)	ansformer. One to one	d)	None of above
19)	To have minimum tra ON at the instant wh a) Voltage across c b) Current through c c) Voltage across c d) None of above	en apacitor is zero capacitor is zero		switching; capaci	tor	must be switched
20)	Duration of transient a) Capacitance c) Resistance	s produced by capa	b)	or switching depe System inductan None of above		on value of



Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER QUALITY (Elective – II)

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four questions:

 $(4 \times 5 = 20)$

- 1) Explain power quality susceptibility criteria.
- 2) With neat diagram, define; explain the causes and effects of undervoltage.
- 3) With neat diagram explain CBEMA curve.
- 4) Define power quality. What are the responsibilities of utility, consumer and equipment manufacturer's regarding power quality.
- 5) Explain with neat diagram working of rotary UPS.
- 6) Explain with neat diagram fundamental principle of protection of equipment against voltage sag.
- 3. Solve any two questions:

 $(2 \times 10 = 20)$

- 1) Explain with neat diagram working of following equipments.
 - a) Online UPS
- b) Voltage regulator
- 2) With neat waveform define, explain the causes and effects of the following power quality problems :
 - a) Noise

- b) Flicker
- 3) Explain with neat diagram transients produced by
 - a) Single capacitor switching
 - b) Back-to-back capacitor switching.

SECTION - II

4. Solve any four questions:

 $(4 \times 5 = 20)$

- 1) Explain with equation how following electric parameters get affected in presence of harmonics:
 - a) RMS voltage
- b) Active Power
- c) Reactive Power.

- 2) Define following terms:
 - a) Triplen harmonics
- b) Interharmonics
- c) K-factor of transformer.

Set R



- 3) Explain different drawbacks of poor power factor. Enlist different methods of improving power factor.
- 4) Define grounding. Explain reasons of grounding.
- 5) Define power quality monitoring. What is the cost of poor power quality?
- 6) 12 pulse PWM variable speed drive has following specifications:

Output : 0 to 250 V, 0 - 150 Hz, 10A, 6KVA Harmonic spectrum for the drive is as given in the table :

Order	1	3	11	13	15	17	23	25	35	37
Angle (Degree)	00	25°	32º	-34º	123º	45°	270	-56°	15º	67°
Magnitude r.m.s. % of fundamental	100	4	40	30	5	3	20	15	5	4

Calculate total harmonic distortion in current.

5. Solve any two questions:

 $(2 \times 10 = 20)$

1) Voltage and currents are analyzed at the load center and are established as follows:

$$\begin{split} v(t) &= \sqrt{2} \{ 220 \, \sin \omega t + 10 \, \sin(3\omega t + 60^\circ) + 20 \, \sin(5\omega t + 160^\circ) \\ &\quad + 24 \, \sin(7\omega t - 84^\circ) + 30 \, \sin(11\,\omega t + 55^\circ) + 14 \, \sin(13\omega t - 65^\circ) \} \\ i(t) &= \sqrt{2} \{ 22 \, \sin(\omega t - 10^\circ) + 3 \, \sin(3\omega t - 90^\circ) + 5 \, \sin(5\omega t + 65^\circ) \\ &\quad + 4 \, \sin(7\omega t - 49^\circ) + 4.5 \, \sin(11\,\omega t - 99^\circ) + 3.5 \, \sin(13\omega t - 65^\circ) \} \end{split}$$

Calculate the following:

- a) RMS voltage due to harmonic components
- b) Equivalent rms current
- c) Displacement power factor
- d) Voltage distortion power
- e) Current distortion power
- f) Total Harmonic Distortion in current.
- 2) Explain with neat diagram following grounding systems:
 - a) Properly grounded electrical system.
 - b) Isolated grounded electrical system.
- 3) Define power quality monitoring. Enlist different power quality measurement equipments. Explain the windowed FFT technique for power quality monitoring and analysis.

