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

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N.B. :**
- 1) Figures to the **right** indicate **full** marks.
 - 2) **Use** of calculator is allowed.
 - 3) Attempt **any three** questions from **each** Section.
 - 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. Choose the most correct alternative :

14

1) The particular integral of $(D^2 + 4D + 3)y = 3e^{2x}$ is

- a) $\frac{e^{2x}}{15}$ b) e^{2x} c) $\frac{e^{2x}}{5}$ d) $c_1e^{-x} + c_2e^{-2x}$

2) The particular integral of $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + y = 2\log x$ is

- a) $\log x + 2$ b) $\log(x + 2)$ c) $2(\log x + 2)$ d) $2(\log x + 4)$

3) Which of the following does not satisfy the differential equation $(D^3 - 1)y = 0$?

- a) e^x b) e^{-x} c) $e^{-x/2} \sin \frac{\sqrt{3}}{2}x$ d) $e^{-x/2} \cos \frac{\sqrt{3}}{2}x$

4) The general solution of $z = p + q$ is

- a) $\phi(x - y, y - z) = 0$ b) $\phi(x - y, y \log z) = 0$
c) $\phi(x - y, y - \log z) = 0$ d) $\phi(x - y, y - z^2/2) = 0$

5) The solution of $q = e^{-p/\alpha}$ is $z =$

- a) $ax - e^{-a/\alpha}y + c$ b) $ax + e^{a/\alpha}y + c$ c) $ax + e^{-a/\alpha}y + c$ d) All of these

6) Z-transform of $\cos \frac{\pi}{2}k$ is _____

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

P.T.O.



7) Inverse z-transform of $\left[\frac{z}{z-2} \right]$ is

a) 2^k for $k < 0, |z| < 1$

b) 2^k for $k \geq 0, |z| < 1$

c) 2^k for $k < 0, |z| > 2$

d) 2^k for $k \geq 0, |z| > 2$

8) If $x_k = \left(\frac{1}{5}\right)^k$, $k < 0$, then $z[x_k] = \text{_____} - \left(\text{with } |z| < \frac{1}{5}\right)$.

a) $\frac{1}{z-5}$

b) $\frac{z}{1-5z}$

c) $\frac{5z}{1-5z}$

d) $\frac{1}{5z-1}$

9) In the cosine series expansion of $f(x) = \begin{cases} 1 & 0 < x < a/2 \\ -1 & a/2 < x < a \end{cases}$ the constant term is

a) -1

b) 1

c) π

d) 0

10) In the interval $(-\pi, \pi)$ if $x \sin x = 1 - \frac{1}{2} \cos x - \frac{2}{3} \cos 2x + \frac{2}{8} \cos 3x - \frac{2}{15} \cos 4x + \dots$

Then $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \frac{1}{7.9} + \dots =$

a) π

b) $\frac{\pi-2}{2}$

c) $\frac{\pi}{4}$

d) $\frac{\pi-2}{4}$

11) The directional derivative of $\phi = (x^2 - y^2 + 2z^2)$ at the point $(1, 2, 3)$ along z-axis is

a) 2

b) -4

c) 12

d) 0

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

a) 2

b) 4

c) 8

d) 10

13) The Fourier sine transform of $f(x) = \begin{cases} 1 & 0 \leq x < 1 \\ 0 & x > 1 \end{cases}$ is

a) $\sqrt{\frac{2}{\pi}} s$

b) $\sqrt{\frac{2}{\pi}} (1 - \cos s)$

c) $\sqrt{\frac{2}{\pi}} \left(\frac{1 - \cos s}{s} \right)$

d) None of these

14) Value of $\int_0^{\infty} e^{-2u} \sin 2u \, du =$

a) $\frac{1}{2}$

b) $\frac{1}{4}$

c) $\frac{1}{8}$

d) $\frac{1}{10}$



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

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- N.B. :** 1) Figures to the **right** indicate **full** marks.
2) **Use** of calculator is **allowed**.
3) Attempt **any three** questions from **each** Section.

SECTION – I

2. a) Solve $(D^3 + 8)y = x^4 + 2x + 1$ 3
b) Solve $(D^3 - 3D^2 + 3D - 1)y = x^{\frac{1}{2}}e^x$ 3
c) Solve $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 2y = x \log x$. 3
3. a) Solve $(x^2 - y^2 - z^2)p + 2xyq = 2xz$. 4
b) Solve $yp + xq + pq = 0$. 3
c) Solve $p^3 + q^3 = 8z$. 3
4. a) Find Z-Transform of $x_k = c^k \cos \alpha k$, $k \geq 0$ where α is real. 4
b) Find Inverse Z-Transform of $\left[\frac{2z^2 - 10z + 13}{(z - 3)^2(z - 2)} \right]$ for $2 < |z| < 3$. 5
5. a) Solve $\frac{d^2y}{dx^2} - 2 \frac{dy}{dx} + y = xe^x \sin x$. 3
b) Find Inverse Z-Transform of $\left(\frac{z + 2}{z^2 - 2z + 1} \right)$, $|z| > 1$ 3
c) Solve $pq = x^4y^3z^4$. 3



SECTION – II

6. a) Expand $f(x) = x$ for $0 < x < 2$ as half range cosine series. 4

b) Find Fourier series expansion of

$$f(x) = \begin{cases} \sin x & \text{for } 0 \leq x \leq \pi \\ 0 & \text{for } \pi \leq x \leq 2\pi \end{cases}$$

and hence deduce that $\frac{1}{2} = \frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots$ 5

7. a) Find the Fourier sine transform of e^{-x} , $x \geq 0$ and show that $\int_0^{\infty} \frac{x \sin mx}{1+m^2} dx = \frac{\pi}{2} e^{-m}$ $m > 0$ 4

b) Evaluate using Laplace Transform $\int_0^{\infty} e^{-2t} t \cos t dt$. 3

c) Find Inverse Laplace Transform of $\left(\frac{s+2}{s^2-4s+13} \right)$. 2

8. a) Find the angle between the tangents to the curve $\vec{r} = (t^3 + 2)\mathbf{i} + (4t - 5)\mathbf{j} + (2t^2 - 6t)\mathbf{k}$ at $t = 0$ and $t = 2$. 3

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

c) Find the constants a and b such that the surface $ax^2 - 2byz = (a + 4)x$ will be orthogonal to the surface $4x^2y + z^3 = 4$ at $(1, -1, 2)$. 3

9. Attempt **any two** :

a) Obtain Fourier series expansion of $f(x) = \begin{cases} x + \frac{\pi}{2} & -\pi < x < 0 \\ \frac{\pi}{2} - x & 0 < x < \pi \end{cases}$.

Hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots$ 5

b) Solve by using Laplace Transform $y'' - 3y' + 2y = 12e^{-2t}$ with $y(0) = 2$, $y'(0) = 6$. 5

c) Find the Fourier Transform of $f(x) = \begin{cases} = 1 & \text{for } |x| < k \\ = 0 & \text{for } |x| > k \end{cases}$ and hence evaluate

$$\int_{-\infty}^{\infty} \frac{\cos sx \sin sk}{s} ds. \quad \text{5}$$



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Duration : 30 Minutes

Marks : 14

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1) If $x_k = \left(\frac{1}{5}\right)^k$, $k < 0$, then $z[x_k] = \text{_____} - \left(\text{with } |z| < \frac{1}{5}\right)$.

- a) $\frac{1}{z-5}$ b) $\frac{z}{1-5z}$ c) $\frac{5z}{1-5z}$ d) $\frac{1}{5z-1}$

2) In the cosine series expansion of $f(x) = \begin{cases} 1 & 0 < x < a/2 \\ -1 & a/2 < x < a \end{cases}$ the constant term is

- a) -1 b) 1 c) π d) 0

3) In the interval $(-\pi, \pi)$ if $x \sin x = 1 - \frac{1}{2} \cos x - \frac{2}{3} \cos 2x + \frac{2}{8} \cos 3x - \frac{2}{15} \cos 4x + \dots$

Then $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \frac{1}{7.9} + \dots =$

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

4) The directional derivative of $\phi = (x^2 - y^2 + 2z^2)$ at the point $(1, 2, 3)$ along z-axis is

- a) 2 b) -4 c) 12 d) 0

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P.T.O.



6) The Fourier sine transform of $f(x) = \begin{cases} 1 & 0 \leq x < 1 \\ 0 & x > 1 \end{cases}$ is

- a) $\sqrt{\frac{2}{\pi}} s$ b) $\sqrt{\frac{2}{\pi}} (1 - \cos s)$ c) $\sqrt{\frac{2}{\pi}} \left(\frac{1 - \cos s}{s} \right)$ d) None of these

7) Value of $\int_0^{\infty} e^{-2u} \sin 2u \, du =$

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14) Inverse z-transform of $\left[\frac{z}{z-2} \right]$ is

- a) 2^k for $k < 0, |z| < 1$ b) 2^k for $k \geq 0, |z| < 1$
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**S.E. (Part – I) (Electrical and Electronics) Examination, 2017
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b) For the curve $x = t^3 + 1$, $y = t^2$, $z = t$ find the magnitudes of tangential and normal components of acceleration of the particle moving on the curve at $t = 1$. 3

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9. Attempt **any two** :

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**S.E. (Part – I) (Electrical and Electronics) Examination, 2017
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MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the most correct alternative :

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- 1) The solution of $q = e^{-p/\alpha}$ is $z =$
 - a) $ax - e^{-a/\alpha}y + c$
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 - c) $ax + e^{-a/\alpha}y + c$
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- 2) Z-transform of $\cos \frac{\pi}{2}k$ is _____
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- 4) If $x_k = \left(\frac{1}{5}\right)^k, k < 0$, then $z[x_k] =$ _____ $-\left(\text{with } |z| < \frac{1}{5}\right)$.
 - a) $\frac{1}{z-5}$
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- 5) In the cosine series expansion of $f(x) = \begin{cases} 1 & 0 < x < a/2 \\ -1 & a/2 < x < a \end{cases}$ the constant term is
 - a) -1
 - b) 1
 - c) π
 - d) 0

P.T.O.



6) In the interval $(-\pi, \pi)$ if $x \sin x = 1 - \frac{1}{2} \cos x - \frac{2}{3} \cos 2x + \frac{2}{8} \cos 3x - \frac{2}{15} \cos 4x + \dots$

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c) Find the constants a and b such that the surface $ax^2 - 2byz = (a + 4)x$ will be orthogonal to the surface $4x^2y + z^3 = 4$ at $(1, -1, 2)$. 3

9. Attempt **any two** :

a) Obtain Fourier series expansion of $f(x) = \begin{cases} x + \frac{\pi}{2} & -\pi < x < 0 \\ \frac{\pi}{2} - x & 0 < x < \pi \end{cases}$.

Hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots$ 5

b) Solve by using Laplace Transform $y'' - 3y' + 2y = 12e^{-2t}$ with $y(0) = 2$, $y'(0) = 6$. 5

c) Find the Fourier Transform of $f(x) = \begin{cases} = 1 & \text{for } |x| < k \\ = 0 & \text{for } |x| > k \end{cases}$ and hence evaluate

$$\int_{-\infty}^{\infty} \frac{\cos sx \sin sk}{s} ds. \quad \text{5}$$



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

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N.B. :**
- 1) Figures to the **right** indicate **full** marks.
 - 2) **Use** of calculator is allowed.
 - 3) Attempt **any three** questions from **each** Section.
 - 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. Choose the most correct alternative :

14

1) In the interval $(-\pi, \pi)$ if $x \sin x = 1 - \frac{1}{2} \cos x - \frac{2}{3} \cos 2x + \frac{2}{8} \cos 3x - \frac{2}{15} \cos 4x + \dots$

Then $\frac{1}{1.3} - \frac{1}{3.5} + \frac{1}{5.7} - \frac{1}{7.9} + \dots =$

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

2) The directional derivative of $\phi = (x^2 - y^2 + 2z^2)$ at the point $(1, 2, 3)$ along z-axis is

- a) 2 b) -4 c) 12 d) 0

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

- a) 2 b) 4 c) 8 d) 10

4) The Fourier sine transform of $f(x) = \begin{cases} 1 & 0 \leq x < 1 \\ 0 & x > 1 \end{cases}$ is

- a) $\sqrt{\frac{2}{\pi}} s$ b) $\sqrt{\frac{2}{\pi}} (1 - \cos s)$ c) $\sqrt{\frac{2}{\pi}} \left(\frac{1 - \cos s}{s} \right)$ d) None of these

5) Value of $\int_0^{\infty} e^{-2u} \sin 2u \, du =$

- a) $\frac{1}{2}$ b) $\frac{1}{4}$ c) $\frac{1}{8}$ d) $\frac{1}{10}$

P.T.O.



- 6) The particular integral of $(D^2 + 4D + 3)y = 3e^{2x}$ is
- a) $\frac{e^{2x}}{15}$ b) e^{2x} c) $\frac{e^{2x}}{5}$ d) $c_1e^{-x} + c_2e^{-2x}$
- 7) The particular integral of $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + y = 2\log x$ is
- a) $\log x + 2$ b) $\log(x + 2)$ c) $2(\log x + 2)$ d) $2(\log x + 4)$
- 8) Which of the following does not satisfy the differential equation $(D^3 - 1)y = 0$?
- a) e^x b) e^{-x} c) $e^{-x/2} \sin \frac{\sqrt{3}}{2} x$ d) $e^{\frac{-x}{2}} \cos \frac{\sqrt{3}}{2} x$
- 9) The general solution of $z = p + q$ is
- a) $\phi(x - y, y - z) = 0$ b) $\phi(x - y, y \log z) = 0$
c) $\phi(x - y, y - \log z) = 0$ d) $\phi(x - y, y - z^2/2) = 0$
- 10) The solution of $q = e^{-p/\alpha}$ is $z =$
- a) $ax - e^{-a/\alpha} y + c$ b) $ax + e^{a/\alpha} y + c$ c) $ax + e^{-a/\alpha} y + c$ d) All of these
- 11) Z-transform of $\cos \frac{\pi}{2} k$ is _____
- a) $\frac{z}{z^2 + 1}$ b) $\frac{z^2}{z^2 + 1}$ c) $\frac{z}{z^2 - 1}$ d) $\frac{z(z-1)}{z^2 - z + 1}$
- 12) Inverse z-transform of $\left[\frac{z}{z-2} \right]$ is
- a) 2^k for $k < 0, |z| < 1$ b) 2^k for $k \geq 0, |z| < 1$
c) 2^k for $k < 0, |z| > 2$ d) 2^k for $k \geq 0, |z| > 2$
- 13) If $x_k = \left(\frac{1}{5}\right)^k, k < 0$, then $z[x_k] =$ _____ $-\left(\text{with } |z| < \frac{1}{5}\right)$.
- a) $\frac{1}{z-5}$ b) $\frac{z}{1-5z}$ c) $\frac{5z}{1-5z}$ d) $\frac{1}{5z-1}$
- 14) In the cosine series expansion of $f(x) = \begin{cases} 1 & 0 < x < a/2 \\ -1 & a/2 < x < a \end{cases}$ the constant term is
- a) -1 b) 1 c) π d) 0



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

Day and Date : Tuesday, 12-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- N.B. :** 1) Figures to the **right** indicate **full** marks.
2) **Use** of calculator is **allowed**.
3) Attempt **any three** questions from **each** Section.

SECTION – I

2. a) Solve $(D^3 + 8)y = x^4 + 2x + 1$ 3
b) Solve $(D^3 - 3D^2 + 3D - 1)y = x^{\frac{1}{2}}e^x$ 3
c) Solve $x^2 \frac{d^2y}{dx^2} - x \frac{dy}{dx} + 2y = x \log x$. 3
3. a) Solve $(x^2 - y^2 - z^2)p + 2xyq = 2xz$. 4
b) Solve $yp + xq + pq = 0$. 3
c) Solve $p^3 + q^3 = 8z$. 3
4. a) Find Z-Transform of $x_k = c^k \cos \alpha k$, $k \geq 0$ where α is real. 4
b) Find Inverse Z-Transform of $\left[\frac{2z^2 - 10z + 13}{(z - 3)^2(z - 2)} \right]$ for $2 < |z| < 3$. 5
5. a) Solve $\frac{d^2y}{dx^2} - 2 \frac{dy}{dx} + y = xe^x \sin x$. 3
b) Find Inverse Z-Transform of $\left(\frac{z + 2}{z^2 - 2z + 1} \right)$, $|z| > 1$ 3
c) Solve $pq = x^4y^3z^4$. 3



SECTION – II

6. a) Expand $f(x) = x$ for $0 < x < 2$ as half range cosine series. 4

b) Find Fourier series expansion of

$$f(x) = \begin{cases} \sin x & \text{for } 0 \leq x \leq \pi \\ 0 & \text{for } \pi \leq x \leq 2\pi \end{cases}$$

and hence deduce that $\frac{1}{2} = \frac{1}{1.3} + \frac{1}{3.5} + \frac{1}{5.7} + \dots$ 5

7. a) Find the Fourier sine transform of e^{-x} , $x \geq 0$ and show that $\int_0^{\infty} \frac{x \sin mx}{1+m^2} dx = \frac{\pi}{2} e^{-m}$ $m > 0$ 4

b) Evaluate using Laplace Transform $\int_0^{\infty} e^{-2t} t \cos t dt$. 3

c) Find Inverse Laplace Transform of $\left(\frac{s+2}{s^2-4s+13} \right)$. 2

8. a) Find the angle between the tangents to the curve $\vec{r} = (t^3 + 2)\mathbf{i} + (4t - 5)\mathbf{j} + (2t^2 - 6t)\mathbf{k}$ at $t = 0$ and $t = 2$. 3

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

c) Find the constants a and b such that the surface $ax^2 - 2byz = (a + 4)x$ will be orthogonal to the surface $4x^2y + z^3 = 4$ at $(1, -1, 2)$. 3

9. Attempt **any two** :

a) Obtain Fourier series expansion of $f(x) = \begin{cases} x + \frac{\pi}{2} & -\pi < x < 0 \\ \frac{\pi}{2} - x & 0 < x < \pi \end{cases}$.

Hence deduce that $\frac{\pi^2}{8} = \frac{1}{1^2} + \frac{1}{3^2} + \frac{1}{5^2} + \dots$ 5

b) Solve by using Laplace Transform $y'' - 3y' + 2y = 12e^{-2t}$ with $y(0) = 2$, $y'(0) = 6$. 5

c) Find the Fourier Transform of $f(x) = \begin{cases} = 1 & \text{for } |x| < k \\ = 0 & \text{for } |x| > k \end{cases}$ and hence evaluate

$$\int_{-\infty}^{\infty} \frac{\cos sx \sin sk}{s} ds. \quad \text{5}$$



- 6) The electric braking system commonly employed in rolling mills, printing presses and elevators is
- a) Plugging
 - b) Rheostatic
 - c) Dynamic
 - d) Both b) and c)
- 7) A DC motor runs at 1725 (rpm) at full load and 1775 (rpm) at no load, the speed regulation is
- a) 4.7%
 - b) 2.8%
 - c) 7.6%
 - d) 1.5%
- 8) Instrument transformers are used on ac circuit for extending the range of
- a) Ammeter
 - b) Voltmeter
 - c) Wattmeter
 - d) All of the above
- 9) Transformer core is laminated in order to _____
- a) Reduce cost
 - b) Reduce hysteresis loss
 - c) Minimize eddy current losses
 - d) All of the above
- 10) The essential conditions for parallel operation of 3 phase transformer is that they should have same
- a) Polarity
 - b) KVA rating
 - c) Phase sequence
 - d) All of the above
- 11) A transformer transforms
- a) Frequency
 - b) Voltage
 - c) Current
 - d) Voltage and Current
- 12) A transformer has negative voltage regulation when its load P. F. is
- a) Zero
 - b) Unity
 - c) Leading
 - d) Lagging
- 13) Back-to-Back test of single phase transformer is mainly carried out to find out
- a) Change in temperature
 - b) Full load Cu loss
 - c) Efficiency of transformer
 - d) Regulation
- 14) The magnetic flux in the core of single phase transformer is
- a) Purely alternating one
 - b) Purely rotating one
 - c) Partly alternating and partly rotating
 - d) None of the above



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**S.E. (E & E) (Part – I) (Old-CGPA) Examination, 2017
DC MACHINES AND TRANSFORMERS**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Solve **any four** : **(4×4=16)**

- a) List out different types of DC motor and explain them with correct diagram. Write the equation of back e.m.f. for each type of motor.
- b) What are the effects of armature reaction ? How to reduce them ?
- c) Draw and explain the I_a Vs N and T Vs I_a characteristics of DC series motor.
- d) Explain Regenerative Braking.
- e) Draw and explain power flow diagram of DC machine.

3. Solve **any two** : **(2×6=12)**

- a) List out and explain different types of losses in DC machine. How these losses can be minimized ?
- b) A 240V DC shunt motor runs at 800 r.p.m. and takes armature current of 2A. Find the resistance required in series with the shunt winding so that motor may run at 950 r.p.m. when taking an armature current of 28A. Assume flux is proportional to field current. Shunt field resistance is 160Ω , armature resistance is 0.4Ω .

OR

- b) The brake test on a DC shunt motor gave the following results : tensions 3.2 kg and 0.3 kg, radius of pulley 10 cm, speed 1500 rpm, $V = 230V$, line current = 2.8 A. Find :
 - 1) Output torque
 - 2) Output power
 - 3) Horse power
 - 4) Efficiency.



SECTION – II

4. Write short notes on the following (**any four**) : **(4×4=16)**
- a) All day efficiency
 - b) Conditions for parallel operation of single phase transformer
 - c) O.C. and S.C. test of single phase transformer.
 - d) YD11 and DY 11 connections of 3 ϕ transformer.
 - e) Equivalent circuit of single phase transformer and its parameters.
5. Solve **any two** : **(2×6=12)**
- a) Explain the different losses in the transformer and derive the condition for maximum efficiency.
 - b) Two single phase transformers with equal voltage ratios have impedances 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 p.f. 0.8 lagging.
 - c) A 3 ϕ step down transformer is connected to 6600V on the primary side. The ratio of turns per phase is 12 and the line current drawn from mains is 20A. Find the secondary line voltage, line current if the transformer is connected in :
 - i) Star-Star
 - ii) Delta-Star
 - iii) Star-Delta
 - iv) Delta-Delta. Neglect losses.
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SLR-TJ – 438

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**S.E. (E & E) (Part –I) (Old-CGPA) Examination, 2017
DC MACHINES AND TRANSFORMERS**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- 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 alternative :

14

- 1) Instrument transformers are used on ac circuit for extending the range of
 - a) Ammeter
 - b) Voltmeter
 - c) Wattmeter
 - d) All of the above
- 2) Transformer core is laminated in order to _____
 - a) Reduce cost
 - b) Reduce hysteresis loss
 - c) Minimize eddy current losses
 - d) All of the above
- 3) The essential conditions for parallel operation of 3 phase transformer is that they should have same
 - a) Polarity
 - b) KVA rating
 - c) Phase sequence
 - d) All of the above
- 4) A transformer transforms
 - a) Frequency
 - b) Voltage
 - c) Current
 - d) Voltage and Current
- 5) A transformer has negative voltage regulation when its load P. F. is
 - a) Zero
 - b) Unity
 - c) Leading
 - d) Lagging

P.T.O.



- 6) Back-to-Back test of single phase transformer is mainly carried out to find out
- a) Change in temperature
 - b) Full load Cu loss
 - c) Efficiency of transformer
 - d) Regulation
- 7) The magnetic flux in the core of single phase transformer is
- a) Purely alternating one
 - b) Purely rotating one
 - c) Partly alternating and partly rotating
 - d) None of the above
- 8) The basic requirement of a DC armature winding is that it must be
-
- a) A closed one
 - b) A wave winding
 - c) A lap winding
 - d) Either b) or c)
- 9) The line which is perpendicular to the magnetic flux in DC machine and divides the flux in two equal parts called
- a) MNA
 - b) GNA
 - c) Polar axis
 - d) GNP
- 10) The E_b/V ratio of a DC motor is an indication of its
- a) Efficiency
 - b) Starting torque
 - c) Speed regulation
 - d) Total loss
- 11) The greatest percentage of heat loss in a DC machine is due to
- a) Eddy current loss
 - b) Hysteresis loss
 - c) Copper loss
 - d) Frictional loss
- 12) The current drawn by DC series motor at starting is
- a) Zero
 - b) Very low
 - c) Normal
 - d) Very high
- 13) The electric braking system commonly employed in rolling mills, printing presses and elevators is
- a) Plugging
 - b) Rheostatic
 - c) Dynamic
 - d) Both b) and c)
- 14) A DC motor runs at 1725 (rpm) at full load and 1775 (rpm) at no load, the speed regulation is
- a) 4.7%
 - b) 2.8%
 - c) 7.6%
 - d) 1.5%



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**S.E. (E & E) (Part – I) (Old-CGPA) Examination, 2017
DC MACHINES AND TRANSFORMERS**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Solve **any four** : **(4×4=16)**

- a) List out different types of DC motor and explain them with correct diagram. Write the equation of back e.m.f. for each type of motor.
- b) What are the effects of armature reaction ? How to reduce them ?
- c) Draw and explain the I_a Vs N and T Vs I_a characteristics of DC series motor.
- d) Explain Regenerative Braking.
- e) Draw and explain power flow diagram of DC machine.

3. Solve **any two** : **(2×6=12)**

- a) List out and explain different types of losses in DC machine. How these losses can be minimized ?
- b) A 240V DC shunt motor runs at 800 r.p.m. and takes armature current of 2A. Find the resistance required in series with the shunt winding so that motor may run at 950 r.p.m. when taking an armature current of 28A. Assume flux is proportional to field current. Shunt field resistance is 160Ω , armature resistance is 0.4Ω .

OR

- b) The brake test on a DC shunt motor gave the following results : tensions 3.2 kg and 0.3 kg, radius of pulley 10 cm, speed 1500 rpm, $V = 230V$, line current = 2.8 A. Find :
 - 1) Output torque
 - 2) Output power
 - 3) Horse power
 - 4) Efficiency.

Set Q



SECTION – II

4. Write short notes on the following (**any four**) : **(4×4=16)**
- a) All day efficiency
 - b) Conditions for parallel operation of single phase transformer
 - c) O.C. and S.C. test of single phase transformer.
 - d) YD11 and DY 11 connections of 3 ϕ transformer.
 - e) Equivalent circuit of single phase transformer and its parameters.
5. Solve **any two** : **(2×6=12)**
- a) Explain the different losses in the transformer and derive the condition for maximum efficiency.
 - b) Two single phase transformers with equal voltage ratios have impedances 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 p.f. 0.8 lagging.
 - c) A 3 ϕ step down transformer is connected to 6600V on the primary side. The ratio of turns per phase is 12 and the line current drawn from mains is 20A. Find the secondary line voltage, line current if the transformer is connected in :
 - i) Star-Star
 - ii) Delta-Star
 - iii) Star-Delta
 - iv) Delta-Delta. Neglect losses.
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**S.E. (E & E) (Part –I) (Old-CGPA) Examination, 2017
DC MACHINES AND TRANSFORMERS**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- 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 alternative :

14

- 1) The current drawn by DC series motor at starting is
 - a) Zero
 - b) Very low
 - c) Normal
 - d) Very high
- 2) The electric braking system commonly employed in rolling mills, printing presses and elevators is
 - a) Plugging
 - b) Rheostatic
 - c) Dynamic
 - d) Both b) and c)
- 3) A DC motor runs at 1725 (rpm) at full load and 1775 (rpm) at no load, the speed regulation is
 - a) 4.7%
 - b) 2.8%
 - c) 7.6%
 - d) 1.5%
- 4) Instrument transformers are used on ac circuit for extending the range of
 - a) Ammeter
 - b) Voltmeter
 - c) Wattmeter
 - d) All of the above
- 5) Transformer core is laminated in order to _____
 - a) Reduce cost
 - b) Reduce hysteresis loss
 - c) Minimize eddy current losses
 - d) All of the above

P.T.O.



- 6) The essential conditions for parallel operation of 3 phase transformer is that they should have same
- a) Polarity
 - b) KVA rating
 - c) Phase sequence
 - d) All of the above
- 7) A transformer transforms
- a) Frequency
 - b) Voltage
 - c) Current
 - d) Voltage and Current
- 8) A transformer has negative voltage regulation when its load P. F. is
- a) Zero
 - b) Unity
 - c) Leading
 - d) Lagging
- 9) Back-to-Back test of single phase transformer is mainly carried out to find out
- a) Change in temperature
 - b) Full load Cu loss
 - c) Efficiency of transformer
 - d) Regulation
- 10) The magnetic flux in the core of single phase transformer is
- a) Purely alternating one
 - b) Purely rotating one
 - c) Partly alternating and partly rotating
 - d) None of the above
- 11) The basic requirement of a DC armature winding is that it must be
-
- a) A closed one
 - b) A wave winding
 - c) A lap winding
 - d) Either b) or c)
- 12) The line which is perpendicular to the magnetic flux in DC machine and divides the flux in two equal parts called
- a) MNA
 - b) GNA
 - c) Polar axis
 - d) GNP
- 13) The E_b/V ratio of a DC motor is an indication of its
- a) Efficiency
 - b) Starting torque
 - c) Speed regulation
 - d) Total loss
- 14) The greatest percentage of heat loss in a DC machine is due to
- a) Eddy current loss
 - b) Hysteresis loss
 - c) Copper loss
 - d) Frictional loss
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**S.E. (E & E) (Part – I) (Old-CGPA) Examination, 2017
DC MACHINES AND TRANSFORMERS**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Solve **any four** : **(4×4=16)**

- a) List out different types of DC motor and explain them with correct diagram. Write the equation of back e.m.f. for each type of motor.
- b) What are the effects of armature reaction ? How to reduce them ?
- c) Draw and explain the I_a Vs N and T Vs I_a characteristics of DC series motor.
- d) Explain Regenerative Braking.
- e) Draw and explain power flow diagram of DC machine.

3. Solve **any two** : **(2×6=12)**

- a) List out and explain different types of losses in DC machine. How these losses can be minimized ?
- b) A 240V DC shunt motor runs at 800 r.p.m. and takes armature current of 2A. Find the resistance required in series with the shunt winding so that motor may run at 950 r.p.m. when taking an armature current of 28A. Assume flux is proportional to field current. Shunt field resistance is 160Ω , armature resistance is 0.4Ω .

OR

- b) The brake test on a DC shunt motor gave the following results : tensions 3.2 kg and 0.3 kg, radius of pulley 10 cm, speed 1500 rpm, $V = 230V$, line current = 2.8 A. Find :
 - 1) Output torque
 - 2) Output power
 - 3) Horse power
 - 4) Efficiency.

Set R



SECTION – II

4. Write short notes on the following (**any four**) : **(4×4=16)**
- a) All day efficiency
 - b) Conditions for parallel operation of single phase transformer
 - c) O.C. and S.C. test of single phase transformer.
 - d) YD11 and DY 11 connections of 3 ϕ transformer.
 - e) Equivalent circuit of single phase transformer and its parameters.
5. Solve **any two** : **(2×6=12)**
- a) Explain the different losses in the transformer and derive the condition for maximum efficiency.
 - b) Two single phase transformers with equal voltage ratios have impedances 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 p.f. 0.8 lagging.
 - c) A 3 ϕ step down transformer is connected to 6600V on the primary side. The ratio of turns per phase is 12 and the line current drawn from mains is 20A. Find the secondary line voltage, line current if the transformer is connected in :
 - i) Star-Star
 - ii) Delta-Star
 - iii) Star-Delta
 - iv) Delta-Delta. Neglect losses.
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**S.E. (E & E) (Part –I) (Old-CGPA) Examination, 2017
DC MACHINES AND TRANSFORMERS**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- 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 alternative :

14

- 1) The essential conditions for parallel operation of 3 phase transformer is that they should have same
 - a) Polarity
 - b) KVA rating
 - c) Phase sequence
 - d) All of the above
- 2) A transformer transforms
 - a) Frequency
 - b) Voltage
 - c) Current
 - d) Voltage and Current
- 3) A transformer has negative voltage regulation when its load P. F. is
 - a) Zero
 - b) Unity
 - c) Leading
 - d) Lagging
- 4) Back-to-Back test of single phase transformer is mainly carried out to find out
 - a) Change in temperature
 - b) Full load Cu loss
 - c) Efficiency of transformer
 - d) Regulation
- 5) The magnetic flux in the core of single phase transformer is
 - a) Purely alternating one
 - b) Purely rotating one
 - c) Partly alternating and partly rotating
 - d) None of the above

P.T.O.



- 6) The basic requirement of a DC armature winding is that it must be _____
- a) A closed one
 - b) A wave winding
 - c) A lap winding
 - d) Either b) or c)
- 7) The line which is perpendicular to the magnetic flux in DC machine and divides the flux in two equal parts called
- a) MNA
 - b) GNA
 - c) Polar axis
 - d) GNP
- 8) The E_b/V ratio of a DC motor is an indication of its
- a) Efficiency
 - b) Starting torque
 - c) Speed regulation
 - d) Total loss
- 9) The greatest percentage of heat loss in a DC machine is due to
- a) Eddy current loss
 - b) Hysteresis loss
 - c) Copper loss
 - d) Frictional loss
- 10) The current drawn by DC series motor at starting is
- a) Zero
 - b) Very low
 - c) Normal
 - d) Very high
- 11) The electric braking system commonly employed in rolling mills, printing presses and elevators is
- a) Plugging
 - b) Rheostatic
 - c) Dynamic
 - d) Both b) and c)
- 12) A DC motor runs at 1725 (rpm) at full load and 1775 (rpm) at no load, the speed regulation is
- a) 4.7%
 - b) 2.8%
 - c) 7.6%
 - d) 1.5%
- 13) Instrument transformers are used on ac circuit for extending the range of
- a) Ammeter
 - b) Voltmeter
 - c) Wattmeter
 - d) All of the above
- 14) Transformer core is laminated in order to _____
- a) Reduce cost
 - b) Reduce hysteresis loss
 - c) Minimize eddy current losses
 - d) All of the above



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**S.E. (E & E) (Part – I) (Old-CGPA) Examination, 2017
DC MACHINES AND TRANSFORMERS**

Day and Date : Thursday, 14-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Solve **any four** : **(4×4=16)**

- a) List out different types of DC motor and explain them with correct diagram. Write the equation of back e.m.f. for each type of motor.
- b) What are the effects of armature reaction ? How to reduce them ?
- c) Draw and explain the I_a Vs N and T Vs I_a characteristics of DC series motor.
- d) Explain Regenerative Braking.
- e) Draw and explain power flow diagram of DC machine.

3. Solve **any two** : **(2×6=12)**

- a) List out and explain different types of losses in DC machine. How these losses can be minimized ?
- b) A 240V DC shunt motor runs at 800 r.p.m. and takes armature current of 2A. Find the resistance required in series with the shunt winding so that motor may run at 950 r.p.m. when taking an armature current of 28A. Assume flux is proportional to field current. Shunt field resistance is 160Ω , armature resistance is 0.4Ω .

OR

- b) The brake test on a DC shunt motor gave the following results : tensions 3.2 kg and 0.3 kg, radius of pulley 10 cm, speed 1500 rpm, $V = 230V$, line current = 2.8 A. Find :
 - 1) Output torque
 - 2) Output power
 - 3) Horse power
 - 4) Efficiency.

Set S



SECTION – II

4. Write short notes on the following (**any four**) : **(4×4=16)**
- a) All day efficiency
 - b) Conditions for parallel operation of single phase transformer
 - c) O.C. and S.C. test of single phase transformer.
 - d) YD11 and DY 11 connections of 3 ϕ transformer.
 - e) Equivalent circuit of single phase transformer and its parameters.
5. Solve **any two** : **(2×6=12)**
- a) Explain the different losses in the transformer and derive the condition for maximum efficiency.
 - b) Two single phase transformers with equal voltage ratios have impedances 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 p.f. 0.8 lagging.
 - c) A 3 ϕ step down transformer is connected to 6600V on the primary side. The ratio of turns per phase is 12 and the line current drawn from mains is 20A. Find the secondary line voltage, line current if the transformer is connected in :
 - i) Star-Star
 - ii) Delta-Star
 - iii) Star-Delta
 - iv) Delta-Delta. Neglect losses.
-



SLR-TJ – 439

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**S.E. (Electrical and Electronics Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL NETWORKS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** i) **All questions are compulsory.**
ii) **Figures to right indicate full marks.**
iii) **Assume suitable data whenever necessary.**
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 :

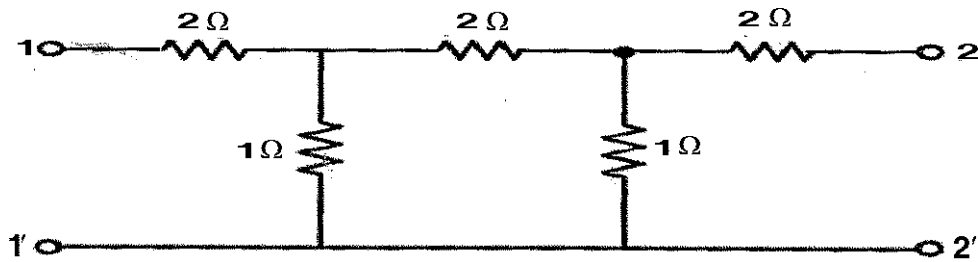
(1×14=14)

- 1) In pure parallel LC circuit current drawn from main supply is
 - a) Maximum
 - b) Zero
 - c) Minimum
 - d) None of the above
- 2) A network has seven nodes and five independent loops. The number of branches in the network is
 - a) 13
 - b) 12
 - c) 11
 - d) 10
- 3) Mesh analysis is based on
 - a) KCL
 - b) KVL
 - c) Both
 - d) None
- 4) What theorem replaces a complex network with an equivalent circuit containing a source voltage and a series resistance ?
 - a) Norton
 - b) Thevenin
 - c) Multinetwork
 - d) Superposition
- 5) Link in network theory refers to
 - a) $B - N + 1$
 - b) $B - N - 1$
 - c) $N - 1$
 - d) $N - B - 1$
- 6) Norton's equivalent circuit consist of
 - a) Voltage source in parallel with resistance
 - b) Voltage source in series with resistance
 - c) Current source in series with resistance
 - d) Current source in parallel with resistance
- 7) In an electrical circuit the dual term pair for G is
 - a) L
 - b) C
 - c) KVL
 - d) R
- 8) Inductor does not allow sudden changes in
 - a) Current
 - b) Voltage
 - c) Power
 - d) Frequency
- 9) Second order circuit is over damped when,
 - a) $\alpha > \omega_0$
 - b) $\alpha = \omega_0$
 - c) $\alpha < \omega_0$
 - d) None of the above
- 10) The initial value of $20 - 10t - e^{25t}$ is
 - a) 20
 - b) 19
 - c) 10
 - d) 25

P.T.O.



- 11) In series resonance reactance at resonant frequency is
 a) Capacitive b) Zero c) Inductive d) Infinite
- 12) For physically realizable circuit, impulse response is
 a) Zero for $t < 0$ b) One for $t < 0$
 c) Zero for $t > 0$ d) Infinite for $t > 0$
- 13) To increase the current in a series RC circuit, the frequency
 a) Should be increased b) Should be decreased
 c) Remain constant d) None of the above
- 14) The impedance parameters Z_{11} and Z_{12} of the two-port network in the figure are



- a) $Z_{11} = 2.75 \Omega$ and $Z_{12} = 0.25 \Omega$ b) $Z_{11} = 3 \Omega$ and $Z_{12} = 0.25 \Omega$
 c) $Z_{11} = 3 \Omega$ and $Z_{12} = 0.5 \Omega$ d) $Z_{11} = 2.25 \Omega$ and $Z_{12} = 0.5 \Omega$



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**S.E. (Electrical and Electronics Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL NETWORKS**

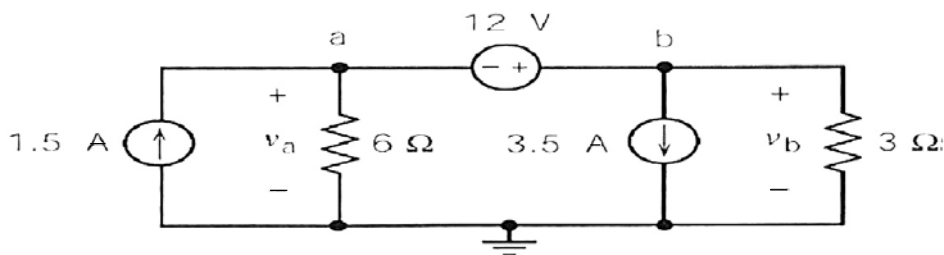
Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

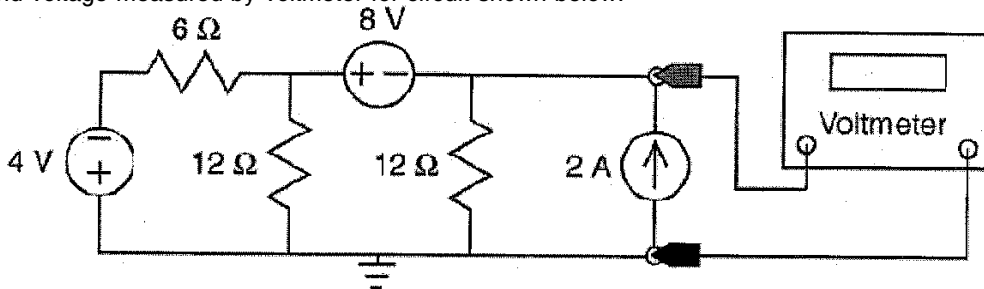
- Instructions:** i) All questions are compulsory.
ii) Figures to right indicate full marks.
iii) Assume suitable data whenever necessary.

SECTION – I

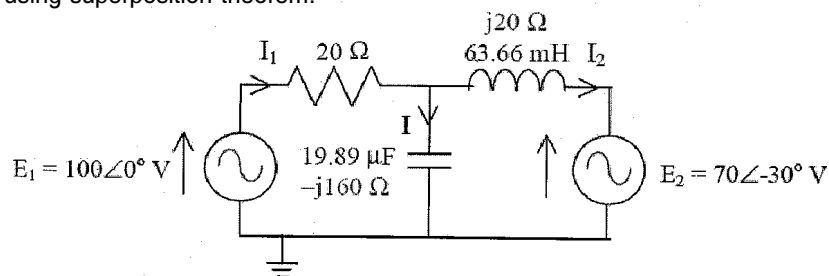
2. Solve any three of the following : (4×3=12)
1) Explain the principle of duality with one example.
2) Find Nodal voltages as shown in circuit.



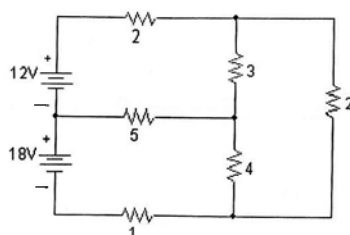
- 3) Define the terms : Tree, Cotree, Links, Twigs.
4) Find voltage measured by voltmeter for circuit shown below.



3. Solve any two of the following : (8×2=16)
1) Find I by using superposition theorem.



- 2) Find current through 5 Ohm resistance by Nodal analysis.



- 3) State and prove maximum power transfer theorem for DC circuits.

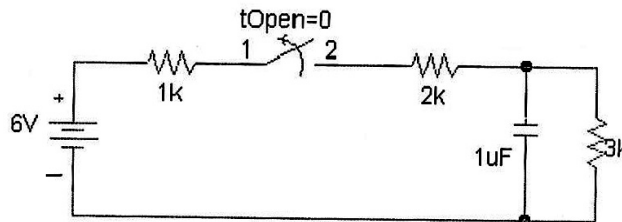


SECTION – II

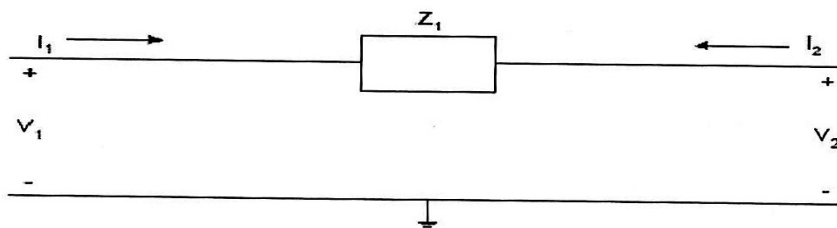
4. Solve **any three** of the following :

(4×3=12)

1) Find the voltage, $V_c(t)$, over the capacitor for all time $t > 0$.



2) Find the transmission parameter for the circuit shown.



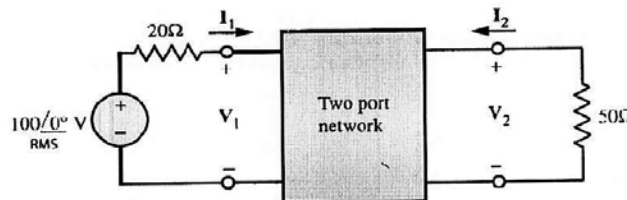
3) Derive an expression for response given by RL circuit.

4) A series RLC circuit has following parameters $R = 10 \Omega$, $L = 0.2 \text{ H}$, $C = 40 \mu\text{F}$ when a variable frequency voltage of 100 V is applied to it, calculate resonant frequency and maximum current, bandwidth, Q factor, power.

5. Solve **any two** of the following :

(8×2=16)

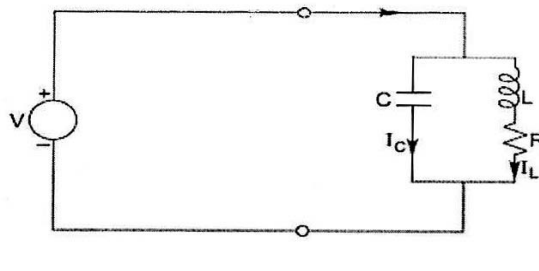
1) If $Z = \begin{bmatrix} 40 & 10 \\ 20 & 30 \end{bmatrix} \Omega$ for the two-port network, calculate the average power delivered to 50Ω resistor.



2) Find the response given by RC circuit for the following inputs by Laplace transform.

- i) Unit step function
- ii) Ramp function

3) Derive the expression for resonant frequency for the circuit shown below. What is the effect on resonant frequency if coil resistance is R is very small ? If $R = 10 \Omega$, $L = 0.1 \text{ H}$ and $C = 10 \text{ microF}$. Estimate resonant frequency.