Seat No.	Set	S
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B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER QUALITY (Elective – II)

POWER QUALIT	TY (Elective - II)
Day and Date : Tuesday, 23-5-2017 Time : 3.00 p.m. to 6.00 p.m.	Max. Marks : 100
Answer Book Page 1 2) Answer MCQ/Obje	No. 3. Each question carries one mark. ective type questions on Page No. 3 only. ention, Q.P. Set (P/Q/R/S) on Top of Page.
MCQ/Objective	Type Questions
Duration: 30 Minutes	Marks: 20
1. Choose the correct answer:	(20×1=20)
 Main sources of transient overvoltage i a) Capacitor switching c) Arc furnace 	in power system are b) Lighting d) Both a and b
2) As we move from load to source the coa) Goes on increasingc) Remains same	ost of power quality protection device b) Goes on decreasing d) None of above
Step up b) Step down	transformer. c) One to one d) None of above
 4) To have minimum transients due to capa ON at the instant when a) Voltage across capacitor is zero b) Current through capacitor is zero c) Voltage across capacitor is maximud) None of above 	acitor switching; capacitor must be switched um
5) Duration of transients produced by capa) Capacitancec) Resistance	pacitor switching depends on value of b) System inductance d) None of above
6) According to IEC definition, Individuala) 100%c) More than 100%	Harmonic Distortion of fundamental is b) Less than 100% d) None of above
7) Which of the following is not a source ofa) DC drivesc) Incandescent lamp	of harmonics in a power system ? b) PWM drives d) Printers
8) Triplen harmonics have ph a) Positive b) Negative	nase sequence. c) Zero d) None of these
9) The dominant harmonics in a 6 pulse of a) Thirdb) Fifth	converter is c) Seventh d) Ninth P.T.O.



10)	Controlling harmonic a) End-user	current distortion is b) Utility		•		None of these
11)	Single tuned shunt pa a) Inductive	assive filter will act b) Resistive				ntal frequency. None of these
12)	In effectively grounde sequence reactance (a) 2	•		d less than	eac d)	·
13)	Reactive power to be	injected by capac	itoı	r to improve the	pow	er factor of load
	from $\cos \phi_1$ to $\cos \phi_2$	is given by				
	a) KW(tan ϕ_1 – tan ϕ	02)	b)	KW(cos ϕ_1 – co	s ϕ_2)
	c) KVA(tan ϕ_1 - tan	ϕ_2)	d)	KVA($\cos \phi_1 - c \phi_2$	os ¢	o ₂)
14)	Power quality monitor a) Service entrance b) Primary side of dis c) Equipment affecte d) None of these	stribution transform	er		ose	as possible to
15)	In windowed FFT tecl will be a) Increased c) Remains same	hnique; to detect lo	b)	requency event; Decreased None of above	the	width of window
16)	Sag is also known as a) Glitch	b) Brownout	c)	Outage	d)	Dip
17)	IEEE standard 1100 i a) Power Quality mo c) Harmonics		,	Flicker Grounding		
18)	Time duration for insta a) 30 cycles to 3 sec c) 3 sec to 1 min		b)	ion variations is 0.5 to 30 cycles 1 min to 3 min		
19)	Percentage unbalanc	e can be described	d as	6		
	a) $\frac{v_0}{v_2} \times 100\%$	b) $\frac{v_0}{v_1} \times 100\%$	c)	$\frac{v_2}{v_1} \times 100\%$	d)	Either b or c
20)	Minimum voltage sag 50% respectively. Wh a) Equipment A b) Equipment B c) Both equipments of d) None of above	nich device will be r	nor	re immune to volt	age	



Seat	
No.	

B.E. (Electrical Engineering) (Part – II) Examination, 2017 POWER QUALITY (Elective – II)

Day and Date: Tuesday, 23-5-2017 Marks: 80

Time: 3.00 p.m. to 6.00 p.m.

SECTION - I

2. Solve any four questions:

 $(4 \times 5 = 20)$

- 1) Explain power quality susceptibility criteria.
- 2) With neat diagram, define; explain the causes and effects of undervoltage.
- 3) With neat diagram explain CBEMA curve.
- 4) Define power quality. What are the responsibilities of utility, consumer and equipment manufacturer's regarding power quality.
- 5) Explain with neat diagram working of rotary UPS.
- 6) Explain with neat diagram fundamental principle of protection of equipment against voltage sag.
- 3. Solve any two questions:

 $(2 \times 10 = 20)$

- 1) Explain with neat diagram working of following equipments.
 - a) Online UPS
- b) Voltage regulator
- 2) With neat waveform define, explain the causes and effects of the following power quality problems :
 - a) Noise

- b) Flicker
- 3) Explain with neat diagram transients produced by
 - a) Single capacitor switching
 - b) Back-to-back capacitor switching.