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**S.E. (Electrical and Electronics Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL NETWORKS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** i) **All questions are compulsory.**
 ii) Figures to **right** indicate **full marks.**
 iii) Assume suitable data **whenever necessary.**
 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

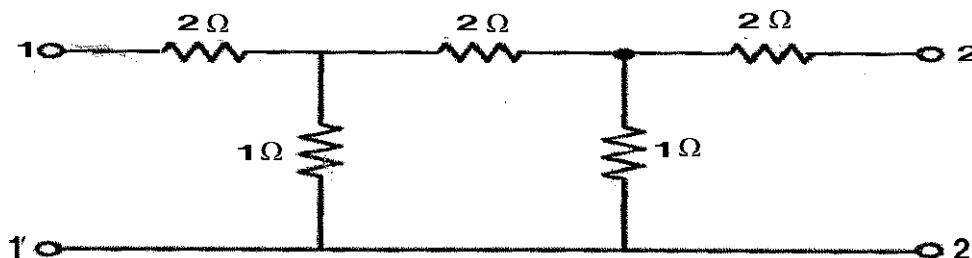
Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) Inductor does not allow sudden changes in
 - a) Current
 - b) Voltage
 - c) Power
 - d) Frequency
- 2) Second order circuit is over damped when,
 - a) $\alpha > \omega_0$
 - b) $\alpha = \omega_0$
 - c) $\alpha < \omega_0$
 - d) None of the above
- 3) The initial value of $20 - 10t - e^{25t}$ is
 - a) 20
 - b) 19
 - c) 10
 - d) 25
- 4) In series resonance reactance at resonant frequency is
 - a) Capacitive
 - b) Zero
 - c) Inductive
 - d) Infinite
- 5) For physically realizable circuit, impulse response is
 - a) Zero for $t < 0$
 - b) One for $t < 0$
 - c) Zero for $t > 0$
 - d) Infinite for $t > 0$
- 6) To increase the current in a series RC circuit, the frequency
 - a) Should be increased
 - b) Should be decreased
 - c) Remain constant
 - d) None of the above
- 7) The impedance parameters Z_{11} and Z_{12} of the two-port network in the figure are



- a) $Z_{11} = 2.75 \Omega$ and $Z_{12} = 0.25 \Omega$
- b) $Z_{11} = 3 \Omega$ and $Z_{12} = 0.25 \Omega$
- c) $Z_{11} = 3 \Omega$ and $Z_{12} = 0.5 \Omega$
- d) $Z_{11} = 2.25 \Omega$ and $Z_{12} = 0.5 \Omega$

P.T.O.



- 8) In pure parallel LC circuit current drawn from main supply is
- a) Maximum
 - b) Zero
 - c) Minimum
 - d) None of the above
- 9) A network has seven nodes and five independent loops. The number of branches in the network is
- a) 13
 - b) 12
 - c) 11
 - d) 10
- 10) Mesh analysis is based on
- a) KCL
 - b) KVL
 - c) Both
 - d) None
- 11) What theorem replaces a complex network with an equivalent circuit containing a source voltage and a series resistance ?
- a) Norton
 - b) Thevenin
 - c) Multinetwork
 - d) Superposition
- 12) Link in network theory refers to
- a) $B - N + 1$
 - b) $B - N - 1$
 - c) $N - 1$
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- 13) Norton's equivalent circuit consist of
- a) Voltage source in parallel with resistance
 - b) Voltage source in series with resistance
 - c) Current source in series with resistance
 - d) Current source in parallel with resistance
- 14) In an electrical circuit the dual term pair for G is
- a) L
 - b) C
 - c) KVL
 - d) R
-



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**S.E. (Electrical and Electronics Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL NETWORKS**

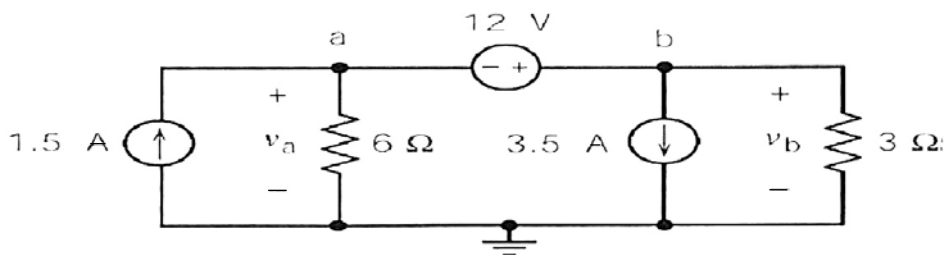
Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

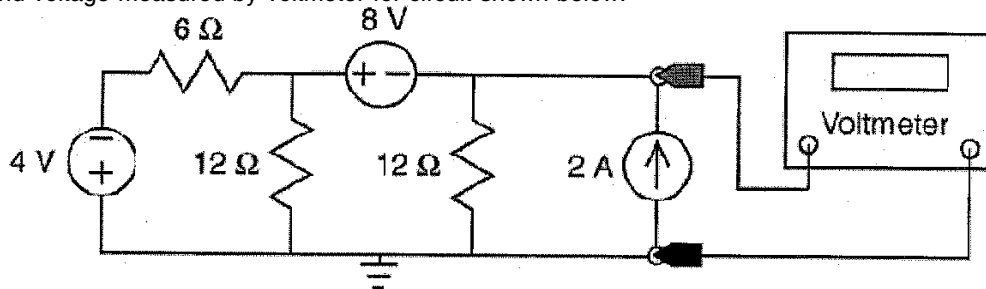
- Instructions:** i) All questions are compulsory.
ii) Figures to right indicate full marks.
iii) Assume suitable data whenever necessary.

SECTION – I

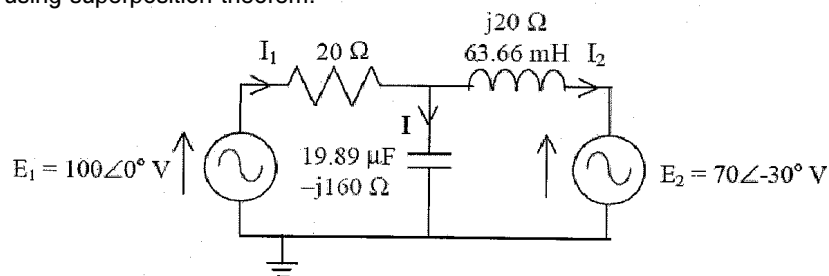
2. Solve any three of the following : (4×3=12)
1) Explain the principle of duality with one example.
2) Find Nodal voltages as shown in circuit.



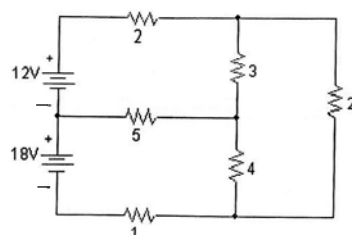
- 3) Define the terms : Tree, Cotree, Links, Twigs.
4) Find voltage measured by voltmeter for circuit shown below.



3. Solve any two of the following : (8×2=16)
1) Find I by using superposition theorem.



- 2) Find current through 5 Ω resistance by Nodal analysis.



- 3) State and prove maximum power transfer theorem for DC circuits.

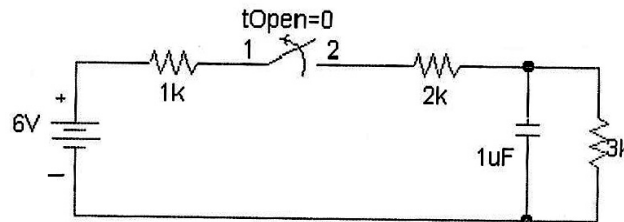


SECTION – II

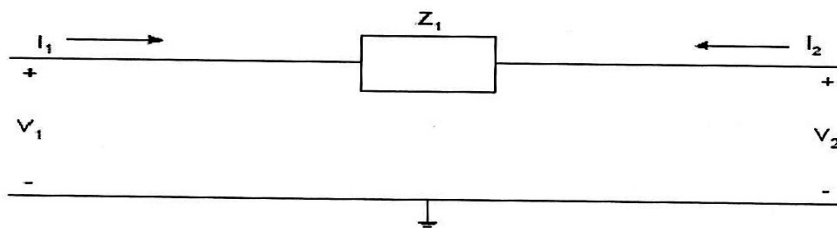
4. Solve **any three** of the following :

(4×3=12)

1) Find the voltage, $V_c(t)$, over the capacitor for all time $t > 0$.



2) Find the transmission parameter for the circuit shown.



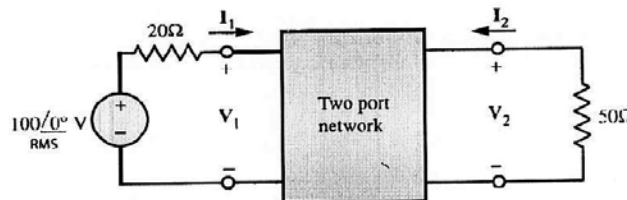
3) Derive an expression for response given by RL circuit.

4) A series RLC circuit has following parameters $R = 10 \Omega$, $L = 0.2 \text{ H}$, $C = 40 \mu\text{F}$ when a variable frequency voltage of 100 V is applied to it, calculate resonant frequency and maximum current, bandwidth, Q factor, power.

5. Solve **any two** of the following :

(8×2=16)

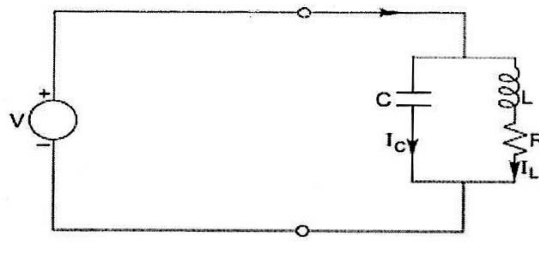
1) If $Z = \begin{bmatrix} 40 & 10 \\ 20 & 30 \end{bmatrix} \Omega$ for the two-port network, calculate the average power delivered to 50Ω resistor.



2) Find the response given by RC circuit for the following inputs by Laplace transform.

- i) Unit step function
- ii) Ramp function

3) Derive the expression for resonant frequency for the circuit shown below. What is the effect on resonant frequency if coil resistance is R is very small ? If $R = 10 \Omega$, $L = 0.1 \text{ H}$ and $C = 10 \text{ microF}$. Estimate resonant frequency.





SLR-TJ – 439

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**S.E. (Electrical and Electronics Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL NETWORKS**

Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** i) **All questions are compulsory.**
ii) Figures to **right** indicate **full** marks.
iii) Assume suitable data **whenever** necessary.
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 :

(1×14=14)

- 1) Link in network theory refers to
a) $B - N + 1$ b) $B - N - 1$ c) $N - 1$ d) $N - B - 1$
- 2) Norton's equivalent circuit consist of
a) Voltage source in parallel with resistance
b) Voltage source in series with resistance
c) Current source in series with resistance
d) Current source in parallel with resistance
- 3) In an electrical circuit the dual term pair for G is
a) L b) C c) KVL d) R
- 4) Inductor does not allow sudden changes in
a) Current b) Voltage c) Power d) Frequency
- 5) Second order circuit is over damped when,
a) $\alpha > \omega_0$ b) $\alpha = \omega_0$
c) $\alpha < \omega_0$ d) None of the above
- 6) The initial value of $20 - 10t - e^{25t}$ is
a) 20 b) 19 c) 10 d) 25
- 7) In series resonance reactance at resonant frequency is
a) Capacitive b) Zero c) Inductive d) Infinite
- 8) For physically realizable circuit, impulse response is
a) Zero for $t < 0$ b) One for $t < 0$
c) Zero for $t > 0$ d) Infinite for $t > 0$
- 9) To increase the current in a series RC circuit, the frequency
a) Should be increased b) Should be decreased
c) Remain constant d) None of the above

P.T.O.



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**S.E. (Electrical and Electronics Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL NETWORKS**

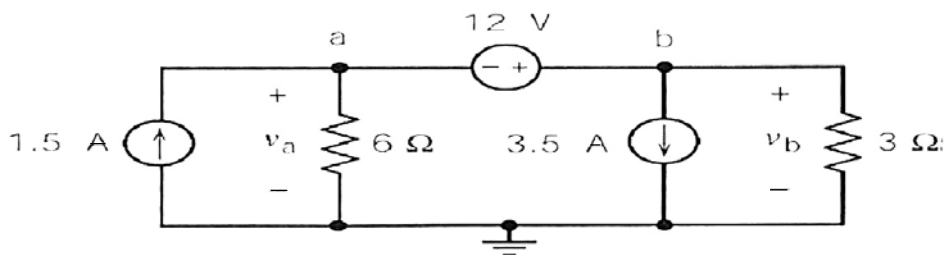
Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

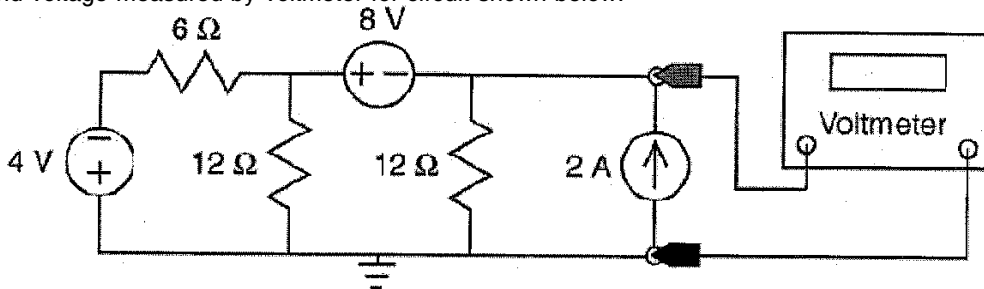
- Instructions:** i) **All questions are compulsory.**
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iii) Assume suitable data **whenever necessary.**

SECTION – I

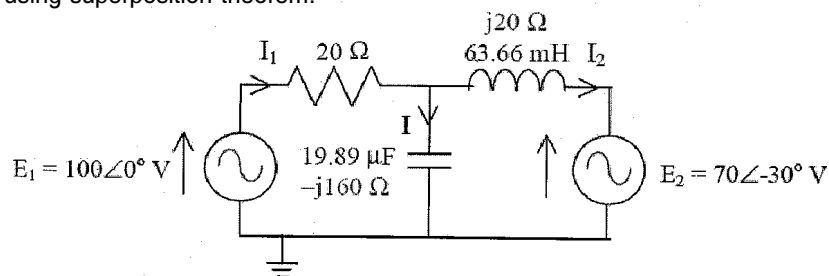
2. Solve **any three** of the following : (4×3=12)
1) Explain the principle of duality with one example.
2) Find Nodal voltages as shown in circuit.



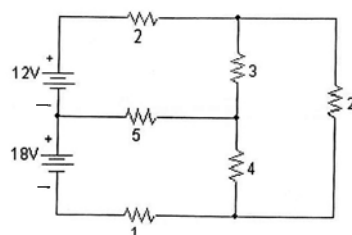
- 3) Define the terms : Tree, Cotree, Links, Twigs.
4) Find voltage measured by voltmeter for circuit shown below.



3. Solve **any two** of the following : (8×2=16)
1) Find I by using superposition theorem.



- 2) Find current through 5 Ω resistance by Nodal analysis.



- 3) State and prove maximum power transfer theorem for DC circuits.

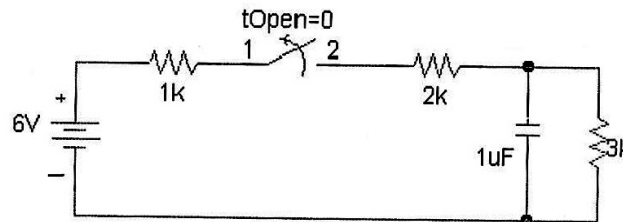


SECTION – II

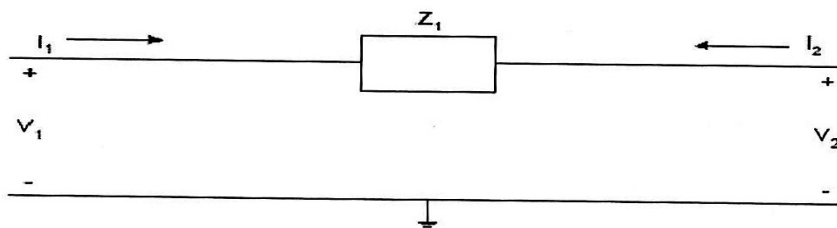
4. Solve **any three** of the following :

(4×3=12)

1) Find the voltage, $V_c(t)$, over the capacitor for all time $t > 0$.



2) Find the transmission parameter for the circuit shown.



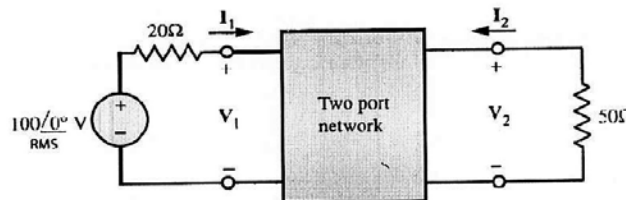
3) Derive an expression for response given by RL circuit.

4) A series RLC circuit has following parameters $R = 10 \Omega$, $L = 0.2 \text{ H}$, $C = 40 \mu\text{F}$ when a variable frequency voltage of 100 V is applied to it, calculate resonant frequency and maximum current, bandwidth, Q factor, power.

5. Solve **any two** of the following :

(8×2=16)

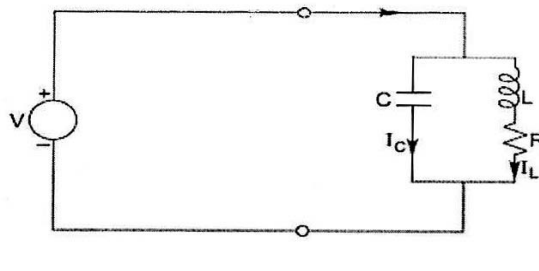
1) If $Z = \begin{bmatrix} 40 & 10 \\ 20 & 30 \end{bmatrix} \Omega$ for the two-port network, calculate the average power delivered to 50Ω resistor.



2) Find the response given by RC circuit for the following inputs by Laplace transform.

- i) Unit step function
- ii) Ramp function

3) Derive the expression for resonant frequency for the circuit shown below. What is the effect on resonant frequency if coil resistance is R is very small ? If $R = 10 \Omega$, $L = 0.1 \text{ H}$ and $C = 10 \text{ microF}$. Estimate resonant frequency.



Seat
No.Set
S**S.E. (Electrical and Electronics Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL NETWORKS**Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** i) All questions are compulsory.
ii) Figures to right indicate full marks.
iii) Assume suitable data whenever necessary.
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

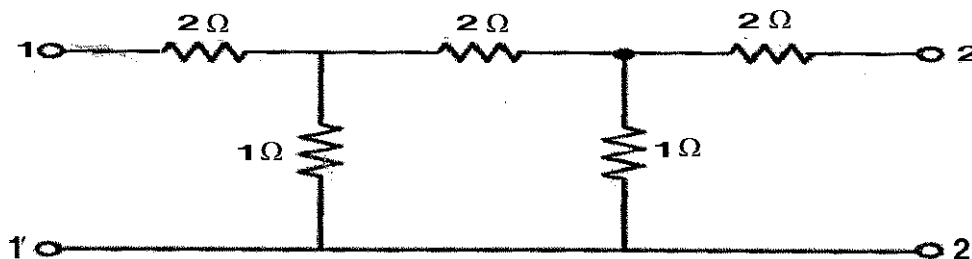
Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

(1×14=14)

- 1) The initial value of $20 - 10t - e^{25t}$ is
a) 20 b) 19 c) 10 d) 25
- 2) In series resonance reactance at resonant frequency is
a) Capacitive b) Zero c) Inductive d) Infinite
- 3) For physically realizable circuit, impulse response is
a) Zero for $t < 0$ b) One for $t < 0$
c) Zero for $t > 0$ d) Infinite for $t > 0$
- 4) To increase the current in a series RC circuit, the frequency
a) Should be increased b) Should be decreased
c) Remain constant d) None of the above
- 5) The impedance parameters Z_{11} and Z_{12} of the two-port network in the figure are



- a) $Z_{11} = 2.75 \Omega$ and $Z_{12} = 0.25 \Omega$ b) $Z_{11} = 3 \Omega$ and $Z_{12} = 0.25 \Omega$
- c) $Z_{11} = 3 \Omega$ and $Z_{12} = 0.5 \Omega$ d) $Z_{11} = 2.25 \Omega$ and $Z_{12} = 0.5 \Omega$
- 6) In pure parallel LC circuit current drawn from main supply is
a) Maximum b) Zero
c) Minimum d) None of the above
- 7) A network has seven nodes and five independent loops. The number of branches in the network is
a) 13 b) 12 c) 11 d) 10

P.T.O.



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**S.E. (Electrical and Electronics Engg.) (Part – I) (Old CGPA) Examination, 2017
ELECTRICAL NETWORKS**

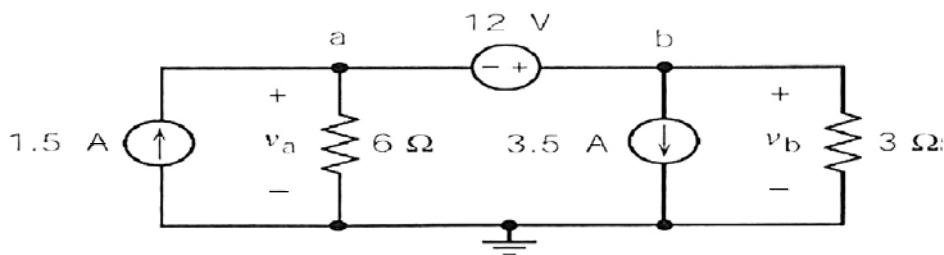
Day and Date : Saturday, 16-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

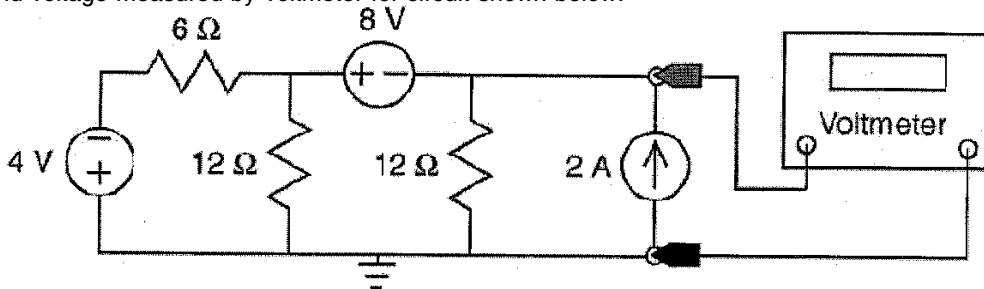
- Instructions:** i) **All questions are compulsory.**
ii) Figures to **right** indicate **full** marks.
iii) Assume suitable data **whenever** necessary.

SECTION – I

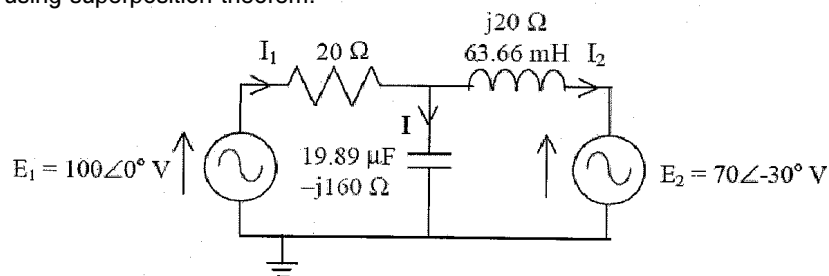
2. Solve **any three** of the following : (4×3=12)
1) Explain the principle of duality with one example.
2) Find Nodal voltages as shown in circuit.



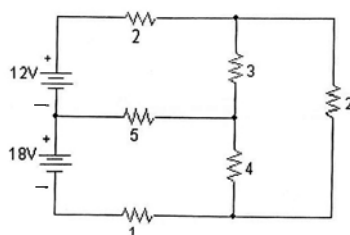
- 3) Define the terms : Tree, Cotree, Links, Twigs.
4) Find voltage measured by voltmeter for circuit shown below.



3. Solve **any two** of the following : (8×2=16)
1) Find I by using superposition theorem.



- 2) Find current through 5 Ω resistance by Nodal analysis.



- 3) State and prove maximum power transfer theorem for DC circuits.

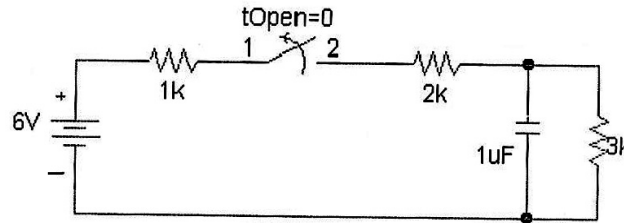


SECTION – II

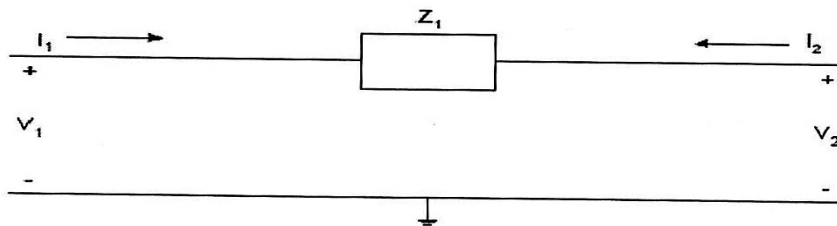
4. Solve **any three** of the following :

(4×3=12)

1) Find the voltage, $V_c(t)$, over the capacitor for all time $t > 0$.



2) Find the transmission parameter for the circuit shown.



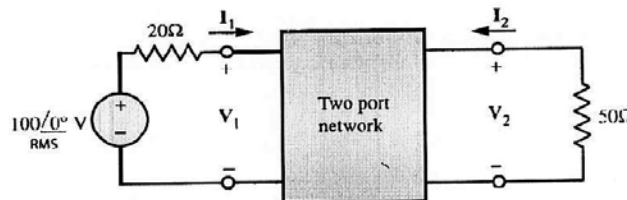
3) Derive an expression for response given by RL circuit.

4) A series RLC circuit has following parameters $R = 10 \Omega$, $L = 0.2 \text{ H}$, $C = 40 \mu\text{F}$ when a variable frequency voltage of 100 V is applied to it, calculate resonant frequency and maximum current, bandwidth, Q factor, power.

5. Solve **any two** of the following :

(8×2=16)

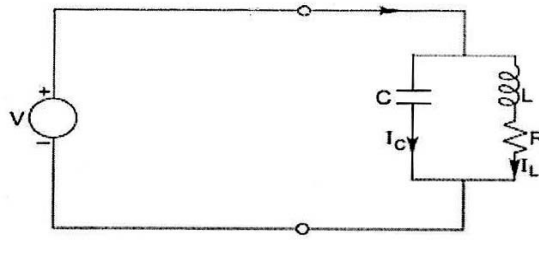
1) If $Z = \begin{bmatrix} 40 & 10 \\ 20 & 30 \end{bmatrix} \Omega$ for the two-port network, calculate the average power delivered to 50Ω resistor.



2) Find the response given by RC circuit for the following inputs by Laplace transform.

- i) Unit step function
- ii) Ramp function

3) Derive the expression for resonant frequency for the circuit shown below. What is the effect on resonant frequency if coil resistance is R is very small ? If $R = 10 \Omega$, $L = 0.1 \text{ H}$ and $C = 10 \text{ microF}$. Estimate resonant frequency.





SLR-TJ – 440

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| Set | P |
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**S.E. (Electrical and Electronics Engineering) (Part – I) (Old CGPA)
Examination, 2017
ANALOG ELECTRONICS**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **If necessary, assume suitable data.**
 - 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.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) When transistor is used as switch its operation is in
 - a) Saturation region
 - b) Cutoff region
 - c) Active region
 - d) Both a) and b)
- 2) The superbeta transistor is a _____ connection.
 - a) Feedback pair
 - b) Darlington
 - c) Cascade
 - d) Cascode
- 3) Which of the following acts like one diode and two resistors ?
 - a) SCR
 - b) Triac
 - c) Diac
 - d) UJT
- 4) A half wave rectifier is equivalent to
 - a) Clamper
 - b) Clipper
 - c) Clamper with positive bias
 - d) Clamper with negative bias
- 5) In Class A amplifier the current in output circuit flows for
 - a) 360°
 - b) 180°
 - c) 90°
 - d) Less than 90°
- 6) If β_{dc} is 49, the value of α_{dc} is
 - a) 50
 - b) 0.98
 - c) 49/50
 - d) None of these

P.T.O.



- 7) FET is
- a) Current controlled device
 - b) Voltage controlled device
 - c) Resistance controlled device
 - d) None of these
- 8) The voltage gain of voltage follower is
- a) Unity
 - b) Less than unity
 - c) Greater than unity
 - d) Variable
- 9) An ideal op-amp has
- a) Infinite input and output impedance
 - b) Zero input and infinite output impedance
 - c) Infinite input and zero output impedance
 - d) Zero input and output impedance
- 10) The op-amp can amplify
- a) AC signal only
 - b) DC signal only
 - c) Both a) and b)
 - d) Neither a) nor b)
- 11) The change in op-amp input offset voltage causes by variation in supply voltage called as
- a) SVRR
 - b) PSS
 - c) PSRR
 - d) All
- 12) The pin numbers of IC 741 used for output offset null are
- a) 2 and 3
 - b) 1 and 5
 - c) 7 and 4
 - d) None of these
- 13) The inverting comparator with positive feedback is called as
- a) Zero crossing detector
 - b) Dead zone circuit
 - c) Schmitt trigger
 - d) None of these
- 14) CMRR is
- a) Center Mode Ratio Rate
 - b) Common Mode Ratio Rejection
 - c) Common Mode Ratio Rate
 - d) None of the above
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**S.E. (Electrical and Electronics Engineering) (Part – I) (Old CGPA)
Examination, 2017
ANALOG ELECTRONICS**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *If necessary, assume suitable data.*
3) *Figure to right indicates full marks.*

SECTION – I

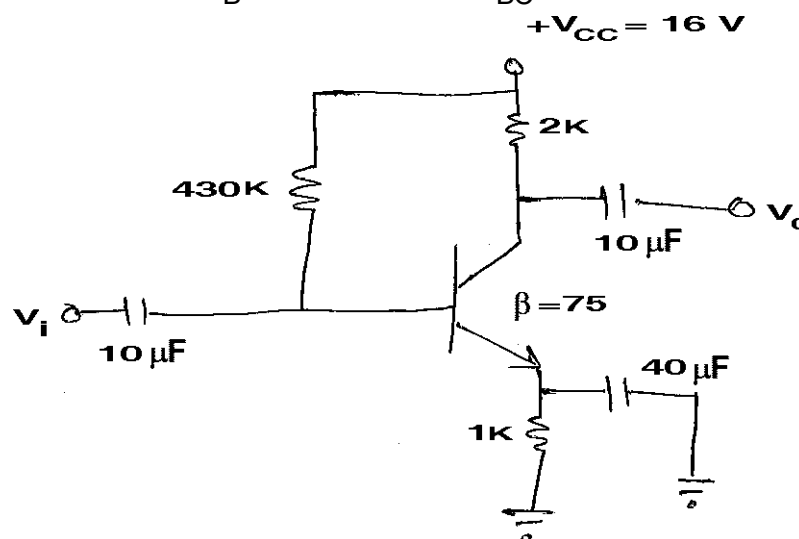
2. Solve any three : (4×3=12)

- 1) Define clipper. Enlist its types and explain any one in detail.
- 2) Differentiate between BJT and FET.
- 3) Explain current mirror circuit using transistor.
- 4) What are different types of power amplifier ? Explain class B amplifier.

3. Solve any two : (2×8=16)

1) Determine following parameters for the circuit shown below :

- | | | | |
|----------|----------|-------------|-------------|
| a) I_B | b) I_C | c) V_{CE} | d) V_C |
| e) V_E | f) V_B | g) V_{BC} | h) α |



- 2) What is rectification ? Explain full wave rectifier in detail.
- 3) Write a note on : (a) DC load line (b) Cascade connection.



SECTION – II

4. Solve **any three** : **(4×3=12)**
- 1) Draw and explain block diagram of op-amp.
 - 2) What are the ideal characteristics of op-amp ?
 - 3) Explain zero crossing detector using op-amp.
 - 4) Draw and explain V to I converter with floating load.
5. Solve **any two** : **(2×8=16)**
- 1) Define following terms :
 - a) CMRR
 - b) Input offset voltage
 - c) Slew rate
 - d) Input bias current.
 - 2) Explain IC 555 as monostable multivibrator.
 - 3) Explain Schmitt trigger with hysteresis plot.
-



SLR-TJ – 440

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**S.E. (Electrical and Electronics Engineering) (Part – I) (Old CGPA)
Examination, 2017
ANALOG ELECTRONICS**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **If necessary, assume suitable data.**
 - 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.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) The voltage gain of voltage follower is
 - a) Unity
 - b) Less than unity
 - c) Greater than unity
 - d) Variable
- 2) An ideal op-amp has
 - a) Infinite input and output impedance
 - b) Zero input and infinite output impedance
 - c) Infinite input and zero output impedance
 - d) Zero input and output impedance
- 3) The op-amp can amplify
 - a) AC signal only
 - b) DC signal only
 - c) Both a) and b)
 - d) Neither a) nor b)
- 4) The change in op-amp input offset voltage causes by variation in supply voltage called as
 - a) SVRR
 - b) PSS
 - c) PSRR
 - d) All
- 5) The pin numbers of IC 741 used for output offset null are
 - a) 2 and 3
 - b) 1 and 5
 - c) 7 and 4
 - d) None of these

P.T.O.



- 6) The inverting comparator with positive feedback is called as
a) Zero crossing detector b) Dead zone circuit
c) Schmitt trigger d) None of these
- 7) CMRR is
a) Center Mode Ratio Rate b) Common Mode Ratio Rejection
c) Common Mode Ratio Rate d) None of the above
- 8) When transistor is used as switch its operation is in
a) Saturation region b) Cutoff region
c) Active region d) Both a) and b)
- 9) The superbeta transistor is a _____ connection.
a) Feedback pair b) Darlington c) Cascade d) Cascode
- 10) Which of the following acts like one diode and two resistors ?
a) SCR b) Triac c) Diac d) UJT
- 11) A half wave rectifier is equivalent to
a) Clamper b) Clipper
c) Clamper with positive bias d) Clamper with negative bias
- 12) In Class A amplifier the current in output circuit flows for
a) 360° b) 180° c) 90° d) Less than 90°
- 13) If β_{dc} is 49, the value of α_{dc} is
a) 50 b) 0.98 c) 49/50 d) None of these
- 14) FET is
a) Current controlled device b) Voltage controlled device
c) Resistance controlled device d) None of these
-



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**S.E. (Electrical and Electronics Engineering) (Part – I) (Old CGPA)
Examination, 2017
ANALOG ELECTRONICS**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *If necessary, assume suitable data.*
3) *Figure to right indicates full marks.*

SECTION – I

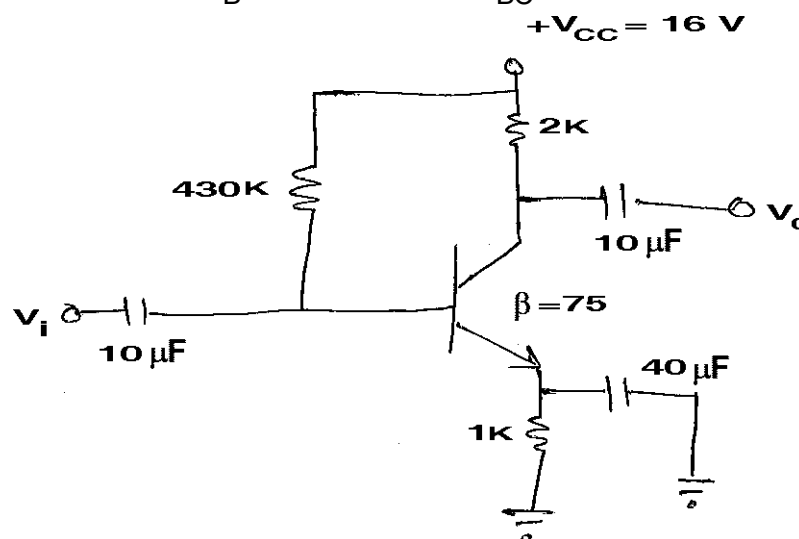
2. Solve any three : (4×3=12)

- 1) Define clipper. Enlist its types and explain any one in detail.
- 2) Differentiate between BJT and FET.
- 3) Explain current mirror circuit using transistor.
- 4) What are different types of power amplifier ? Explain class B amplifier.

3. Solve any two : (2×8=16)

1) Determine following parameters for the circuit shown below :

- | | | | |
|----------|----------|-------------|-------------|
| a) I_B | b) I_C | c) V_{CE} | d) V_C |
| e) V_E | f) V_B | g) V_{BC} | h) α |



- 2) What is rectification ? Explain full wave rectifier in detail.
- 3) Write a note on : (a) DC load line (b) Cascade connection.



SECTION – II

4. Solve **any three** : **(4×3=12)**
- 1) Draw and explain block diagram of op-amp.
 - 2) What are the ideal characteristics of op-amp ?
 - 3) Explain zero crossing detector using op-amp.
 - 4) Draw and explain V to I converter with floating load.
5. Solve **any two** : **(2×8=16)**
- 1) Define following terms :
 - a) CMRR
 - b) Input offset voltage
 - c) Slew rate
 - d) Input bias current.
 - 2) Explain IC 555 as monostable multivibrator.
 - 3) Explain Schmitt trigger with hysteresis plot.
-



SLR-TJ – 440

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**S.E. (Electrical and Electronics Engineering) (Part – I) (Old CGPA)
Examination, 2017
ANALOG ELECTRONICS**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **If necessary, assume suitable data.**
 - 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.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) In Class A amplifier the current in output circuit flows for
a) 360° b) 180° c) 90° d) Less than 90°
- 2) If β_{dc} is 49, the value of α_{dc} is
a) 50 b) 0.98 c) 49/50 d) None of these
- 3) FET is
a) Current controlled device b) Voltage controlled device
c) Resistance controlled device d) None of these
- 4) The voltage gain of voltage follower is
a) Unity b) Less than unity
c) Greater than unity d) Variable
- 5) An ideal op-amp has
a) Infinite input and output impedance
b) Zero input and infinite output impedance
c) Infinite input and zero output impedance
d) Zero input and output impedance

P.T.O.



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**S.E. (Electrical and Electronics Engineering) (Part – I) (Old CGPA)
Examination, 2017
ANALOG ELECTRONICS**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*
2) *If necessary, assume suitable data.*
3) *Figure to right indicates full marks.*

SECTION – I

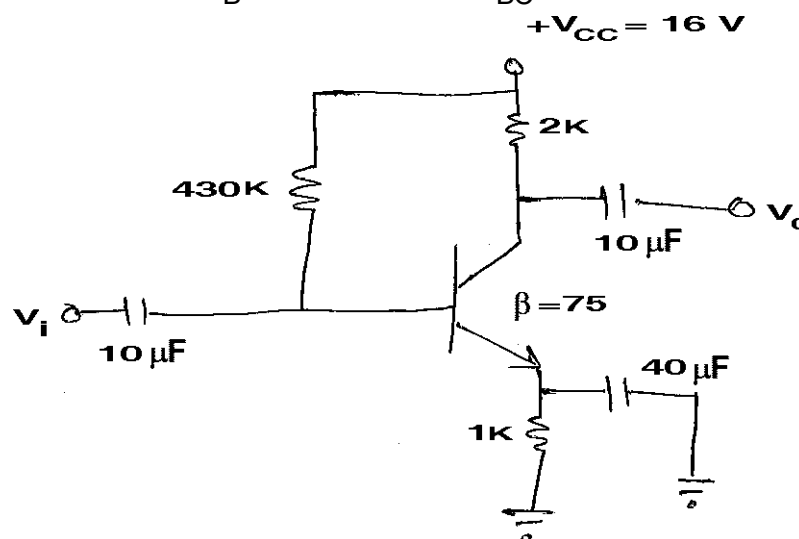
2. Solve any three : (4×3=12)

- 1) Define clipper. Enlist its types and explain any one in detail.
- 2) Differentiate between BJT and FET.
- 3) Explain current mirror circuit using transistor.
- 4) What are different types of power amplifier ? Explain class B amplifier.

3. Solve any two : (2×8=16)

1) Determine following parameters for the circuit shown below :

- | | | | |
|----------|----------|-------------|-------------|
| a) I_B | b) I_C | c) V_{CE} | d) V_C |
| e) V_E | f) V_B | g) V_{BC} | h) α |



- 2) What is rectification ? Explain full wave rectifier in detail.
- 3) Write a note on : (a) DC load line (b) Cascade connection.



SECTION – II

4. Solve **any three** : **(4×3=12)**
- 1) Draw and explain block diagram of op-amp.
 - 2) What are the ideal characteristics of op-amp ?
 - 3) Explain zero crossing detector using op-amp.
 - 4) Draw and explain V to I converter with floating load.
5. Solve **any two** : **(2×8=16)**
- 1) Define following terms :
 - a) CMRR
 - b) Input offset voltage
 - c) Slew rate
 - d) Input bias current.
 - 2) Explain IC 555 as monostable multivibrator.
 - 3) Explain Schmitt trigger with hysteresis plot.
-



SLR-TJ – 440

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**S.E. (Electrical and Electronics Engineering) (Part – I) (Old CGPA)
Examination, 2017
ANALOG ELECTRONICS**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
 - 2) **If necessary, assume suitable data.**
 - 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.**

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 14

1. Choose the correct option :

14

- 1) The op-amp can amplify
 - a) AC signal only
 - b) DC signal only
 - c) Both a) and b)
 - d) Neither a) nor b)
- 2) The change in op-amp input offset voltage causes by variation in supply voltage called as
 - a) SVRR
 - b) PSS
 - c) PSRR
 - d) All
- 3) The pin numbers of IC 741 used for output offset null are
 - a) 2 and 3
 - b) 1 and 5
 - c) 7 and 4
 - d) None of these
- 4) The inverting comparator with positive feedback is called as
 - a) Zero crossing detector
 - b) Dead zone circuit
 - c) Schmitt trigger
 - d) None of these
- 5) CMRR is
 - a) Center Mode Ratio Rate
 - b) Common Mode Ratio Rejection
 - c) Common Mode Ratio Rate
 - d) None of the above

P.T.O.



- 6) When transistor is used as switch its operation is in
a) Saturation region b) Cutoff region
c) Active region d) Both a) and b)
- 7) The superbeta transistor is a _____ connection.
a) Feedback pair b) Darlington c) Cascade d) Cascode
- 8) Which of the following acts like one diode and two resistors ?
a) SCR b) Triac c) Diac d) UJT
- 9) A half wave rectifier is equivalent to
a) Clamper b) Clipper
c) Clamper with positive bias d) Clamper with negative bias
- 10) In Class A amplifier the current in output circuit flows for
a) 360° b) 180° c) 90° d) Less than 90°
- 11) If β_{dc} is 49, the value of α_{dc} is
a) 50 b) 0.98 c) $49/50$ d) None of these
- 12) FET is
a) Current controlled device b) Voltage controlled device
c) Resistance controlled device d) None of these
- 13) The voltage gain of voltage follower is
a) Unity b) Less than unity
c) Greater than unity d) Variable
- 14) An ideal op-amp has
a) Infinite input and output impedance
b) Zero input and infinite output impedance
c) Infinite input and zero output impedance
d) Zero input and output impedance
-



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**S.E. (Electrical and Electronics Engineering) (Part – I) (Old CGPA)
Examination, 2017
ANALOG ELECTRONICS**

Day and Date : Tuesday, 19-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**
2) **If necessary, assume suitable data.**
3) **Figure to right indicates full marks.**

SECTION – I

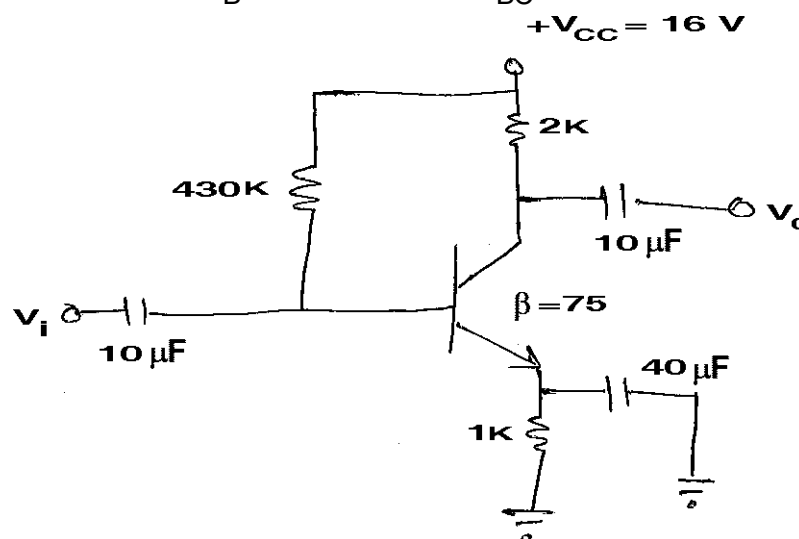
2. Solve any three : (4×3=12)

- 1) Define clipper. Enlist its types and explain any one in detail.
- 2) Differentiate between BJT and FET.
- 3) Explain current mirror circuit using transistor.
- 4) What are different types of power amplifier ? Explain class B amplifier.

3. Solve any two : (2×8=16)

1) Determine following parameters for the circuit shown below :

- | | | | |
|----------|----------|-------------|-------------|
| a) I_B | b) I_C | c) V_{CE} | d) V_C |
| e) V_E | f) V_B | g) V_{BC} | h) α |



- 2) What is rectification ? Explain full wave rectifier in detail.
- 3) Write a note on : (a) DC load line (b) Cascade connection.