SECTION - II

4. Solve any four questions:

 $(4 \times 5 = 20)$

- 1) Explain with equation how following electric parameters get affected in presence of harmonics:
 - a) RMS voltage
- b) Active Power
- c) Reactive Power.

- 2) Define following terms:
 - a) Triplen harmonics
- b) Interharmonics
- c) K-factor of transformer.

Set S



- 3) Explain different drawbacks of poor power factor. Enlist different methods of improving power factor.
- 4) Define grounding. Explain reasons of grounding.
- 5) Define power quality monitoring. What is the cost of poor power quality?
- 6) 12 pulse PWM variable speed drive has following specifications:

Output : 0 to 250 V, 0 - 150 Hz, 10A, 6KVA Harmonic spectrum for the drive is as given in the table :

Order	1	3	11	13	15	17	23	25	35	37
Angle (Degree)	0 °	25°	32º	-34°	123º	45°	27º	-56°	15º	67°
Magnitude r.m.s. % of fundamental	100	4	40	30	5	3	20	15	5	4

Calculate total harmonic distortion in current.

5. Solve any two questions:

 $(2 \times 10 = 20)$

1) Voltage and currents are analyzed at the load center and are established as follows:

$$\begin{split} v(t) &= \sqrt{2} \{ 220 \, \sin \omega t + 10 \, \sin(3\omega t + 60^\circ) + 20 \, \sin(5\omega t + 160^\circ) \\ &\quad + 24 \, \sin(7\omega t - 84^\circ) + 30 \, \sin(11\,\omega t + 55^\circ) + 14 \, \sin(13\omega t - 65^\circ) \} \\ i(t) &= \sqrt{2} \{ 22 \, \sin(\omega t - 10^\circ) + 3 \, \sin(3\omega t - 90^\circ) + 5 \, \sin(5\omega t + 65^\circ) \\ &\quad + 4 \, \sin(7\omega t - 49^\circ) + 4.5 \, \sin(11\,\omega t - 99^\circ) + 3.5 \, \sin(13\omega t - 65^\circ) \} \end{split}$$

Calculate the following:

- a) RMS voltage due to harmonic components
- b) Equivalent rms current
- c) Displacement power factor
- d) Voltage distortion power
- e) Current distortion power
- f) Total Harmonic Distortion in current.
- 2) Explain with neat diagram following grounding systems:
 - a) Properly grounded electrical system.
 - b) Isolated grounded electrical system.
- 3) Define power quality monitoring. Enlist different power quality measurement equipments. Explain the windowed FFT technique for power quality monitoring and analysis.

					SLR-\	/B – 346
Seat No.						Set P
	B.E. (E	Electrical) (Part HVDC T	– II) (Old) RANSMIS			
•	nd Date : Monda 10.00 a.m. to	-			Max	. Marks : 100
	Instructions :	 Q. No. 1 is comin Answer Boo Answer MCQ/Don't forget to 	k Page No. 3 Objective ty	B. Each qu p <mark>e quest</mark> i	uestion carries <mark>ions on Page</mark>	one mark. No. 3 only.
		MCQ/Object	tive Type Qu	uestions		
Duratio	on : 30 Minutes					Marks : 20
1. Cł	noose the corre	ect answer :				20
,	b) Consumes c) Consumes d) None of al) A 12-pulse br a) It eliminate	consume reactive ps as much reactive s 50% of the real poove idge is preferred in es certain harmonic	power as recower HVDC beca	·		
	,	n better power fact nnection of convert pove		side is be	etter	
3)) In HVDC tran a) 0°	smission system, b) 15°	rectifier firing c) 30		is kept near d) 90°	
4)	Passive filters a) Active pov c) Apparent p		b) Re	eactive por nly (a) and		
5)	a) High speed	MTDC system can d disconnecting swi al type protection	tches b) Fa			
6)) UHV DC trans	smission is being c				
	a) ± 500 KV	,	•		d) ± 800	V
7)) Individual ope a) IPC	eration of firing puls b) EPC	ses for each c) CC		he teature ot _ d) VGC	