SECTION – II

4. Solve **any three** : **(4×3=12)**
- 1) Draw and explain block diagram of op-amp.
 - 2) What are the ideal characteristics of op-amp ?
 - 3) Explain zero crossing detector using op-amp.
 - 4) Draw and explain V to I converter with floating load.
5. Solve **any two** : **(2×8=16)**
- 1) Define following terms :
 - a) CMRR
 - b) Input offset voltage
 - c) Slew rate
 - d) Input bias current.
 - 2) Explain IC 555 as monostable multivibrator.
 - 3) Explain Schmitt trigger with hysteresis plot.
-



SLR-TJ – 441

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**S.E. (Part – I) (E & E) Examination, 2017
ELECTRICAL POWER GENERATION (Old – CGPA)**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

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. MCQ :

(14×1=14)

- 1) In thermal power plants the size of coal after crushing
 - a) 300 mm
 - b) 200 – 205 mm
 - c) 40 mm
 - d) 20 – 25 mm
- 2) Uses of diesel power stations
 - a) peak load plant
 - b) emergency plants
 - c) stand by plants
 - d) all of the above
- 3) Which of following is a medium and low head turbines ?
 - a) Pelton and Kaplan turbines
 - b) Kaplan and Francis turbines
 - c) Francis and Kaplan turbines
 - d) None of above
- 4) Water hammering process in pen-stocks results in
 - a) noise increases
 - b) pressure increases
 - c) noise increases, pressure increases, velocity decreases
 - d) none of the above
- 5) India's 1st nuclear plant was set up at
 - a) Kalpakkam
 - b) Rana Pratap Sagar
 - c) Tarapur
 - d) Bhabha
- 6) Nuclear fission means
 - a) breaking up of nuclear of heavy atoms into nearly equal parts
 - b) combination of two light nuclei
 - c) moderator
 - d) graphite

P.T.O.



- 7) A graphical representation between discharge and time is known as
a) Monograph b) Hectograph c) Topograph d) Hydrograph
- 8) Cost of operation of which plant is least ?
a) Gas turbine plant b) Thermal power plant
c) Nuclear power plant d) Hydroelectric plant
- 9) An air filter is used in
a) nuclear power plants b) steam power plants
c) diesel engine power plants d) hydro-power plants
- 10) Geothermal energy is
a) a renewable energy resource b) alternative energy source
c) inexhaustible energy source d) any of the above
- 11) Solar cells are made of
a) silicon b) germanium c) silver d) aluminium
- 12) Isotopes of uranium
a) U_{235} b) U_{234} c) U_{238} d) all of the above
- 13) The area under the daily load curve divided by 24 hrs. gives
a) Average load for the day b) Maximum demand
c) Connected load d) Demand factor
- 14) Pulverized coal is
a) coal free from ash b) non-smoking coal
c) coal which burns for long time d) coal broken into fine particles
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**S.E. (Part – I) (E & E) Examination, 2017
ELECTRICAL POWER GENERATION (Old – CGPA)**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

2. Solve **any four** : **(4×4=16)**

- 1) Write a short note on stream flow and run-off.
- 2) Explain pressurized water reactor with neat diagram.
- 3) Write a short note on hydrology.
- 4) Discuss factors to be considered for selection of site for thermal power plant.
- 5) Explain the process of nuclear fission.

3. Solve **any two** : **(6×2=12)**

- 1) Explain single line diagram of typical AC power system.
- 2) Draw typical layout of hydroelectric power plant and explain it briefly.
- 3) Draw typical layout of thermal power plant and explain it briefly.

4. Solve **any four** : **(4×4=16)**

- 1) Define bio-gas and bio-mass energy.
- 2) Explain wind power plant with block diagram also state its application.
- 3) Explain geo-thermal power plant with neat diagram also state its application.
- 4) Explain load duration curve with example.
- 5) Explain construction and working of solar photovoltaic cell.

Set P



5. Solve **any two** :

(6×2=12)

- 1) With a neat diagram explain tidal power plant with its advantages and limitations.
 - 2) Define bio-gas and explain common circular fixed dome digester (china plant) with neat diagram.
 - 3) Explain the following :
 - a) Load factor
 - b) Plant capacity factor
 - c) Diversity factor
 - d) Demand factor
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SLR-TJ – 441

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**S.E. (Part – I) (E & E) Examination, 2017
ELECTRICAL POWER GENERATION (Old – CGPA)**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

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. MCQ :

(14×1=14)

- 1) Cost of operation of which plant is least ?
 - a) Gas turbine plant
 - b) Thermal power plant
 - c) Nuclear power plant
 - d) Hydroelectric plant
- 2) An air filter is used in
 - a) nuclear power plants
 - b) steam power plants
 - c) diesel engine power plants
 - d) hydro-power plants
- 3) Geothermal energy is
 - a) a renewable energy resource
 - b) alternative energy source
 - c) inexhaustible energy source
 - d) any of the above
- 4) Solar cells are made of
 - a) silicon
 - b) germanium
 - c) silver
 - d) aluminium
- 5) Isotopes of uranium
 - a) U_{235}
 - b) U_{234}
 - c) U_{238}
 - d) all of the above
- 6) The area under the daily load curve divided by 24 hrs. gives
 - a) Average load for the day
 - b) Maximum demand
 - c) Connected load
 - d) Demand factor
- 7) Pulverized coal is
 - a) coal free from ash
 - b) non-smoking coal
 - c) coal which burns for long time
 - d) coal broken into fine particles
- 8) In thermal power plants the size of coal after crushing
 - a) 300 mm
 - b) 200 – 205 mm
 - c) 40 mm
 - d) 20 – 25 mm

P.T.O.



- 9) Uses of diesel power stations
- a) peak load plant
 - b) emergency plants
 - c) stand by plants
 - d) all of the above
- 10) Which of following is a medium and low head turbines ?
- a) Pelton and Kaplan turbines
 - b) Kaplan and Francis turbines
 - c) Francis and Kaplan turbines
 - d) None of above
- 11) Water hammering process in pen-stocks results in
- a) noise increases
 - b) pressure increases
 - c) noise increases, pressure increases, velocity decreases
 - d) none of the above
- 12) India's 1st nuclear plant was set up at
- a) Kalpakkam
 - b) Rana Pratap Sagar
 - c) Tarapur
 - d) Bhaba
- 13) Nuclear fission means
- a) breaking up of nuclear of heavy atoms into nearly equal parts
 - b) combination of two light nuclei
 - c) moderator
 - d) graphite
- 14) A graphical representation between discharge and time is known as
- a) Monograph
 - b) Hectograph
 - c) Topograph
 - d) Hydrograph
-



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**S.E. (Part – I) (E & E) Examination, 2017
ELECTRICAL POWER GENERATION (Old – CGPA)**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

2. Solve **any four** : **(4×4=16)**
- 1) Write a short note on stream flow and run-off.
 - 2) Explain pressurized water reactor with neat diagram.
 - 3) Write a short note on hydrology.
 - 4) Discuss factors to be considered for selection of site for thermal power plant.
 - 5) Explain the process of nuclear fission.
3. Solve **any two** : **(6×2=12)**
- 1) Explain single line diagram of typical AC power system.
 - 2) Draw typical layout of hydroelectric power plant and explain it briefly.
 - 3) Draw typical layout of thermal power plant and explain it briefly.
4. Solve **any four** : **(4×4=16)**
- 1) Define bio-gas and bio-mass energy.
 - 2) Explain wind power plant with block diagram also state its application.
 - 3) Explain geo-thermal power plant with neat diagram also state its application.
 - 4) Explain load duration curve with example.
 - 5) Explain construction and working of solar photovoltaic cell.



5. Solve **any two** :

(6×2=12)

- 1) With a neat diagram explain tidal power plant with its advantages and limitations.
 - 2) Define bio-gas and explain common circular fixed dome digester (china plant) with neat diagram.
 - 3) Explain the following :
 - a) Load factor
 - b) Plant capacity factor
 - c) Diversity factor
 - d) Demand factor
-



SLR-TJ – 441

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**S.E. (Part – I) (E & E) Examination, 2017
ELECTRICAL POWER GENERATION (Old – CGPA)**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

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. MCQ :

(14×1=14)

- 1) India's 1st nuclear plant was set up at
 - a) Kalpakkam
 - b) Rana Pratap Sagar
 - c) Tarapur
 - d) Bhaba
- 2) Nuclear fission means
 - a) breaking up of nuclear of heavy atoms into nearly equal parts
 - b) combination of two light nuclei
 - c) moderator
 - d) graphite
- 3) A graphical representation between discharge and time is known as
 - a) Monograph
 - b) Hectograph
 - c) Topograph
 - d) Hydrograph
- 4) Cost of operation of which plant is least ?
 - a) Gas turbine plant
 - b) Thermal power plant
 - c) Nuclear power plant
 - d) Hydroelectric plant
- 5) An air filter is used in
 - a) nuclear power plants
 - b) steam power plants
 - c) diesel engine power plants
 - d) hydro-power plants
- 6) Geothermal energy is
 - a) a renewable energy resource
 - b) alternative energy source
 - c) inexhaustible energy source
 - d) any of the above

P.T.O.



- 7) Solar cells are made of
a) silicon b) germanium c) silver d) aluminium
- 8) Isotopes of uranium
a) U_{235} b) U_{234} c) U_{238} d) all of the above
- 9) The area under the daily load curve divided by 24 hrs. gives
a) Average load for the day b) Maximum demand
c) Connected load d) Demand factor
- 10) Pulverized coal is
a) coal free from ash b) non-smoking coal
c) coal which burns for long time d) coal broken into fine particles
- 11) In thermal power plants the size of coal after crushing
a) 300 mm b) 200 – 205 mm c) 40 mm d) 20 – 25 mm
- 12) Uses of diesel power stations
a) peak load plant b) emergency plants
c) stand by plants d) all of the above
- 13) Which of following is a medium and low head turbines ?
a) Pelton and Kaplan turbines b) Kaplan and Francis turbines
c) Francis and Kaplan turbines d) None of above
- 14) Water hammering process in pen-stocks results in
a) noise increases
b) pressure increases
c) noise increases, pressure increases, velocity decreases
d) none of the above
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**S.E. (Part – I) (E & E) Examination, 2017
ELECTRICAL POWER GENERATION (Old – CGPA)**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

2. Solve **any four** : **(4×4=16)**
- 1) Write a short note on stream flow and run-off.
 - 2) Explain pressurized water reactor with neat diagram.
 - 3) Write a short note on hydrology.
 - 4) Discuss factors to be considered for selection of site for thermal power plant.
 - 5) Explain the process of nuclear fission.
3. Solve **any two** : **(6×2=12)**
- 1) Explain single line diagram of typical AC power system.
 - 2) Draw typical layout of hydroelectric power plant and explain it briefly.
 - 3) Draw typical layout of thermal power plant and explain it briefly.
4. Solve **any four** : **(4×4=16)**
- 1) Define bio-gas and bio-mass energy.
 - 2) Explain wind power plant with block diagram also state its application.
 - 3) Explain geo-thermal power plant with neat diagram also state its application.
 - 4) Explain load duration curve with example.
 - 5) Explain construction and working of solar photovoltaic cell.



5. Solve **any two** :

(6×2=12)

- 1) With a neat diagram explain tidal power plant with its advantages and limitations.
 - 2) Define bio-gas and explain common circular fixed dome digester (china plant) with neat diagram.
 - 3) Explain the following :
 - a) Load factor
 - b) Plant capacity factor
 - c) Diversity factor
 - d) Demand factor
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SLR-TJ – 441

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**S.E. (Part – I) (E & E) Examination, 2017
ELECTRICAL POWER GENERATION (Old – CGPA)**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

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. MCQ :

(14×1=14)

- 1) Geothermal energy is
 - a) a renewable energy resource
 - b) alternative energy source
 - c) inexhaustible energy source
 - d) any of the above
- 2) Solar cells are made of
 - a) silicon
 - b) germanium
 - c) silver
 - d) aluminium
- 3) Isotopes of uranium
 - a) U_{235}
 - b) U_{234}
 - c) U_{238}
 - d) all of the above
- 4) The area under the daily load curve divided by 24 hrs. gives
 - a) Average load for the day
 - b) Maximum demand
 - c) Connected load
 - d) Demand factor
- 5) Pulverized coal is
 - a) coal free from ash
 - b) non-smoking coal
 - c) coal which bums for long time
 - d) coal broken into fine particles
- 6) In thermal power plants the size of coal after crushing
 - a) 300 mm
 - b) 200 – 205 mm
 - c) 40 mm
 - d) 20 – 25 mm
- 7) Uses of diesel power stations
 - a) peak load plant
 - b) emergency plants
 - c) stand by plants
 - d) all of the above
- 8) Which of following is a medium and low head turbines ?
 - a) Pelton and Kaplan turbines
 - b) Kaplan and Francis turbines
 - c) Francis and Kaplan turbines
 - d) None of above

P.T.O.



- 9) Water hammering process in pen-stocks results in
- a) noise increases
 - b) pressure increases
 - c) noise increases, pressure increases, velocity decreases
 - d) none of the above
- 10) India's 1st nuclear plant was set up at
- a) Kalpakkam
 - b) Rana Pratap Sagar
 - c) Tarapur
 - d) Bhaba
- 11) Nuclear fission means
- a) breaking up of nuclear of heavy atoms into nearly equal parts
 - b) combination of two light nuclei
 - c) moderator
 - d) graphite
- 12) A graphical representation between discharge and time is known as
- a) Monograph
 - b) Hectograph
 - c) Topograph
 - d) Hydrograph
- 13) Cost of operation of which plant is least ?
- a) Gas turbine plant
 - b) Thermal power plant
 - c) Nuclear power plant
 - d) Hydroelectric plant
- 14) An air filter is used in
- a) nuclear power plants
 - b) steam power plants
 - c) diesel engine power plants
 - d) hydro-power plants
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**S.E. (Part – I) (E & E) Examination, 2017
ELECTRICAL POWER GENERATION (Old – CGPA)**

Day and Date : Thursday, 21-12-2017
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

2. Solve **any four** : **(4×4=16)**

- 1) Write a short note on stream flow and run-off.
- 2) Explain pressurized water reactor with neat diagram.
- 3) Write a short note on hydrology.
- 4) Discuss factors to be considered for selection of site for thermal power plant.
- 5) Explain the process of nuclear fission.

3. Solve **any two** : **(6×2=12)**

- 1) Explain single line diagram of typical AC power system.
- 2) Draw typical layout of hydroelectric power plant and explain it briefly.
- 3) Draw typical layout of thermal power plant and explain it briefly.

4. Solve **any four** : **(4×4=16)**

- 1) Define bio-gas and bio-mass energy.
- 2) Explain wind power plant with block diagram also state its application.
- 3) Explain geo-thermal power plant with neat diagram also state its application.
- 4) Explain load duration curve with example.
- 5) Explain construction and working of solar photovoltaic cell.



5. Solve **any two** :

(6×2=12)

- 1) With a neat diagram explain tidal power plant with its advantages and limitations.
 - 2) Define bio-gas and explain common circular fixed dome digester (china plant) with neat diagram.
 - 3) Explain the following :
 - a) Load factor
 - b) Plant capacity factor
 - c) Diversity factor
 - d) Demand factor
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SLR- TJ – 442

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Set **P**

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

Day and Date : Tuesday, 28-11-2017
Time : 3.00 p.m. to 6.00 p.m.

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.**
 - 3) **All** questions are **compulsory**.
 - 4) Figures to **right** indicate **full** marks.
 - 5) Assume suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : (1×20=20)
- 1) Node of linked list consist of
a) Information Field b) Pointer Field c) Both a) and b) d) None
 - 2) Array is _____ data type.
a) Structured b) Composite c) Primitive d) Both a) and b
 - 3) The getnode () operation of Avail list uses _____ algorithm.
a) delete first node b) insert first node c) insert last node d) delete last node
 - 4) The freenode() operation of Avail list uses _____ algorithm.
a) delete first node b) insert first node c) insert last node d) delete last node
 - 5) Correct option to declare Node of doubly linked list in C is
a) struct nodetype
{
 int info;
 int next, back;
};
struct nodetype node[noofnodes];
b) struct node
{
 int info;
 struct node *next, *back;
};
typedef struct node *nodeptr;
c) Both a) & b)
d) struct node
{
 int info;
 struct node *next;
};
typedef struct node *nodeptr;

P.T.O.



- 6) Josephus problem is related to
a) Stack b) Singly linked list c) Circular linked list d) Queue
- 7) Polynomial manipulation is one of the applications of
a) Stack b) Structure c) Linked list d) Tree
- 8) Whenever PUSH operation is performed on the stack Top is incremented by
a) 4 b) 2 c) 3 d) 1
- 9) In case of stack using array we can identify whether stack is empty or not by using
a) $top = -1$ b) $top = \text{empty}$ c) $top = \text{MAX}-1$ d) $top = \text{full}$
- 10) Which is the correct form of infix notation ?
a) $A+B$ b) $+AB$ c) $AB+$ d) none of this
- 11) Following is related to stack
a) Front End b) Rear End c) Top d) Both a) & b)
- 12) Queue is _____ type data structure.
a) FILO b) LIFO c) FIFO d) LILO
- 13) The situation when queue is empty and still we are trying to delete elements from queue is called as
a) Overflow b) Underflow c) Empty d) None of these
- 14) When queue is empty then
a) $front = 0$ & $rear = -1$ b) $front=rear=1$ c) $front=rear=-1$ d) $front=rear=0$
- 15) In short DEQUE is called as
a) Stack b) Tree c) Linear list d) None of these
- 16) Tower of Hanoi can be solved by using
a) Queue b) Tree c) Structure d) Recursion
- 17) Polynomial manipulation is solved by using _____ data structure.
a) Stack b) Linked List c) Queue d) Structure
- 18) The complexity of linear search algorithm is
a) $O(n)$ b) $O(\log n)$ c) $O(n^2)$ d) $O(n \log n)$
- 19) The complexity of Binary search algorithm is
a) $O(n)$ b) $O(\log n)$ c) $O(n^2)$ d) $O(n \log n)$
- 20) The complexity of bubble sort algorithm is
a) $O(n)$ b) $O(\log n)$ c) $O(n^2)$ d) $O(n \log n)$



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

Day and Date : Tuesday, 28-11-2017

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 four**. **(5×4=20)**
- a) Write a short note on File Handling In 'C'.
 - b) Write in brief about the various operations on stack.
 - c) Write a short note on :
 - i) Implementation of stack using array
 - ii) Implementation of stack using linked list.
 - d) Write in brief about array as an ADT.
 - e) Write a short note on :
 - i) Pointers In 'C'
 - ii) Functions in 'C'
3. a) Solve **any one**. **(1×10=10)**
- i) Write a program to implement bitwise AND, OR, EX-OR and bitwise left and right shift.
 - ii) Write and explain algorithm for evaluation postfix expression.
- b) Write a short note on : **(2×5=10)**
- i) Structures and Unions
 - ii) File handling in 'C'

Set P



SECTION – II

4. Write a short note on (Solve **any four**). (4×5=20)
- i) Tower of Hanoi
 - ii) Circular Linked List
 - iii) Quick Sort
 - iv) Collision resolution techniques in Hashing
 - v) Bubble sort
 - vi) Linear Search
5. a) Solve **any one** : (1×10=10)
- i) Explain in brief about bubble sort.
 - ii) Write in brief about applications of queue.
- b) Write a short note on : (2×5=10)
- i) Sequential searching
 - ii) Binary search.
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SLR- TJ – 442

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| Seat No. | |
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Set **Q**

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

Day and Date : Tuesday, 28-11-2017
Time : 3.00 p.m. to 6.00 p.m.

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.**
 - 3) **All** questions are **compulsory**.
 - 4) Figures to **right** indicate **full** marks.
 - 5) Assume suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(1×20=20)

- 1) Tower of Hanoi can be solved by using
 - a) Queue
 - b) Tree
 - c) Structure
 - d) Recursion
- 2) Polynomial manipulation is solved by using _____ data structure.
 - a) Stack
 - b) Linked List
 - c) Queue
 - d) Structure
- 3) The complexity of linear search algorithm is
 - a) $O(n)$
 - b) $O(\log n)$
 - c) $O(n^2)$
 - d) $O(n \log n)$
- 4) The complexity of Binary search algorithm is
 - a) $O(n)$
 - b) $O(\log n)$
 - c) $O(n^2)$
 - d) $O(n \log n)$
- 5) The complexity of bubble sort algorithm is
 - a) $O(n)$
 - b) $O(\log n)$
 - c) $O(n^2)$
 - d) $O(n \log n)$
- 6) Node of linked list consist of
 - a) Information Field
 - b) Pointer Field
 - c) Both a) and b)
 - d) None
- 7) Array is _____ data type.
 - a) Structured
 - b) Composite
 - c) Primitive
 - d) Both a) and b)
- 8) The getnode () operation of Avail list uses _____ algorithm.
 - a) delete first node
 - b) insert first node
 - c) insert last node
 - d) delete last node
- 9) The freenode() operation of Avail list uses _____ algorithm.
 - a) delete first node
 - b) insert first node
 - c) insert last node
 - d) delete last node

P.T.O.



- 10) Correct option to declare Node of doubly linked list in C is
- a) struct nodetype
{
 int info;
 int next, back;
};
struct nodetype node[noofnodes];
- b) struct node
{
 int info;
 struct node *next, *back;
};
typedef struct node *nodeptr;
- c) Both a) & b)
- d) struct node
{
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 struct node *next;
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- 11) Josephus problem is related to
a) Stack b) Singly linked list c) Circular linked list d) Queue
- 12) Polynomial manipulation is one of the applications of
a) Stack b) Structure c) Linked list d) Tree
- 13) Whenever PUSH operation is performed on the stack Top is incremented by
a) 4 b) 2 c) 3 d) 1
- 14) In case of stack using array we can identify whether stack is empty or not by using
a) $top = -1$ b) $top = \text{empty}$ c) $top = \text{MAX}-1$ d) $top = \text{full}$
- 15) Which is the correct form of infix notation ?
a) $A+B$ b) $+AB$ c) $AB+$ d) none of this
- 16) Following is related to stack
a) Front End b) Rear End c) Top d) Both a) & b)
- 17) Queue is _____ type data structure.
a) FILO b) LIFO c) FIFO d) LILO
- 18) The situation when queue is empty and still we are trying to delete elements from queue is called as
a) Overflow b) Underflow c) Empty d) None of these
- 19) When queue is empty then
a) $front = 0 \ \& \ rear = -1$ b) $front=rear=1$ c) $front=rear=-1$ d) $front=rear=0$
- 20) In short DEQUEUE is called as
a) Stack b) Tree c) Linear list d) None of these



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

Day and Date : Tuesday, 28-11-2017

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 four**. **(5×4=20)**
- a) Write a short note on File Handling In 'C'.
 - b) Write in brief about the various operations on stack.
 - c) Write a short note on :
 - i) Implementation of stack using array
 - ii) Implementation of stack using linked list.
 - d) Write in brief about array as an ADT.
 - e) Write a short note on :
 - i) Pointers In 'C'
 - ii) Functions in 'C'
3. a) Solve **any one**. **(1×10=10)**
- i) Write a program to implement bitwise AND, OR, EX-OR and bitwise left and right shift.
 - ii) Write and explain algorithm for evaluation postfix expression.
- b) Write a short note on : **(2×5=10)**
- i) Structures and Unions
 - ii) File handling in 'C'

Set Q



SECTION – II

4. Write a short note on (Solve **any four**). **(4×5=20)**
- i) Tower of Hanoi
 - ii) Circular Linked List
 - iii) Quick Sort
 - iv) Collision resolution techniques in Hashing
 - v) Bubble sort
 - vi) Linear Search
5. a) Solve **any one** : **(1×10=10)**
- i) Explain in brief about bubble sort.
 - ii) Write in brief about applications of queue.
- b) Write a short note on : **(2×5=10)**
- i) Sequential searching
 - ii) Binary search.
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SLR- TJ – 442

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Set **R**

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

Day and Date : Tuesday, 28-11-2017
Time : 3.00 p.m. to 6.00 p.m.

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.**
 - 3) **All** questions are **compulsory**.
 - 4) Figures to **right** indicate **full** marks.
 - 5) Assume suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(1×20=20)

- 1) Following is related to stack
 - a) Front End
 - b) Rear End
 - c) Top
 - d) Both a) & b)
- 2) Queue is _____ type data structure.
 - a) FILO
 - b) LIFO
 - c) FIFO
 - d) LILO
- 3) The situation when queue is empty and still we are trying to delete elements from queue is called as
 - a) Overflow
 - b) Underflow
 - c) Empty
 - d) None of these
- 4) When queue is empty then
 - a) front = 0 & rear = -1
 - b) front=rear=1
 - c) front=rear=-1
 - d) front=rear=0
- 5) In short DEQUE is called as
 - a) Stack
 - b) Tree
 - c) Linear list
 - d) None of these
- 6) Tower of Hanoi can be solved by using
 - a) Queue
 - b) Tree
 - c) Structure
 - d) Recursion
- 7) Polynomial manipulation is solved by using _____ data structure.
 - a) Stack
 - b) Linked List
 - c) Queue
 - d) Structure
- 8) The complexity of linear search algorithm is
 - a) O(n)
 - b) O(log n)
 - c) O(n²)
 - d) O(n log n)
- 9) The complexity of Binary search algorithm is
 - a) O(n)
 - b) O(log n)
 - c) O(n²)
 - d) O(n log n)
- 10) The complexity of bubble sort algorithm is
 - a) O(n)
 - b) O(log n)
 - c) O(n²)
 - d) O(n log n)

P.T.O.



- 11) Node of linked list consist of
a) Information Field b) Pointer Field c) Both a) and b) d) None
- 12) Array is _____ data type.
a) Structured b) Composite c) Primitive d) Both a) and b
- 13) The getnode () operation of Avail list uses _____ algorithm.
a) delete first node b) insert first node c) insert last node d) delete last node
- 14) The freenode() operation of Avail list uses _____ algorithm.
a) delete first node b) insert first node c) insert last node d) delete last node
- 15) Correct option to declare Node of doubly linked list in C is
a)

```
struct nodetype
{
    int info;
    int next, back;
};
struct nodetype node[noofnodes];
```


b)

```
struct node
{
    int info;
    struct node *next, *back;
};
typedef struct node *nodeptr;
```


c) Both a) & b)
d)

```
struct node
{
    int info;
    struct node *next;
};
typedef struct node *nodeptr;
```
- 16) Josephus problem is related to
a) Stack b) Singly linked list c) Circular linked list d) Queue
- 17) Polynomial manipulation is one of the applications of
a) Stack b) Structure c) Linked list d) Tree
- 18) Whenever PUSH operation is performed on the stack Top is incremented by
a) 4 b) 2 c) 3 d) 1
- 19) In case of stack using array we can identify whether stack is empty or not by using
a) $top = -1$ b) $top = empty$ c) $top = MAX-1$ d) $top = full$
- 20) Which is the correct form of infix notation ?
a) A+B b) +AB c) AB+ d) none of this



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

Day and Date : Tuesday, 28-11-2017

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 four**. **(5×4=20)**
- a) Write a short note on File Handling In 'C'.
 - b) Write in brief about the various operations on stack.
 - c) Write a short note on :
 - i) Implementation of stack using array
 - ii) Implementation of stack using linked list.
 - d) Write in brief about array as an ADT.
 - e) Write a short note on :
 - i) Pointers In 'C'
 - ii) Functions in 'C'
3. a) Solve **any one**. **(1×10=10)**
- i) Write a program to implement bitwise AND, OR, EX-OR and bitwise left and right shift.
 - ii) Write and explain algorithm for evaluation postfix expression.
- b) Write a short note on : **(2×5=10)**
- i) Structures and Unions
 - ii) File handling in 'C'

Set R



SECTION – II

4. Write a short note on (Solve **any four**). **(4×5=20)**
- i) Tower of Hanoi
 - ii) Circular Linked List
 - iii) Quick Sort
 - iv) Collision resolution techniques in Hashing
 - v) Bubble sort
 - vi) Linear Search
5. a) Solve **any one** : **(1×10=10)**
- i) Explain in brief about bubble sort.
 - ii) Write in brief about applications of queue.
- b) Write a short note on : **(2×5=10)**
- i) Sequential searching
 - ii) Binary search.
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SLR- TJ – 442

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Set **S**

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

Day and Date : Tuesday, 28-11-2017
Time : 3.00 p.m. to 6.00 p.m.

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.**
 - 3) **All** questions are **compulsory**.
 - 4) Figures to **right** indicate **full** marks.
 - 5) Assume suitable data **if necessary**.

MCQ/Objective Type Questions

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer : **(1×20=20)**
- 1) Josephus problem is related to
 - a) Stack
 - b) Singly linked list
 - c) Circular linked list
 - d) Queue
 - 2) Polynomial manipulation is one of the applications of
 - a) Stack
 - b) Structure
 - c) Linked list
 - d) Tree
 - 3) Whenever PUSH operation is performed on the stack Top is incremented by
 - a) 4
 - b) 2
 - c) 3
 - d) 1
 - 4) In case of stack using array we can identify whether stack is empty or not by using
 - a) $top = -1$
 - b) $top = empty$
 - c) $top = MAX-1$
 - d) $top = full$
 - 5) Which is the correct form of infix notation ?
 - a) $A+B$
 - b) $+AB$
 - c) $AB+$
 - d) none of this
 - 6) Following is related to stack
 - a) Front End
 - b) Rear End
 - c) Top
 - d) Both a) & b)
 - 7) Queue is _____ type data structure.
 - a) FILO
 - b) LIFO
 - c) FIFO
 - d) LILO
 - 8) The situation when queue is empty and still we are trying to delete elements from queue is called as
 - a) Overflow
 - b) Underflow
 - c) Empty
 - d) None of these
 - 9) When queue is empty then
 - a) $front = 0$ & $rear = -1$
 - b) $front=rear=1$
 - c) $front=rear=-1$
 - d) $front=rear=0$
 - 10) In short DEQUE is called as
 - a) Stack
 - b) Tree
 - c) Linear list
 - d) None of these

P.T.O.



- 11) Tower of Hanoi can be solved by using
- a) Queue b) Tree c) Structure d) Recursion
- 12) Polynomial manipulation is solved by using _____ data structure.
- a) Stack b) Linked List c) Queue d) Structure
- 13) The complexity of linear search algorithm is
- a) $O(n)$ b) $O(\log n)$ c) $O(n^2)$ d) $O(n \log n)$
- 14) The complexity of Binary search algorithm is
- a) $O(n)$ b) $O(\log n)$ c) $O(n^2)$ d) $O(n \log n)$
- 15) The complexity of bubble sort algorithm is
- a) $O(n)$ b) $O(\log n)$ c) $O(n^2)$ d) $O(n \log n)$
- 16) Node of linked list consist of
- a) Information Field b) Pointer Field c) Both a) and b) d) None
- 17) Array is _____ data type.
- a) Structured b) Composite c) Primitive d) Both a) and b
- 18) The getnode () operation of Avail list uses _____ algorithm.
- a) delete first node b) insert first node c) insert last node d) delete last node
- 19) The freenode() operation of Avail list uses _____ algorithm.
- a) delete first node b) insert first node c) insert last node d) delete last node
- 20) Correct option to declare Node of doubly linked list in C is
- a) struct nodetype
- ```
{
 int info;
 int next, back;
};
struct nodetype node[noofnodes];
```
- b) struct node
- ```
{
  int info;
  struct node *next, *back;
};
typedef struct node *nodeptr;
```
- c) Both a) & b)
- d) struct node
- ```
{
 int info;
 struct node *next;
};
typedef struct node *nodeptr;
```



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

Day and Date : Tuesday, 28-11-2017

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 four**. **(5×4=20)**
- a) Write a short note on File Handling In 'C'.
  - b) Write in brief about the various operations on stack.
  - c) Write a short note on :
    - i) Implementation of stack using array
    - ii) Implementation of stack using linked list.
  - d) Write in brief about array as an ADT.
  - e) Write a short note on :
    - i) Pointers In 'C'
    - ii) Functions in 'C'
3. a) Solve **any one**. **(1×10=10)**
- i) Write a program to implement bitwise AND, OR, EX-OR and bitwise left and right shift.
  - ii) Write and explain algorithm for evaluation postfix expression.
- b) Write a short note on : **(2×5=10)**
- i) Structures and Unions
  - ii) File handling in 'C'

**Set S**



## SECTION – II

4. Write a short note on (Solve **any four**). **(4×5=20)**
- i) Tower of Hanoi
  - ii) Circular Linked List
  - iii) Quick Sort
  - iv) Collision resolution techniques in Hashing
  - v) Bubble sort
  - vi) Linear Search
5. a) Solve **any one** : **(1×10=10)**
- i) Explain in brief about bubble sort.
  - ii) Write in brief about applications of queue.
- b) Write a short note on : **(2×5=10)**
- i) Sequential searching
  - ii) Binary search.
-





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**S.E. (E & E) (Part – II) (CGPA) Examination, 2017**  
**LINEAR ALGEBRA**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N. B. :**
- 1) Attempt **any three** questions from **each** Section.
  - 2) Figures to the **right** indicate **full** marks.
  - 3) **Use** of calculator is **allowed**.
  - 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. Choose the correct answers :

1) Which system of equations corresponds to the following augmented matrix ?

$$\left[ \begin{array}{ccc|c} 1 & 2 & 0 & 3 \\ 0 & 1 & 3 & 6 \\ 0 & -1 & -1 & 4 \end{array} \right]$$

a)  $a + 2b = 3$   
 $b + 3c = 6$   
 $b + c = 4$

b)  $x + 2z = 3$   
 $x + 3y = 6$   
 $-x - y = -4$

c)  $r + 2s = 3$   
 $s + 3t = 6$   
 $-s - t = 4$

d)  $u + 2v = 3w + 3$   
 $v + 3w = 6$   
 $v + w = -4$

2) Given 1 is an eigen value of  $A = \begin{bmatrix} 2 & 5 & -6 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$  the other two eigen values are

a) 2, -3

b) -2, 3

c) 0, 3

d) 0, -3

3) If  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^4$ ,  $T(e_1) = [3, 1, 3, 1]$ ,  $T(e_2) = [-5, 2, 0, 0]$  where  $e_1 = [1, 0]$  and  $e_2 = [0, 1]$  then standard matrix of T is \_\_\_\_\_

a)  $\begin{bmatrix} 3 & 1 & 3 & 1 \\ -5 & 2 & 0 & 0 \end{bmatrix}$     b)  $\begin{bmatrix} 3 & -5 \\ 1 & 2 \\ 3 & 0 \\ 1 & 0 \end{bmatrix}$     c)  $\begin{bmatrix} -5 & 2 & 0 & 0 \\ 3 & 1 & 3 & 1 \end{bmatrix}$     d)  $\begin{bmatrix} -5 & 3 \\ 2 & 1 \\ 0 & 3 \\ 0 & 1 \end{bmatrix}$

P.T.O.



4) State which of the following is false ?

- a) A is invertible iff  $|A| \neq 0$       b)  $|AB| = |A| \cdot |B|$   
 c)  $|A^T| = |A|$       d)  $|AB| = |A| + |B|$

5) If  $B = \begin{bmatrix} 1 & 0 & 6 & 5 \\ 0 & 2 & 5 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$  then  $\dim(\text{Null } A)$  and  $\dim(\text{Col } A)$  are

- a) 2, 2      b) 4, 1      c) 2, 3      d) 1, 3

6) The eigen values of  $A = \begin{bmatrix} 2 & 1 & 4 \\ 0 & -3 & 7 \\ 0 & 0 & -1 \end{bmatrix}$  are

- a) -2, 0, 1      b) 0, 1, 3      c) 1, 4, 7      d) 2, -3, -1

7) Which of the following is true ?

- a)  $\text{rank } A + \dim \text{column} = m$       b)  $\text{rank } A + \dim \text{Null } A = m$   
 c)  $\text{rank } A + \dim \text{column} = n$       d)  $\text{rank } A + \dim \text{Null } A = n$

8) Two vectors u and v are orthogonal to each other if

- a)  $u + v = 0$       b)  $u - v = 0$       c)  $u \cdot v = 0$       d) None of these

9) The matrix of the quadratic form  $Q(X) = 5x_1^2 + 3x_1x_2$  is

- a)  $\begin{bmatrix} 0 & 3/2 \\ 3/2 & 5 \end{bmatrix}$       b)  $\begin{bmatrix} 0 & 3 \\ 3 & 5 \end{bmatrix}$       c)  $\begin{bmatrix} 5 & 3/2 \\ 3/2 & 0 \end{bmatrix}$       d) None of these

10) The correlation coefficient r is negative if

- a)  $byx$  is negative      b)  $bxy$  is negative  
 c) Both  $byx$  and  $bxy$  are negative      d) None of these

11) If  $byx = \frac{5}{18}$ ,  $bxy = \frac{8}{5}$  then  $r =$

- a)  $\frac{2}{5}$       b)  $\frac{1}{5}$       c)  $\frac{2}{3}$       d)  $\frac{3}{2}$

12) The equation of line of regression of y on x is

- a)  $x - \bar{x} = byx (y - \bar{y})$       b)  $x - \bar{x} = byx (y - \bar{y})$   
 c)  $y - \bar{y} = bxy (x - \bar{x})$       d)  $y - \bar{y} = byx (x - \bar{x})$

13) The Mobius transformation  $W = \frac{az+b}{cz+d}$  is called normalised if

- a)  $ad - bc = 0$       b)  $ab - cd = 1$       c)  $ad - bc = 1$       d)  $ab - cd = 0$

14) The function  $W = Z^2$  is analytic

- a) everywhere      b) only at (0, 0)      c) nowhere      d) none of these



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| <b>Seat No.</b> |  |
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**S.E. (E & E) (Part – II) (CGPA) Examination, 2017**  
**LINEAR ALGEBRA**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- N. B. :** 1) Attempt **any three** questions from **each** Section.  
2) Figures to the **right** indicate **full** marks.  
3) **Use** of calculator is **allowed**.

SECTION – I

2. Attempt **any three** of the following : **9**

a) Find an equation involving g, h and k that makes this augmented matrix correspond to a

consistent system 
$$\left[ \begin{array}{ccc|c} 1 & -4 & 7 & q \\ 0 & 3 & -5 & h \\ -2 & 5 & -9 & k \end{array} \right]$$

b) For what values of h will y be in span  $\{v_1, v_2, v_3\}$  if  $v_1 = \begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}$ ,  $v_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}$   $v_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}$

and  $y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$

c) Determine the columns of the matrix  $\begin{bmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{bmatrix}$  are linearly independent set.

Justify each answer.

d) Find the LU Factorization of following matrix  $\begin{bmatrix} 2 & 4 & -1 & 5 & -2 \\ -4 & -5 & 3 & -8 & 1 \\ 2 & -5 & -4 & 1 & 8 \\ -6 & 0 & 7 & -3 & 1 \end{bmatrix}$ .

3. a) Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be a linear transformation such that  $T(x_1, x_2) = (x_1 + x_2, 4x_1 + 5x_2)$ , Find X such that  $T(X) = (3, 8)$  **3**

b) Let the transformation T defined by  $T(X) = AX$ , find a vector X whose image under T is

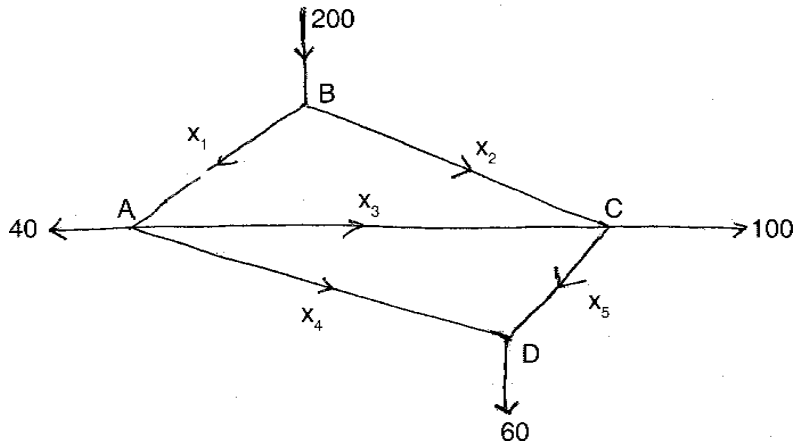
b where  $A = \begin{bmatrix} 1 & 0 & -2 \\ -2 & 1 & 6 \\ 3 & -2 & -5 \end{bmatrix}$ ,  $b = \begin{bmatrix} -1 \\ 7 \\ -3 \end{bmatrix}$ . **3**

**Set P**



c) Find the general traffic pattern in the free way network shown in the figure

4



4. a) Let  $b_1 = \begin{bmatrix} -9 \\ 1 \end{bmatrix}$ ,  $b_2 = \begin{bmatrix} -5 \\ -1 \end{bmatrix}$ ,  $c_1 = \begin{bmatrix} 1 \\ -4 \end{bmatrix}$ ,  $c_2 = \begin{bmatrix} 3 \\ -5 \end{bmatrix}$  and consider the bases for  $R^2$  given by  $B = \{b_1, b_2\}$  and  $C = \{c_1, c_2\}$ . Find the change of coordinates matrix from B to C.

4

b) If  $A = \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ -2 & 3 & -3 & -3 & -4 \\ 4 & -6 & 9 & 5 & 9 \\ -2 & 3 & 3 & -4 & 1 \end{bmatrix} \sim \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ 0 & 0 & 3 & -1 & 1 \\ 0 & 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$  Find rank of A and dimNull A.

Hence find basis for Null A.

5

5. a) Apply power method to  $A = \begin{bmatrix} 6 & 5 \\ 1 & 2 \end{bmatrix}$  with  $X_0 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$  stop when  $k = 5$ . Estimate the dominant eigen value and corresponding eigen vector of A.

3

b) Diagonalize the matrix if possible  $\begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$ .

3

c) Is  $\begin{bmatrix} 1 \\ 4 \end{bmatrix}$  an eigen vector of  $\begin{bmatrix} -3 & 1 \\ -3 & 8 \end{bmatrix}$ ? If so, find the eigen value.

3

SECTION – II

6. a) Find the matrix of the quadratic form assume that X is in  $R^3$  for  $8x_1^2 + 7x_2^2 - 3x_3^2 - 6x_1x_2 + 4x_1x_3 - 2x_2x_3$

4

OR



a) Find a least squares solution of  $AX = b$

$$A = \begin{bmatrix} 4 & 0 \\ 0 & 2 \\ 1 & 1 \end{bmatrix}, b = \begin{bmatrix} 2 \\ 0 \\ 11 \end{bmatrix}$$

4

b) Write down the quadratic form corresponding to the following matrix.

i)  $\begin{bmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}$       ii)  $\begin{bmatrix} 3 & -2 \\ -2 & 7 \end{bmatrix}$

3

c) Show that the set S of vectors in  $R^4$  is orthogonal set where  $S = \{u = (1, 2, -3, 4), v = (3, 4, 1, -2), w = (3, -2, 1, 1)\}$

3

7. a) Mean soil temperature and germination interval for winter in 1996-97 at 12 places are recorded below.

|                            |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|
| <b>Mean Soil temp. (n)</b> | 57 | 42 | 38 | 42 | 45 | 42 | 44 | 40 | 46 | 44 | 43 | 40 |
| <b>No. of days (y)</b>     | 10 | 26 | 41 | 29 | 27 | 27 | 19 | 18 | 19 | 31 | 29 | 33 |

Obtain the regression equation of germination interval (x) on mean soil temperature (y) and of temperature (y) on germination interval (x).

5

b) Find the coefficient of correlation between x and y from following data.

4

$$n = 25, \sum x = 100, \sum x^2 = 950, \sum y = 110, \sum y^2 = 850, \sum xy = 800.$$

8. a) The following results were obtained from marks in Applied mechanics and engineering mathematics in an examination.

|       | <b>Marks in App. Mech. (x)</b> | <b>Marks in Engg. Maths (y)</b> |
|-------|--------------------------------|---------------------------------|
| Mean  | 47.5                           | 39.5                            |
| S. D. | 16.8                           | 10.8                            |

$$r = 0.95$$

Find both the regression equations. Also estimate the value of y for x = 30.

3

b) The equations of the lines of regression are  $x + 2y = 5$  and  $2x + 3y = 8$ . Find  $\bar{x}$ ,  $\bar{y}$  and r.

3

c) Construct an analytic function whose real part is  $e^x \cdot \cos y$ .

3

9. a) Prove that the function  $f(z) = \frac{1}{z}$  is analytic and find  $f'(z)$ .

3

b) Show that  $u = y^3 - 3x^2y$  is a harmonic function. Find it's harmonic conjugate.

3

c) Evaluate  $\int_0^{1+i} (x^2 - iy) dy$  along the path

- i)  $y = x$
- ii)  $y = x^2$ .

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**S.E. (E & E) (Part – II) (CGPA) Examination, 2017**  
**LINEAR ALGEBRA**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N. B. :**
- 1) Attempt **any three** questions from **each** Section.
  - 2) Figures to the **right** indicate **full** marks.
  - 3) **Use** of calculator is **allowed**.
  - 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. Choose the correct answers :

- 1) Two vectors  $u$  and  $v$  are orthogonal to each other if
  - a)  $u + v = 0$
  - b)  $u - v = 0$
  - c)  $u \cdot v = 0$
  - d) None of these
  
- 2) The matrix of the quadratic form  $Q(X) = 5x_1^2 + 3x_1x_2$  is
  - a)  $\begin{bmatrix} 0 & 3/2 \\ 3/2 & 5 \end{bmatrix}$
  - b)  $\begin{bmatrix} 0 & 3 \\ 3 & 5 \end{bmatrix}$
  - c)  $\begin{bmatrix} 5 & 3/2 \\ 3/2 & 0 \end{bmatrix}$
  - d) None of these
  
- 3) The correlation coefficient  $r$  is negative if
  - a)  $byx$  is negative
  - b)  $bxy$  is negative
  - c) Both  $byx$  and  $bxy$  are negative
  - d) None of these
  
- 4) If  $byx = \frac{5}{18}$ ,  $bxy = \frac{8}{5}$  then  $r =$ 
  - a)  $\frac{2}{5}$
  - b)  $\frac{1}{5}$
  - c)  $\frac{2}{3}$
  - d)  $\frac{3}{2}$
  
- 5) The equation of line of regression of  $y$  on  $x$  is
  - a)  $x - \bar{x} = bxy (y - \bar{y})$
  - b)  $x - \bar{x} = byx (y - \bar{y})$
  - c)  $y - \bar{y} = bxy (x - \bar{x})$
  - d)  $y - \bar{y} = byx (x - \bar{x})$
  
- 6) The Mobius transformation  $W = \frac{az + b}{cz + d}$  is called normalised if
  - a)  $ad - bc = 0$
  - b)  $ab - cd = 1$
  - c)  $ad - bc = 1$
  - d)  $ab - cd = 0$

P.T.O.