8) The first commercially used HVDC link was built in

b) 1954

c) 1986

a) 2006

d) yet to be built



9)	Reactive power to HVDC system may a) AC filters c) SVS	be supplied from b) Shunt capacitors d) All of the above
10)	Tuned filters are used to filter out a) Characteristic harmonics c) Both a) and b)	b) Non-characteristic harmonics d) Transients only
11)	winding.	sults in severe stress on transformer
40\	a) Self clearingc) Communication failure	b) Non-self clearingd) Both a) and b)
12)	 Misfire occurs a) The presence of an unwanted sign b) Because of duplicated converter of c) The required gate pulse is missing d) Both a) and b) 	
13)	HVDC transmission lines are more ed a) short distance transmission c) long distance transmission	b) interconnected system
14)	Short gate pulse or long gate pulse us a) To start AC link c) To start DC link	ed for b) To stop AC link d) To stop DC link
15)	The characteristics of DC breakers ca a) Voltage capability c) Energy capability	n be determined by b) Current capability d) All of the above
16)	A DC tie used in parallel with an AC tie for the controllers a) Frequency and power/frequency cob) Stabilization of AC ties control c) Sub synchronous damping control d) Reactive power control	to damp the low frequency oscillations, ontrol
17)	Normal value of breakeven distance i a) 70 km b) 700 km	
18)	As compared to HVAC line, the corona a a) lower b) more	nd radio interference on a HVDC line are c) the same d) all of the above
19)	In pulse frequency control, ga a) $K1 = Pf_0V3/V1$ c) $K1 = P(V3/V1)$	in K1 of integrator is given by b) K1 = Pf ₀ V3 d) None of the above
20)	Fault on a two terminal DC link is rem a) Breakers on DC side c) Current control of converters	oved by b) Breakers on AC side d) None of above



Seat	
No.	

B.E. (Electrical) (Part – II) (Old) Examination, 2017 HVDC TRANSMISSION

Day and Date: Monday, 29-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

2. Solve any four:

Five marks each

- a) Define pulse number and explain valve utilization factor.
- b) Draw and explain the basic power controller of HVDC system.
- c) Give advantage and disadvantage of HVDC over EHVAC transmission systems.
- d) State necessity of higher level controllers in HVDC systems.
- e) Explain the analysis of bridge converter with overlap less than 60 degree.

3. Solve any two:

Ten marks each

- a) Explain with neat diagram the different types of DC links.
- b) Draw the basic converter control hierarchy and explain firing angle control in detail.
- c) Give detailed comparison between HVDC and AC transmission.

SECTION - II

4. Solve any four:

Five marks each

- a) Explain harmonic instability problem.
- b) Explain the potential application of MTDC system.
- c) Explain protection against overcurrent in HVDC system.
- d) Explain the basic faults that occur in converters.
- e) Explain DC filters.

5. Solve any two:

Ten marks each

- a) Explain the following current control methods of MTDC system.
 - i) Current margin method
- ii) Two ACR method.
- b) Define the Non-characteristic harmonics and explain
 - i) Harmonic distortion
- ii) IT product
- iii) Telephone influence factor
- iv) THFF
- c) Explain the significance of commutation margin angle and extinction angle.

SLR-VB - 346

Seat No.			Set	
	B.E. (E	lectrical) (Part – II) (Old) Ex HVDC TRANSMISSI	xamination, 2017	<u> </u>
•	nd Date : Monda 10.00 a.m. to		Max. Ma	ırks : 100
	Instructions :	 Q. No. 1 is compulsory. It sho in Answer Book Page No. 3. E Answer MCQ/Objective type Don't forget to mention, Q.P 	E ach question carries one e <mark>questions on Page No</mark> .	e mark. 3 only.
		MCQ/Objective Type Ques	stions	
Durati	on : 30 Minutes			larks : 20
1. C	hoose the corre	ct answer :		20
1	for the control a) Frequency b) Stabilization	and power/frequency control on of AC ties control ronous damping control	the low frequency oscillat	ions,
2) Normal value	of breakeven distance in dc trans	smission is around	

a) lower 4) In _____ pulse frequency control, gain K1 of integrator is given by

3) As compared to HVAC line, the corona and radio interference on a HVDC line are

a) $K1 = Pf_0V3/V1$

a) 70 km

b) $K1 = Pf_0V3$

b) 700 km c) 7000 km d) any distance

b) more c) the same d) all of the above

c) K1 = P(V3/V1)

- d) None of the above
- 5) Fault on a two terminal DC link is removed by
 - a) Breakers on DC side
- b) Breakers on AC side
- c) Current control of converters
- d) None of above

- 6) The HVDC converter
 - a) Does not consume reactive power
 - b) Consumes as much reactive power as real power
 - c) Consumes 50% of the real power
 - d) None of above
- 7) A 12-pulse bridge is preferred in HVDC because
 - a) It eliminates certain harmonics
 - b) It results in better power factor
 - c) Series connection of converters on D.C. side is better
 - d) None of above



8)	In HVDC transmission system, rectifinal 0° b) 15°	er firing angle a is kept near c) 30° d) 90°
9)	Passive filters acts as source of a) Active power c) Apparent power	b) Reactive power d) Only (a) and (c)
10)	Protection of MTDC system can be do a) High speed disconnecting switches c) Differential type protection	b) Fast current control
11)	UHV DC transmission is being consident a) $\pm 500 \text{KV}$ b) $\pm 800 \text{KV}$	
12)	Individual operation of firing pulses for a) IPC b) EPC	c) CCC d) VGC
13)	The first commercially used HVDC lir a) 2006 b) 1954	
14)	Reactive power to HVDC system may a) AC filters c) SVS	y be supplied from b) Shunt capacitors d) All of the above
15)	Tuned filters are used to filter out a) Characteristic harmonics c) Both a) and b)	b) Non-characteristic harmonics d) Transients only
	Arc-back is a fault and reswinding.	sults in severe stress on transformer
4 - 7\	c) Communication failure	d) Both a) and b)
17)	 Misfire occurs a) The presence of an unwanted sign b) Because of duplicated converter c c) The required gate pulse is missing d) Both a) and b) 	ontrols
18)	HVDC transmission lines are more eda) short distance transmissionc) long distance transmission	conomical for b) interconnected system d) both a) and b)
19)	Short gate pulse or long gate pulse us a) To start AC link c) To start DC link	sed for b) To stop AC link d) To stop DC link
20)	The characteristics of DC breakers ca a) Voltage capability c) Energy capability	an be determined by b) Current capability d) All of the above



Seat	
No.	

B.E. (Electrical) (Part – II) (Old) Examination, 2017 HVDC TRANSMISSION

Day and Date: Monday, 29-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

2. Solve any four:

Five marks each

- a) Define pulse number and explain valve utilization factor.
- b) Draw and explain the basic power controller of HVDC system.
- c) Give advantage and disadvantage of HVDC over EHVAC transmission systems.
- d) State necessity of higher level controllers in HVDC systems.
- e) Explain the analysis of bridge converter with overlap less than 60 degree.

3. Solve any two:

Ten marks each

- a) Explain with neat diagram the different types of DC links.
- b) Draw the basic converter control hierarchy and explain firing angle control in detail.
- c) Give detailed comparison between HVDC and AC transmission.

SECTION - II

4. Solve any four:

Five marks each

- a) Explain harmonic instability problem.
- b) Explain the potential application of MTDC system.
- c) Explain protection against overcurrent in HVDC system.
- d) Explain the basic faults that occur in converters.
- e) Explain DC filters.

5. Solve any two:

Ten marks each

- a) Explain the following current control methods of MTDC system.
 - i) Current margin method
- ii) Two ACR method.
- b) Define the Non-characteristic harmonics and explain
 - i) Harmonic distortion
- ii) IT product
- iii) Telephone influence factor
- iv) THFF
- c) Explain the significance of commutation margin angle and extinction angle.

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Seat	
No.	