- 7) The function  $W = Z^2$  is analytic  
 a) everywhere      b) only at  $(0, 0)$       c) nowhere      d) none of these

- 8) Which system of equations corresponds to the following augmented matrix ?

$$\left[ \begin{array}{ccc|c} 1 & 2 & 0 & 3 \\ 0 & 1 & 3 & 6 \\ 0 & -1 & -1 & 4 \end{array} \right]$$

- a)  $a + 2b = 3$   
 $b + 3c = 6$   
 $b + c = 4$
- b)  $x + 2z = 3$   
 $x + 3y = 6$   
 $-x - y = -4$
- c)  $r + 2s = 3$   
 $s + 3t = 6$   
 $-s - t = 4$
- d)  $u + 2v = 3w + 3$   
 $v + 3w = 6$   
 $v + w = -4$

- 9) Given 1 is an eigen value of  $A = \begin{bmatrix} 2 & 5 & -6 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$  the other two eigen values are

- a) 2, -3      b) -2, 3      c) 0, 3      d) 0, -3

- 10) If  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^4$ ,  $T(e_1) = [3, 1, 3, 1]$ ,  $T(e_2) = [-5, 2, 0, 0]$  where  $e_1 = [1, 0]$  and  $e_2 = [0, 1]$  then standard matrix of T is \_\_\_\_\_

- a)  $\begin{bmatrix} 3 & 1 & 3 & 1 \\ -5 & 2 & 0 & 0 \end{bmatrix}$       b)  $\begin{bmatrix} 3 & -5 \\ 1 & 2 \\ 3 & 0 \\ 1 & 0 \end{bmatrix}$       c)  $\begin{bmatrix} -5 & 2 & 0 & 0 \\ 3 & 1 & 3 & 1 \end{bmatrix}$       d)  $\begin{bmatrix} -5 & 3 \\ 2 & 1 \\ 0 & 3 \\ 0 & 1 \end{bmatrix}$

- 11) State which of the following is false ?

- a) A is invertible iff  $|A| \neq 0$       b)  $|AB| = |A| \bullet |B|$   
 c)  $|A^T| = |A|$       d)  $|AB| = |A| + |B|$

- 12) If  $B = \begin{bmatrix} 1 & 0 & 6 & 5 \\ 0 & 2 & 5 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$  then  $\dim(\text{Null } A)$  and  $\dim(\text{Col } A)$  are

- a) 2, 2      b) 4, 1      c) 2, 3      d) 1, 3

- 13) The eigen values of  $A = \begin{bmatrix} 2 & 1 & 4 \\ 0 & -3 & 7 \\ 0 & 0 & -1 \end{bmatrix}$  are

- a) -2, 0, 1      b) 0, 1, 3      c) 1, 4, 7      d) 2, -3, -1

- 14) Which of the following is true ?

- a)  $\text{rank } A + \dim \text{column} = m$       b)  $\text{rank } A + \dim \text{Null } A = m$   
 c)  $\text{rank } A + \dim \text{column} = n$       d)  $\text{rank } A + \dim \text{Null } A = n$





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**S.E. (E & E) (Part – II) (CGPA) Examination, 2017**  
**LINEAR ALGEBRA**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- N. B. :** 1) Attempt **any three** questions from **each** Section.  
2) Figures to the **right** indicate **full** marks.  
3) **Use** of calculator is **allowed**.

SECTION – I

2. Attempt **any three** of the following : **9**

a) Find an equation involving g, h and k that makes this augmented matrix correspond to a

consistent system  $\left[ \begin{array}{ccc|c} 1 & -4 & 7 & q \\ 0 & 3 & -5 & h \\ -2 & 5 & -9 & k \end{array} \right]$

b) For what values of h will y be in span  $\{v_1, v_2, v_3\}$  if  $v_1 = \begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}$ ,  $v_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}$   $v_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}$

and  $y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$

c) Determine the columns of the matrix  $\begin{bmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{bmatrix}$  are linearly independent set.

Justify each answer.

d) Find the LU Factorization of following matrix  $\begin{bmatrix} 2 & 4 & -1 & 5 & -2 \\ -4 & -5 & 3 & -8 & 1 \\ 2 & -5 & -4 & 1 & 8 \\ -6 & 0 & 7 & -3 & 1 \end{bmatrix}$ .

3. a) Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be a linear transformation such that  $T(x_1, x_2) = (x_1 + x_2, 4x_1 + 5x_2)$ , Find X such that  $T(X) = (3, 8)$  **3**

b) Let the transformation T defined by  $T(X) = AX$ , find a vector X whose image under T is

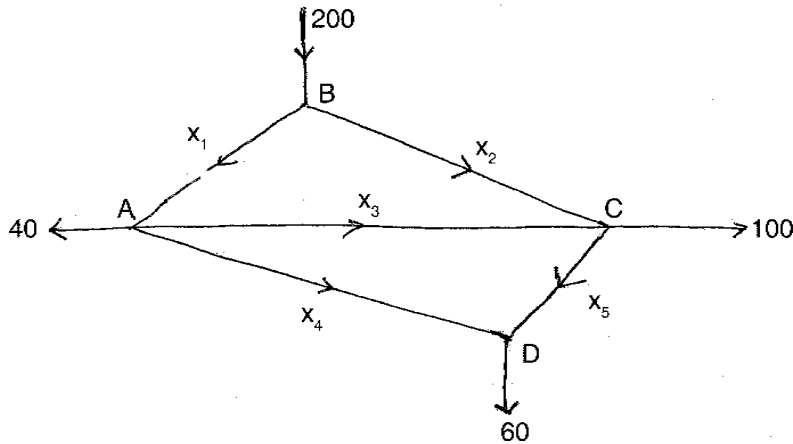
b where  $A = \begin{bmatrix} 1 & 0 & -2 \\ -2 & 1 & 6 \\ 3 & -2 & -5 \end{bmatrix}$ ,  $b = \begin{bmatrix} -1 \\ 7 \\ -3 \end{bmatrix}$ . **3**

**Set Q**



c) Find the general traffic pattern in the free way network shown in the figure

4



4. a) Let  $b_1 = \begin{bmatrix} -9 \\ 1 \end{bmatrix}$ ,  $b_2 = \begin{bmatrix} -5 \\ -1 \end{bmatrix}$ ,  $c_1 = \begin{bmatrix} 1 \\ -4 \end{bmatrix}$ ,  $c_2 = \begin{bmatrix} 3 \\ -5 \end{bmatrix}$  and consider the bases for  $R^2$  given by  $B = \{b_1, b_2\}$  and  $c = \{c_1, c_2\}$ . Find the change of coordinates matrix from B to C.

4

b) If  $A = \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ -2 & 3 & -3 & -3 & -4 \\ 4 & -6 & 9 & 5 & 9 \\ -2 & 3 & 3 & -4 & 1 \end{bmatrix} \sim \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ 0 & 0 & 3 & -1 & 1 \\ 0 & 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$  Find rank of A and dimNull A.

Hence find basis for Null A.

5

5. a) Apply power method to  $A = \begin{bmatrix} 6 & 5 \\ 1 & 2 \end{bmatrix}$  with  $X_0 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$  stop when  $k = 5$ . Estimate the dominant eigen value and corresponding eigen vector of A.

3

b) Diagonalize the matrix if possible  $\begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$ .

3

c) Is  $\begin{bmatrix} 1 \\ 4 \end{bmatrix}$  an eigen vector of  $\begin{bmatrix} -3 & 1 \\ -3 & 8 \end{bmatrix}$ ? If so, find the eigen value.

3

SECTION – II

6. a) Find the matrix of the quadratic form assume that X is in  $R^3$  for  $8x_1^2 + 7x_2^2 - 3x_3^2 - 6x_1x_2 + 4x_1x_3 - 2x_2x_3$

4

OR



a) Find a least squares solution of  $AX = b$

$$A = \begin{bmatrix} 4 & 0 \\ 0 & 2 \\ 1 & 1 \end{bmatrix}, b = \begin{bmatrix} 2 \\ 0 \\ 11 \end{bmatrix}$$

4

b) Write down the quadratic form corresponding to the following matrix.

i)  $\begin{bmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}$       ii)  $\begin{bmatrix} 3 & -2 \\ -2 & 7 \end{bmatrix}$

3

c) Show that the set S of vectors in  $R^4$  is orthogonal set where  $S = \{u = (1, 2, -3, 4), v = (3, 4, 1, -2), w = (3, -2, 1, 1)\}$

3

7. a) Mean soil temperature and germination interval for winter in 1996-97 at 12 places are recorded below.

|                            |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|
| <b>Mean Soil temp. (n)</b> | 57 | 42 | 38 | 42 | 45 | 42 | 44 | 40 | 46 | 44 | 43 | 40 |
| <b>No. of days (y)</b>     | 10 | 26 | 41 | 29 | 27 | 27 | 19 | 18 | 19 | 31 | 29 | 33 |

Obtain the regression equation of germination interval (x) on mean soil temperature (y) and of temperature (y) on germination interval (x).

5

b) Find the coefficient of correlation between x and y from following data.

4

$$n = 25, \sum x = 100, \sum x^2 = 950, \sum y = 110, \sum y^2 = 850, \sum xy = 800.$$

8. a) The following results were obtained from marks in Applied mechanics and engineering mathematics in an examination.

|       | <b>Marks in App. Mech. (x)</b> | <b>Marks in Engg. Maths (y)</b> |
|-------|--------------------------------|---------------------------------|
| Mean  | 47.5                           | 39.5                            |
| S. D. | 16.8                           | 10.8                            |

$$r = 0.95$$

Find both the regression equations. Also estimate the value of y for x = 30.

3

b) The equations of the lines of regression are  $x + 2y = 5$  and  $2x + 3y = 8$ . Find  $\bar{x}, \bar{y}$  and r.

3

c) Construct an analytic function whose real part is  $e^x \cdot \cos y$ .

3

9. a) Prove that the function  $f(z) = \frac{1}{z}$  is analytic and find  $f'(z)$ .

3

b) Show that  $u = y^3 - 3x^2y$  is a harmonic function. Find it's harmonic conjugate.

3

c) Evaluate  $\int_0^{1+i} (x^2 - iy) dy$  along the path

- i)  $y = x$
- ii)  $y = x^2$ .

3





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**S.E. (E & E) (Part – II) (CGPA) Examination, 2017**  
**LINEAR ALGEBRA**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N. B. :**
- 1) Attempt **any three** questions from **each** Section.
  - 2) Figures to the **right** indicate **full** marks.
  - 3) **Use** of calculator is **allowed**.
  - 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. Choose the correct answers :

1) If  $B = \begin{bmatrix} 1 & 0 & 6 & 5 \\ 0 & 2 & 5 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$  then  $\dim(\text{Null } A)$  and  $\dim(\text{Col } A)$  are

- a) 2, 2                      b) 4, 1                      c) 2, 3                      d) 1, 3

2) The eigen values of  $A = \begin{bmatrix} 2 & 1 & 4 \\ 0 & -3 & 7 \\ 0 & 0 & -1 \end{bmatrix}$  are

- a) -2, 0, 1                      b) 0, 1, 3                      c) 1, 4, 7                      d) 2, -3, -1

3) Which of the following is true ?

- a)  $\text{rank } A + \dim \text{column} = m$                       b)  $\text{rank } A + \dim \text{Null } A = m$   
c)  $\text{rank } A + \dim \text{column} = n$                       d)  $\text{rank } A + \dim \text{Null } A = n$

4) Two vectors  $u$  and  $v$  are orthogonal to each other if

- a)  $u + v = 0$                       b)  $u - v = 0$                       c)  $u \cdot v = 0$                       d) None of these

5) The matrix of the quadratic form  $Q(X) = 5x_1^2 + 3x_1x_2$  is

a)  $\begin{bmatrix} 0 & 3/2 \\ 3/2 & 5 \end{bmatrix}$                       b)  $\begin{bmatrix} 0 & 3 \\ 3 & 5 \end{bmatrix}$                       c)  $\begin{bmatrix} 5 & 3/2 \\ 3/2 & 0 \end{bmatrix}$                       d) None of these

6) The correlation coefficient  $r$  is negative if

- a)  $b_{yx}$  is negative                      b)  $b_{xy}$  is negative  
c) Both  $b_{yx}$  and  $b_{xy}$  are negative                      d) None of these

P.T.O.



7) If  $byx = \frac{5}{18}$ ,  $bxy = \frac{8}{5}$  then  $r =$

- a)  $\frac{2}{5}$                       b)  $\frac{1}{5}$                       c)  $\frac{2}{3}$                       d)  $\frac{3}{2}$

8) The equation of line of regression of  $y$  on  $x$  is

- a)  $x - \bar{x} = bxy (y - \bar{y})$                       b)  $x - \bar{x} = byx (y - \bar{y})$   
 c)  $y - \bar{y} = bxy (x - \bar{x})$                       d)  $y - \bar{y} = byx (x - \bar{x})$

9) The Mobius transformation  $W = \frac{az+b}{cz+d}$  is called normalised if

- a)  $ad - bc = 0$             b)  $ab - cd = 1$             c)  $ad - bc = 1$             d)  $ab - cd = 0$

10) The function  $W = Z^2$  is analytic

- a) everywhere            b) only at  $(0, 0)$             c) nowhere            d) none of these

11) Which system of equations corresponds to the following augmented matrix ?

$$\left[ \begin{array}{ccc|c} 1 & 2 & 0 & 3 \\ 0 & 1 & 3 & 6 \\ 0 & -1 & -1 & 4 \end{array} \right]$$

- a)  $a + 2b = 3$   
 $b + 3c = 6$   
 $b + c = 4$
- b)  $x + 2z = 3$   
 $x + 3y = 6$   
 $-x - y = -4$
- c)  $r + 2s = 3$   
 $s + 3t = 6$   
 $-s - t = 4$
- d)  $u + 2v = 3w + 3$   
 $v + 3w = 6$   
 $v + w = -4$

12) Given 1 is an eigen value of  $A = \begin{bmatrix} 2 & 5 & -6 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$  the other two eigen values are

- a) 2, -3                      b) -2, 3                      c) 0, 3                      d) 0, -3

13) If  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^4$ ,  $T(e_1) = [3, 1, 3, 1]$ ,  $T(e_2) = [-5, 2, 0, 0]$  where  $e_1 = [1, 0]$  and  $e_2 = [0, 1]$  then standard matrix of  $T$  is \_\_\_\_\_

- a)  $\begin{bmatrix} 3 & 1 & 3 & 1 \\ -5 & 2 & 0 & 0 \end{bmatrix}$             b)  $\begin{bmatrix} 3 & -5 \\ 1 & 2 \\ 3 & 0 \\ 1 & 0 \end{bmatrix}$             c)  $\begin{bmatrix} -5 & 2 & 0 & 0 \\ 3 & 1 & 3 & 1 \end{bmatrix}$             d)  $\begin{bmatrix} -5 & 3 \\ 2 & 1 \\ 0 & 3 \\ 0 & 1 \end{bmatrix}$

14) State which of the following is false ?

- a)  $A$  is invertible iff  $|A| \neq 0$                       b)  $|AB| = |A| \cdot |B|$   
 c)  $|A^T| = |A|$                       d)  $|AB| = |A| + |B|$



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**S.E. (E & E) (Part – II) (CGPA) Examination, 2017**  
**LINEAR ALGEBRA**

Day and Date : Tuesday, 21-11-2017  
 Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- N. B. :** 1) Attempt **any three** questions from **each** Section.  
 2) Figures to the **right** indicate **full** marks.  
 3) **Use** of calculator is **allowed**.

SECTION – I

2. Attempt **any three** of the following : **9**

a) Find an equation involving g, h and k that makes this augmented matrix correspond to a

consistent system 
$$\left[ \begin{array}{ccc|c} 1 & -4 & 7 & q \\ 0 & 3 & -5 & h \\ -2 & 5 & -9 & k \end{array} \right]$$

b) For what values of h will y be in span  $\{v_1, v_2, v_3\}$  if  $v_1 = \begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}$ ,  $v_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}$   $v_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}$

and  $y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$

c) Determine the columns of the matrix  $\begin{bmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{bmatrix}$  are linearly independent set.

Justify each answer.

d) Find the LU Factorization of following matrix  $\begin{bmatrix} 2 & 4 & -1 & 5 & -2 \\ -4 & -5 & 3 & -8 & 1 \\ 2 & -5 & -4 & 1 & 8 \\ -6 & 0 & 7 & -3 & 1 \end{bmatrix}$ .

3. a) Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be a linear transformation such that  $T(x_1, x_2) = (x_1 + x_2, 4x_1 + 5x_2)$ , Find X such that  $T(X) = (3, 8)$  **3**

b) Let the transformation T defined by  $T(X) = AX$ , find a vector X whose image under T is

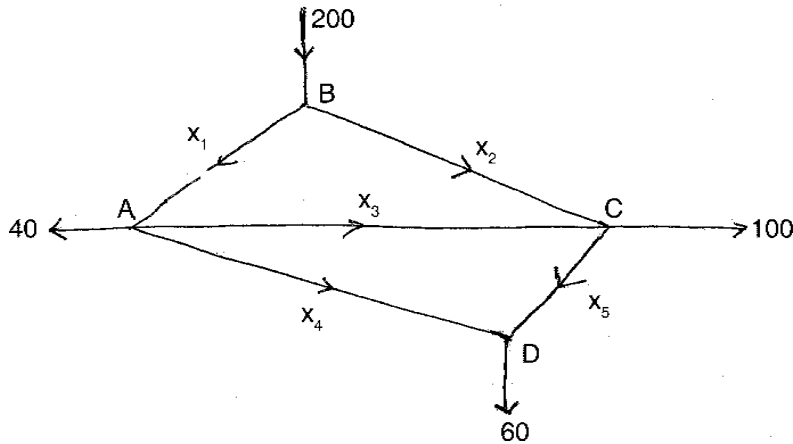
b where  $A = \begin{bmatrix} 1 & 0 & -2 \\ -2 & 1 & 6 \\ 3 & -2 & -5 \end{bmatrix}$ ,  $b = \begin{bmatrix} -1 \\ 7 \\ -3 \end{bmatrix}$ . **3**

**Set R**



c) Find the general traffic pattern in the free way network shown in the figure

4



4. a) Let  $b_1 = \begin{bmatrix} -9 \\ 1 \end{bmatrix}$ ,  $b_2 = \begin{bmatrix} -5 \\ -1 \end{bmatrix}$ ,  $c_1 = \begin{bmatrix} 1 \\ -4 \end{bmatrix}$ ,  $c_2 = \begin{bmatrix} 3 \\ -5 \end{bmatrix}$  and consider the bases for  $R^2$  given by  $B = \{b_1, b_2\}$  and  $C = \{c_1, c_2\}$ . Find the change of coordinates matrix from B to C.

4

b) If  $A = \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ -2 & 3 & -3 & -3 & -4 \\ 4 & -6 & 9 & 5 & 9 \\ -2 & 3 & 3 & -4 & 1 \end{bmatrix} \sim \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ 0 & 0 & 3 & -1 & 1 \\ 0 & 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$  Find rank of A and dimNull A.

Hence find basis for Null A.

5

5. a) Apply power method to  $A = \begin{bmatrix} 6 & 5 \\ 1 & 2 \end{bmatrix}$  with  $X_0 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$  stop when  $k = 5$ . Estimate the dominant eigen value and corresponding eigen vector of A.

3

b) Diagonalize the matrix if possible  $\begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$ .

3

c) Is  $\begin{bmatrix} 1 \\ 4 \end{bmatrix}$  an eigen vector of  $\begin{bmatrix} -3 & 1 \\ -3 & 8 \end{bmatrix}$ ? If so, find the eigen value.

3

SECTION – II

6. a) Find the matrix of the quadratic form assume that X is in  $R^3$  for  $8x_1^2 + 7x_2^2 - 3x_3^2 - 6x_1x_2 + 4x_1x_3 - 2x_2x_3$

4

OR

Set R





a) Find a least squares solution of  $AX = b$

$$A = \begin{bmatrix} 4 & 0 \\ 0 & 2 \\ 1 & 1 \end{bmatrix}, b = \begin{bmatrix} 2 \\ 0 \\ 11 \end{bmatrix}$$

4

b) Write down the quadratic form corresponding to the following matrix.

i)  $\begin{bmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}$       ii)  $\begin{bmatrix} 3 & -2 \\ -2 & 7 \end{bmatrix}$

3

c) Show that the set S of vectors in  $R^4$  is orthogonal set where  $S = \{u = (1, 2, -3, 4), v = (3, 4, 1, -2), w = (3, -2, 1, 1)\}$

3

7. a) Mean soil temperature and germination interval for winter in 1996-97 at 12 places are recorded below.

|                            |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|
| <b>Mean Soil temp. (n)</b> | 57 | 42 | 38 | 42 | 45 | 42 | 44 | 40 | 46 | 44 | 43 | 40 |
| <b>No. of days (y)</b>     | 10 | 26 | 41 | 29 | 27 | 27 | 19 | 18 | 19 | 31 | 29 | 33 |

Obtain the regression equation of germination interval (x) on mean soil temperature (y) and of temperature (y) on germination interval (x).

5

b) Find the coefficient of correlation between x and y from following data.

4

$$n = 25, \sum x = 100, \sum x^2 = 950, \sum y = 110, \sum y^2 = 850, \sum xy = 800.$$

8. a) The following results were obtained from marks in Applied mechanics and engineering mathematics in an examination.

|       | <b>Marks in App. Mech. (x)</b> | <b>Marks in Engg. Maths (y)</b> |
|-------|--------------------------------|---------------------------------|
| Mean  | 47.5                           | 39.5                            |
| S. D. | 16.8                           | 10.8                            |

$$r = 0.95$$

Find both the regression equations. Also estimate the value of y for x = 30.

3

b) The equations of the lines of regression are  $x + 2y = 5$  and  $2x + 3y = 8$ . Find  $\bar{x}$ ,  $\bar{y}$  and r.

3

c) Construct an analytic function whose real part is  $e^x \cdot \cos y$ .

3

9. a) Prove that the function  $f(z) = \frac{1}{z}$  is analytic and find  $f'(z)$ .

3

b) Show that  $u = y^3 - 3x^2y$  is a harmonic function. Find it's harmonic conjugate.

3

c) Evaluate  $\int_0^{1+i} (x^2 - iy) dy$  along the path

- i)  $y = x$
- ii)  $y = x^2$ .

3





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**S.E. (E & E) (Part – II) (CGPA) Examination, 2017**  
**LINEAR ALGEBRA**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- N. B. :**
- 1) Attempt **any three** questions from **each** Section.
  - 2) Figures to the **right** indicate **full** marks.
  - 3) **Use** of calculator is **allowed**.
  - 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. Choose the correct answers :

- 1) The correlation coefficient  $r$  is negative if
  - a)  $b_{yx}$  is negative
  - b)  $b_{xy}$  is negative
  - c) Both  $b_{yx}$  and  $b_{xy}$  are negative
  - d) None of these
- 2) If  $b_{yx} = \frac{5}{18}$ ,  $b_{xy} = \frac{8}{5}$  then  $r =$ 
  - a)  $\frac{2}{5}$
  - b)  $\frac{1}{5}$
  - c)  $\frac{2}{3}$
  - d)  $\frac{3}{2}$
- 3) The equation of line of regression of  $y$  on  $x$  is
  - a)  $x - \bar{x} = b_{yx}(y - \bar{y})$
  - b)  $x - \bar{x} = b_{xy}(y - \bar{y})$
  - c)  $y - \bar{y} = b_{yx}(x - \bar{x})$
  - d)  $y - \bar{y} = b_{xy}(x - \bar{x})$
- 4) The Mobius transformation  $W = \frac{az+b}{cz+d}$  is called normalised if
  - a)  $ad - bc = 0$
  - b)  $ab - cd = 1$
  - c)  $ad - bc = 1$
  - d)  $ab - cd = 0$
- 5) The function  $W = Z^2$  is analytic
  - a) everywhere
  - b) only at  $(0, 0)$
  - c) nowhere
  - d) none of these
- 6) Which system of equations corresponds to the following augmented matrix ?
 
$$\left[ \begin{array}{ccc|c} 1 & 2 & 0 & 3 \\ 0 & 1 & 3 & 6 \\ 0 & -1 & -1 & 4 \end{array} \right]$$
  - a)  $a + 2b = 3$   
 $b + 3c = 6$   
 $b + c = 4$
  - b)  $x + 2z = 3$   
 $x + 3y = 6$   
 $-x - y = -4$
  - c)  $r + 2s = 3$   
 $s + 3t = 6$   
 $-s - t = 4$
  - d)  $u + 2v = 3w + 3$   
 $v + 3w = 6$   
 $v + w = -4$

P.T.O.