			Set K	
	B.E. (Electrical) (Part – II) HVDC TRA) (Old) Examination, 201 NSMISSION		
•	d Date : Monday, 29-5-2017 10.00 a.m. to 1.00 p.m.	Ma	ax. Marks : 1	100
	2) Answer MCQ/Obje	sory. It should be solved in firs age No. 3. Each question carr ective type questions on Pag ention, Q.P. Set (P/Q/R/S) on	ies one mark g e No. 3 only	k. /.
	MCQ/Objective	Type Questions		
Duratio	on : 30 Minutes		Marks:	20
1. Ch	oose the correct answer :			20
	Arc-back is a fault and rewinding. a) Self clearing c) Communication failure Misfire occurs	b) Non-self clearing d) Both a) and b)	ransformer	
	a) The presence of an unwanted sigb) Because of duplicated converterc) The required gate pulse is missird) Both a) and b)	controls		
3)	HVDC transmission lines are more a) short distance transmission c) long distance transmission	b) interconnected system		
4)	Short gate pulse or long gate pulse (a) To start AC link c) To start DC link	used for b) To stop AC link d) To stop DC link		
5)	The characteristics of DC breakers (a) Voltage capability c) Energy capability	can be determined by b) Current capability d) All of the above	_	
6)	A DC tie used in parallel with an AC ti	ie to damp the low frequency o	oscillations,	

- - a) Frequency and power/frequency controlb) Stabilization of AC ties control

 - c) Sub synchronous damping control
 - d) Reactive power control
- 7) Normal value of breakeven distance in dc transmission is around
 - a) 70 km

- b) 700 km c) 7000 km d) any distance



8)	As compared to HVAC line, the corona a a) lower b) more	nd radio interference on a HVDC line are c) the same d) all of the above
9)	In pulse frequency control, ga a) $K1 = Pf_0V3/V1$ c) $K1 = P(V3/V1)$	nin K1 of integrator is given by b) K1 = Pf ₀ V3 d) None of the above
10)	Fault on a two terminal DC link is rem a) Breakers on DC side c) Current control of converters	b) Breakers on AC side
11)	The HVDC converter a) Does not consume reactive power b) Consumes as much reactive power c) Consumes 50% of the real power d) None of above	
12)	 A 12-pulse bridge is preferred in HVD a) It eliminates certain harmonics b) It results in better power factor c) Series connection of converters or d) None of above 	
13)	In HVDC transmission system, rectifica) 0° b) 15°	er firing angle a is kept near c) 30° d) 90°
14)	Passive filters acts as source of a) Active power c) Apparent power	b) Reactive power d) Only (a) and (c)
15)	Protection of MTDC system can be do a) High speed disconnecting switches c) Differential type protection	b) Fast current control
16)	UHV DC transmission is being consid a) \pm 500 KV b) \pm 800 KV	
17)	Individual operation of firing pulses fo a) IPC b) EPC	r each valve is the feature of c) CCC d) VGC
18)	The first commercially used HVDC lir a) 2006 b) 1954	c) 1986 d) yet to be built
19)	Reactive power to HVDC system may a) AC filters c) SVS	be supplied from b) Shunt capacitors d) All of the above
20)	Tuned filters are used to filter out a) Characteristic harmonics c) Both a) and b)	b) Non-characteristic harmonics d) Transients only



Seat	
No.	

B.E. (Electrical) (Part – II) (Old) Examination, 2017 HVDC TRANSMISSION

Day and Date: Monday, 29-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

SECTION-I

2. Solve any four:

Five marks each

- a) Define pulse number and explain valve utilization factor.
- b) Draw and explain the basic power controller of HVDC system.
- c) Give advantage and disadvantage of HVDC over EHVAC transmission systems.
- d) State necessity of higher level controllers in HVDC systems.
- e) Explain the analysis of bridge converter with overlap less than 60 degree.

3. Solve any two:

Ten marks each

- a) Explain with neat diagram the different types of DC links.
- b) Draw the basic converter control hierarchy and explain firing angle control in detail.
- c) Give detailed comparison between HVDC and AC transmission.

SECTION - II

4. Solve any four:

Five marks each

- a) Explain harmonic instability problem.
- b) Explain the potential application of MTDC system.
- c) Explain protection against overcurrent in HVDC system.
- d) Explain the basic faults that occur in converters.
- e) Explain DC filters.

5. Solve any two:

Ten marks each

- a) Explain the following current control methods of MTDC system.
 - i) Current margin method
- ii) Two ACR method.
- b) Define the Non-characteristic harmonics and explain
 - i) Harmonic distortion
- ii) IT product
- iii) Telephone influence factor
- iv) THFF
- c) Explain the significance of commutation margin angle and extinction angle.

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			SLR-VB - 346
Seat No.			Set S
B.E.	• • • •	– II) (Old) Examina RANSMISSION	
Day and Date: Mon Time: 10.00 a.m. to			Max. Marks : 100
Instructions	in Answer Book 2) Answer MCQ/	k Page No. 3. Each qu Objective type questi	colved in first 30 minutes estion carries one mark. ons on Page No. 3 only. (Q/R/S) on Top of Page.
Duration : 30 Minute		ive Type Questions	Marks : 20
1. Choose the cor	rect answer :		20
1) UHV DC tra	nsmission is being c	onsidered more than _	
a) \pm 500 K	V b) ±800 KV	c) \pm 800 MV	d) ± 800 V
2) Individual o a) IPC	peration of firing puls b) EPC	ses for each valve is th c) CCC	ne feature of d) VGC
3) The first cor a) 2006	nmercially used HVI b) 1954	DC link was built in c) 1986	d) yet to be built
4) Reactive poa) AC filtersc) SVS	_	n may be supplied from b) Shunt capac d) All of the abo	itors
•	s are used to filter ou eristic harmonics and b)		eristic harmonics nly
winding. a) Self clea		nd results in severe s b) Non-self clea d) Both a) and l	
7) Misfire occu		a, boma, and	<i>-</i> /

- iVIIstire occurs __ a) The presence of an unwanted signals
 - b) Because of duplicated converter controls
 - c) The required gate pulse is missing
 - d) Both a) and b)
- 8) HVDC transmission lines are more economical for
- a) short distance transmissionb) interconnected systemc) long distance transmissiond) both a) and b)



9)	Short gate pulse or long gate pulse us a) To start AC link c) To start DC link	
10)	The characteristics of DC breakers ca a) Voltage capability c) Energy capability	
11)	A DC tie used in parallel with an AC tie for the controllers a) Frequency and power/frequency control stabilization of AC ties control c) Sub synchronous damping control d) Reactive power control	
12)	Normal value of breakeven distance i a) 70 km b) 700 km	
13)		and radio interference on a HVDC line are c) the same d) all of the above
14)	In pulse frequency control, ga a) $K1 = Pf_0V3/V1$ c) $K1 = P(V3/V1)$	ain K1 of integrator is given by b) K1 = Pf ₀ V3 d) None of the above
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17)	A 12-pulse bridge is preferred in HVD a) It eliminates certain harmonics b) It results in better power factor c) Series connection of converters or d) None of above	
18)	In HVDC transmission system, rectifi a) 0° b) 15°	er firing angle a is kept near c) 30° d) 90°
19)	Passive filters acts as source of a) Active power c) Apparent power	b) Reactive power d) Only (a) and (c)
20)	Protection of MTDC system can be do a) High speed disconnecting switches c) Differential type protection	•



Seat	
No.	

B.E. (Electrical) (Part – II) (Old) Examination, 2017 HVDC TRANSMISSION

Day and Date: Monday, 29-5-2017 Marks: 80

Time: 10.00 a.m. to 1.00 p.m.

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- d) State necessity of higher level controllers in HVDC systems.
- e) Explain the analysis of bridge converter with overlap less than 60 degree.

3. Solve any two:

Ten marks each

- a) Explain with neat diagram the different types of DC links.
- b) Draw the basic converter control hierarchy and explain firing angle control in detail.
- c) Give detailed comparison between HVDC and AC transmission.

SECTION - II

4. Solve any four:

Five marks each

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- b) Explain the potential application of MTDC system.
- c) Explain protection against overcurrent in HVDC system.
- d) Explain the basic faults that occur in converters.
- e) Explain DC filters.

5. Solve any two:

Ten marks each

- a) Explain the following current control methods of MTDC system.
 - i) Current margin method
- ii) Two ACR method.
- b) Define the Non-characteristic harmonics and explain
 - i) Harmonic distortion
- ii) IT product
- iii) Telephone influence factor
- iv) THFF
- c) Explain the significance of commutation margin angle and extinction angle.