7) Given 1 is an eigen value of  $A = \begin{bmatrix} 2 & 5 & -6 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$  the other two eigen values are

- a) 2, -3                      b) -2, 3                      c) 0, 3                      d) 0, -3

8) If  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^4$ ,  $T(e_1) = [3, 1, 3, 1]$ ,  $T(e_2) = [-5, 2, 0, 0]$  where  $e_1 = [1, 0]$  and  $e_2 = [0, 1]$  then standard matrix of T is \_\_\_\_\_

- a)  $\begin{bmatrix} 3 & 1 & 3 & 1 \\ -5 & 2 & 0 & 0 \end{bmatrix}$     b)  $\begin{bmatrix} 3 & -5 \\ 1 & 2 \\ 3 & 0 \\ 1 & 0 \end{bmatrix}$     c)  $\begin{bmatrix} -5 & 2 & 0 & 0 \\ 3 & 1 & 3 & 1 \end{bmatrix}$     d)  $\begin{bmatrix} -5 & 3 \\ 2 & 1 \\ 0 & 3 \\ 0 & 1 \end{bmatrix}$

9) State which of the following is false ?

- a) A is invertible iff  $|A| \neq 0$                       b)  $|AB| = |A| \cdot |B|$   
 c)  $|A^T| = |A|$                                               d)  $|AB| = |A| + |B|$

10) If  $B = \begin{bmatrix} 1 & 0 & 6 & 5 \\ 0 & 2 & 5 & 3 \\ 0 & 0 & 0 & 0 \end{bmatrix}$  then  $\dim(\text{Null } A)$  and  $\dim(\text{Col } A)$  are

- a) 2, 2                      b) 4, 1                      c) 2, 3                      d) 1, 3

11) The eigen values of  $A = \begin{bmatrix} 2 & 1 & 4 \\ 0 & -3 & 7 \\ 0 & 0 & -1 \end{bmatrix}$  are

- a) -2, 0, 1                      b) 0, 1, 3                      c) 1, 4, 7                      d) 2, -3, -1

12) Which of the following is true ?

- a)  $\text{rank } A + \dim \text{column} = m$                       b)  $\text{rank } A + \dim \text{Null } A = m$   
 c)  $\text{rank } A + \dim \text{column} = n$                       d)  $\text{rank } A + \dim \text{Null } A = n$

13) Two vectors u and v are orthogonal to each other if

- a)  $u + v = 0$                       b)  $u - v = 0$                       c)  $u \cdot v = 0$                       d) None of these

14) The matrix of the quadratic form  $Q(X) = 5x_1^2 + 3x_1x_2$  is

- a)  $\begin{bmatrix} 0 & 3/2 \\ 3/2 & 5 \end{bmatrix}$     b)  $\begin{bmatrix} 0 & 3 \\ 3 & 5 \end{bmatrix}$     c)  $\begin{bmatrix} 5 & 3/2 \\ 3/2 & 0 \end{bmatrix}$     d) None of these



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**S.E. (E & E) (Part – II) (CGPA) Examination, 2017**  
**LINEAR ALGEBRA**

Day and Date : Tuesday, 21-11-2017  
 Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- N. B. :** 1) Attempt **any three** questions from **each** Section.  
 2) Figures to the **right** indicate **full** marks.  
 3) **Use** of calculator is **allowed**.

SECTION – I

2. Attempt **any three** of the following : **9**

a) Find an equation involving g, h and k that makes this augmented matrix correspond to a

consistent system 
$$\left[ \begin{array}{ccc|c} 1 & -4 & 7 & q \\ 0 & 3 & -5 & h \\ -2 & 5 & -9 & k \end{array} \right]$$

b) For what values of h will y be in span  $\{v_1, v_2, v_3\}$  if  $v_1 = \begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}$ ,  $v_2 = \begin{bmatrix} 5 \\ -4 \\ -7 \end{bmatrix}$   $v_3 = \begin{bmatrix} -3 \\ 1 \\ 0 \end{bmatrix}$

and  $y = \begin{bmatrix} -4 \\ 3 \\ h \end{bmatrix}$

c) Determine the columns of the matrix  $\begin{bmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{bmatrix}$  are linearly independent set.

Justify each answer.

d) Find the LU Factorization of following matrix  $\begin{bmatrix} 2 & 4 & -1 & 5 & -2 \\ -4 & -5 & 3 & -8 & 1 \\ 2 & -5 & -4 & 1 & 8 \\ -6 & 0 & 7 & -3 & 1 \end{bmatrix}$ .

3. a) Let  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$  be a linear transformation such that  $T(x_1, x_2) = (x_1 + x_2, 4x_1 + 5x_2)$ , Find X such that  $T(X) = (3, 8)$  **3**

b) Let the transformation T defined by  $T(X) = AX$ , find a vector X whose image under T is

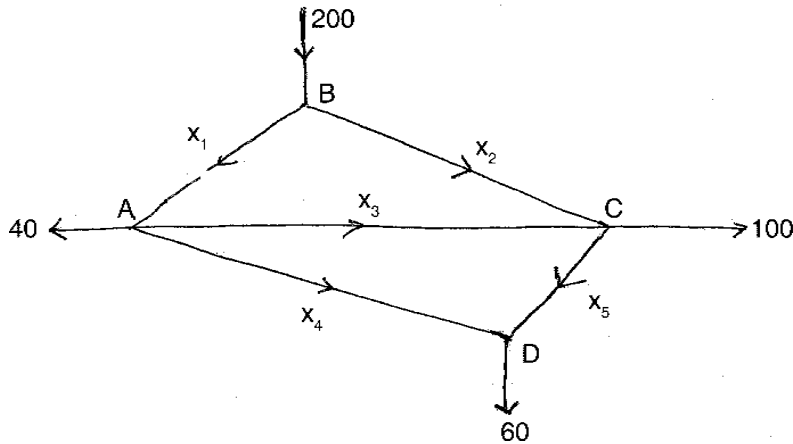
b where  $A = \begin{bmatrix} 1 & 0 & -2 \\ -2 & 1 & 6 \\ 3 & -2 & -5 \end{bmatrix}$ ,  $b = \begin{bmatrix} -1 \\ 7 \\ -3 \end{bmatrix}$ . **3**

**Set S**



c) Find the general traffic pattern in the free way network shown in the figure

4



4. a) Let  $b_1 = \begin{bmatrix} -9 \\ 1 \end{bmatrix}$ ,  $b_2 = \begin{bmatrix} -5 \\ -1 \end{bmatrix}$ ,  $c_1 = \begin{bmatrix} 1 \\ -4 \end{bmatrix}$ ,  $c_2 = \begin{bmatrix} 3 \\ -5 \end{bmatrix}$  and consider the bases for  $R^2$  given by  $B = \{b_1, b_2\}$  and  $c = \{c_1, c_2\}$ . Find the change of coordinates matrix from B to C.

4

b) If  $A = \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ -2 & 3 & -3 & -3 & -4 \\ 4 & -6 & 9 & 5 & 9 \\ -2 & 3 & 3 & -4 & 1 \end{bmatrix} \sim \begin{bmatrix} 2 & -3 & 6 & 2 & 5 \\ 0 & 0 & 3 & -1 & 1 \\ 0 & 0 & 0 & 1 & 3 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix}$  Find rank of A and dimNull A.

Hence find basis for Null A.

5

5. a) Apply power method to  $A = \begin{bmatrix} 6 & 5 \\ 1 & 2 \end{bmatrix}$  with  $X_0 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$  stop when  $k = 5$ . Estimate the dominant eigen value and corresponding eigen vector of A.

3

b) Diagonalize the matrix if possible  $\begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$ .

3

c) Is  $\begin{bmatrix} 1 \\ 4 \end{bmatrix}$  an eigen vector of  $\begin{bmatrix} -3 & 1 \\ -3 & 8 \end{bmatrix}$ ? If so, find the eigen value.

3

SECTION – II

6. a) Find the matrix of the quadratic form assume that X is in  $R^3$  for  $8x_1^2 + 7x_2^2 - 3x_3^2 - 6x_1x_2 + 4x_1x_3 - 2x_2x_3$

4

OR



a) Find a least squares solution of  $AX = b$

$$A = \begin{bmatrix} 4 & 0 \\ 0 & 2 \\ 1 & 1 \end{bmatrix}, b = \begin{bmatrix} 2 \\ 0 \\ 11 \end{bmatrix}$$

4

b) Write down the quadratic form corresponding to the following matrix.

i)  $\begin{bmatrix} 0 & 5 & -1 \\ 5 & 1 & 6 \\ -1 & 6 & 2 \end{bmatrix}$       ii)  $\begin{bmatrix} 3 & -2 \\ -2 & 7 \end{bmatrix}$

3

c) Show that the set S of vectors in  $R^4$  is orthogonal set where  $S = \{u = (1, 2, -3, 4), v = (3, 4, 1, -2), w = (3, -2, 1, 1)\}$

3

7. a) Mean soil temperature and germination interval for winter in 1996-97 at 12 places are recorded below.

|                            |    |    |    |    |    |    |    |    |    |    |    |    |
|----------------------------|----|----|----|----|----|----|----|----|----|----|----|----|
| <b>Mean Soil temp. (n)</b> | 57 | 42 | 38 | 42 | 45 | 42 | 44 | 40 | 46 | 44 | 43 | 40 |
| <b>No. of days (y)</b>     | 10 | 26 | 41 | 29 | 27 | 27 | 19 | 18 | 19 | 31 | 29 | 33 |

Obtain the regression equation of germination interval (x) on mean soil temperature (y) and of temperature (y) on germination interval (x).

5

b) Find the coefficient of correlation between x and y from following data.

4

$$n = 25, \sum x = 100, \sum x^2 = 950, \sum y = 110, \sum y^2 = 850, \sum xy = 800.$$

8. a) The following results were obtained from marks in Applied mechanics and engineering mathematics in an examination.

|       | <b>Marks in App. Mech. (x)</b> | <b>Marks in Engg. Maths (y)</b> |
|-------|--------------------------------|---------------------------------|
| Mean  | 47.5                           | 39.5                            |
| S. D. | 16.8                           | 10.8                            |

$$r = 0.95$$

Find both the regression equations. Also estimate the value of y for x = 30.

3

b) The equations of the lines of regression are  $x + 2y = 5$  and  $2x + 3y = 8$ . Find  $\bar{x}$ ,  $\bar{y}$  and r.

3

c) Construct an analytic function whose real part is  $e^x \cdot \cos y$ .

3

9. a) Prove that the function  $f(z) = \frac{1}{z}$  is analytic and find  $f'(z)$ .

3

b) Show that  $u = y^3 - 3x^2y$  is a harmonic function. Find it's harmonic conjugate.

3

c) Evaluate  $\int_0^{1+i} (x^2 - iy) dy$  along the path

- i)  $y = x$
- ii)  $y = x^2$ .

3







SLR-TJ – 444

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**S.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
AC MACHINES**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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 alternatives :

(1×14=14)

- 1) The crawling in the induction motor is caused by
  - a) Improper design of the machine
  - b) Low supply voltage
  - c) High loads
  - d) Harmonics developed in the motor
- 2) Iron losses in the rotor of a 3-phase induction motor are negligible, because
  - a) Frequency of rotor emf is too low
  - b) Flux linking the rotor is of constant magnitude
  - c) Flux density in the rotor parts is too low
  - d) None of the above
- 3) The term 'cogging' is associated with
  - a) Transformers
  - b) Compound generator
  - c) DC series motor
  - d) Induction motor
- 4) The no-load current of a 3-phase induction motor in terms of its full-load current is of the order of
  - a) 5%
  - b) 10%
  - c) 25%
  - d) 50%
- 5) A capacitor start capacitor run single phase induction motor will usually have
  - a) Low p.f.
  - b) High p.f.
  - c) Low efficiency
  - d) High starting torque

P.T.O.



- 6) The torque developed by a split phase motor is proportional to
- a) Sine of angle between  $I_m$  and  $I_s$
  - b) Cosine of angle between  $I_m$  and  $I_s$
  - c) Main winding current,  $I_m$
  - d) Auxiliary winding current,  $I_s$
- 7) Large air-gap in 3-phase induction motor
- a) Increases pf
  - b) Decreases pf
  - c) Unaffected on pf
  - d) None of the above
- 8) Alternator field is excited by
- a) AC supply
  - b) DC supply
  - c) Pulse supply
  - d) Triangular wave supply
- 9) Rating of alternator is expressed in
- a) KW
  - b) HP
  - c) KVA
  - d) KVAR
- 10) The synchronous motor is operating at 0.5 p.f. leading. The excitation is called
- a) Over
  - b) Under
  - c) Normal
  - d) Super
- 11) Magnetizing current drawn by induction motor is the cause of their \_\_\_\_\_ power factor.
- a) Zero
  - b) Unity
  - c) Lagging
  - d) Leading
- 12) Salient poles are generally used on
- a) High speed prime movers only
  - b) Medium speed prime movers only
  - c) Low speed prime movers only
  - d) Low and medium speed prime movers
- 13) Magnitude of EMF generated by an alternator depends upon
- a) No. of poles
  - b) Rotor speed
  - c) Flux per pole
  - d) All of the above
- 14) KVA rating of alternator delivering a load of 100 KW at 0.8 p.f. is
- a) 80 KVA
  - b) 100 KVA
  - c) 200 KVA
  - d) 0 KVA
-



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**S.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
AC MACHINES**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any four** : **(4×4=16)**
- a) Derive the condition for maximum running torque of an induction motor.
  - b) An 8-pole, 3-phase, 50Hz induction motor running with a slip of 4% is taking 20 kW. Stator losses amount to 0.5 kW. If the mechanical torque lost in friction is 16.25 N-m, find (i) BHP (ii) Efficiency.
  - c) What is the necessity of starters ? Explain about star-delta starter with neat diagram. Derive the relation between the  $T_{st}$  and  $T_{fl}$ .
  - d) Derive :  $P_i : P_c : P_m = I : S : (1 - S)$ . Where  $P_i$  = Rotor input ;  $P_c$  = Rotor Cu loss and  $P_m$  = Mechanical power developed.
  - e) Draw slip-torque characteristics of 3-phase induction motor when rotor resistance  $R_2$  is varied. Explain the shapes of the curve why are modified in such shapes.
3. Attempt **any two** : **(2×6=12)**
- a) Give the constructional details of 3 phase induction motor with suitable sketches.
  - b) A 100 kW, 3300 V, 50Hz, 3- phase, Y connected induction motor has a  $N_s = 500$  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.
  - c) Explain how rotating magnetic field is created when 3-phase supply voltage is given to the stator winding. Give the important assumptions in this case.

Set P



## SECTION – II

4. Attempt **any four** : **(4×4=16)**
- a) What is armature reaction in alternators and what effect will it produce for R-C load ?
  - b) Explain parallel operation of two alternators.
  - c) Write the industrial applications of synchronous motor.
  - d) Derive the power equation for smooth cylindrical rotor alternator.
  - e) Derive EMF equation of alternator with short pitched coils and distributed winding.
5. Attempt **any two** : **(2×6=12)**
- a) With neat vector diagram explain V and inverted V curves of synchronous motor. Draw both the curves.
  - b) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs  $\delta$  characteristics.
  - c) Find the no load line voltage of a star connected 4 pole, 50 Hz alternator from the following data :  
Flux per pole = 0.12 Wb ; no. of slots/pole = 4 ; conductors/slot = 4 ; two layer winding with coil span 150 degrees.
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SLR-TJ – 444

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Examination, 2017  
AC MACHINES**

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**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct alternatives :

(1×14=14)

1) Alternator field is excited by

- |                 |                           |
|-----------------|---------------------------|
| a) AC supply    | b) DC supply              |
| c) Pulse supply | d) Triangular wave supply |

2) Rating of alternator is expressed in

- |        |         |
|--------|---------|
| a) KW  | b) HP   |
| c) KVA | d) KVAR |

3) The synchronous motor is operating at 0.5 p.f. leading. The excitation is called

- |           |          |
|-----------|----------|
| a) Over   | b) Under |
| c) Normal | d) Super |

4) Magnetizing current drawn by induction motor is the cause of their \_\_\_\_\_ power factor.

- |         |          |            |            |
|---------|----------|------------|------------|
| a) Zero | b) Unity | c) Lagging | d) Leading |
|---------|----------|------------|------------|

5) Salient poles are generally used on

- |                                      |
|--------------------------------------|
| a) High speed prime movers only      |
| b) Medium speed prime movers only    |
| c) Low speed prime movers only       |
| d) Low and medium speed prime movers |

P.T.O.



- 6) Magnitude of EMF generated by an alternator depends upon
- a) No. of poles
  - b) Rotor speed
  - c) Flux per pole
  - d) All of the above
- 7) KVA rating of alternator delivering a load of 100 KW at 0.8 p.f. is
- a) 80 KVA
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- a) Transformers
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- a) 5%
  - b) 10%
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  - c) Main winding current,  $I_m$
  - d) Auxiliary winding current,  $I_s$
- 14) Large air-gap in 3-phase induction motor
- a) Increases pf
  - b) Decreases pf
  - c) Unaffected on pf
  - d) None of the above
-



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**S.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
AC MACHINES**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any four** : **(4×4=16)**
- a) Derive the condition for maximum running torque of an induction motor.
  - b) An 8-pole, 3-phase, 50Hz induction motor running with a slip of 4% is taking 20 kW. Stator losses amount to 0.5 kW. If the mechanical torque lost in friction is 16.25 N-m, find (i) BHP (ii) Efficiency.
  - c) What is the necessity of starters ? Explain about star-delta starter with neat diagram. Derive the relation between the  $T_{st}$  and  $T_{fl}$ .
  - d) Derive :  $P_i : P_c : P_m = I : S : (1 - S)$ . Where  $P_i$  = Rotor input ;  $P_c$  = Rotor Cu loss and  $P_m$  = Mechanical power developed.
  - e) Draw slip-torque characteristics of 3-phase induction motor when rotor resistance  $R_2$  is varied. Explain the shapes of the curve why are modified in such shapes.
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  - b) A 100 kW, 3300 V, 50Hz, 3- phase, Y connected induction motor has a  $N_s = 500$  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
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    - ii) The line current.
  - c) Explain how rotating magnetic field is created when 3-phase supply voltage is given to the stator winding. Give the important assumptions in this case.

**Set Q**



## SECTION – II

4. Attempt **any four** : **(4×4=16)**
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  - b) Explain parallel operation of two alternators.
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  - d) Derive the power equation for smooth cylindrical rotor alternator.
  - e) Derive EMF equation of alternator with short pitched coils and distributed winding.
5. Attempt **any two** : **(2×6=12)**
- a) With neat vector diagram explain V and inverted V curves of synchronous motor. Draw both the curves.
  - b) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs  $\delta$  characteristics.
  - c) Find the no load line voltage of a star connected 4 pole, 50 Hz alternator from the following data :  
Flux per pole = 0.12 Wb ; no. of slots/pole = 4 ; conductors/slot = 4 ; two layer winding with coil span 150 degrees.
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SLR-TJ – 444

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Set **R**

**S.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
AC MACHINES**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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 alternatives :

**(1×14=14)**

- 1) A capacitor start capacitor run single phase induction motor will usually have
  - a) Low p.f.
  - b) High p.f.
  - c) Low efficiency
  - d) High starting torque
- 2) The torque developed by a split phase motor is proportional to
  - a) Sine of angle between  $I_m$  and  $I_s$
  - b) Cosine of angle between  $I_m$  and  $I_s$
  - c) Main winding current,  $I_m$
  - d) Auxiliary winding current,  $I_s$
- 3) Large air-gap in 3-phase induction motor
  - a) Increases pf
  - b) Decreases pf
  - c) Unaffected on pf
  - d) None of the above
- 4) Alternator field is excited by
  - a) AC supply
  - b) DC supply
  - c) Pulse supply
  - d) Triangular wave supply
- 5) Rating of alternator is expressed in
  - a) KW
  - b) HP
  - c) KVA
  - d) KVAR

P.T.O.





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**S.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
AC MACHINES**

Day and Date : Wednesday, 22-11-2017

Marks : 56

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

SECTION – I

2. Attempt **any four** : **(4×4=16)**

- a) Derive the condition for maximum running torque of an induction motor.
- b) An 8-pole, 3-phase, 50Hz induction motor running with a slip of 4% is taking 20 kW. Stator losses amount to 0.5 kW. If the mechanical torque lost in friction is 16.25 N-m, find (i) BHP (ii) Efficiency.
- c) What is the necessity of starters ? Explain about star-delta starter with neat diagram. Derive the relation between the  $T_{st}$  and  $T_{fl}$ .
- d) Derive :  $P_i : P_c : P_m = I : S : (1 - S)$ . Where  $P_i$  = Rotor input ;  $P_c$  = Rotor Cu loss and  $P_m$  = Mechanical power developed.
- e) Draw slip-torque characteristics of 3-phase induction motor when rotor resistance  $R_2$  is varied. Explain the shapes of the curve why are modified in such shapes.

3. Attempt **any two** : **(2×6=12)**

- a) Give the constructional details of 3 phase induction motor with suitable sketches.
- b) A 100 kW, 3300 V, 50Hz, 3- phase, Y connected induction motor has a  $N_s = 500$  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.
- c) Explain how rotating magnetic field is created when 3-phase supply voltage is given to the stator winding. Give the important assumptions in this case.

**Set R**



## SECTION – II

4. Attempt **any four** : **(4×4=16)**
- a) What is armature reaction in alternators and what effect will it produce for R-C load ?
  - b) Explain parallel operation of two alternators.
  - c) Write the industrial applications of synchronous motor.
  - d) Derive the power equation for smooth cylindrical rotor alternator.
  - e) Derive EMF equation of alternator with short pitched coils and distributed winding.
5. Attempt **any two** : **(2×6=12)**
- a) With neat vector diagram explain V and inverted V curves of synchronous motor. Draw both the curves.
  - b) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs  $\delta$  characteristics.
  - c) Find the no load line voltage of a star connected 4 pole, 50 Hz alternator from the following data :  
Flux per pole = 0.12 Wb ; no. of slots/pole = 4 ; conductors/slot = 4 ; two layer winding with coil span 150 degrees.
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SLR-TJ – 444

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**S.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
AC MACHINES**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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 alternatives :

(1×14=14)

- 1) The synchronous motor is operating at 0.5 p.f. leading. The excitation is called
  - a) Over
  - b) Under
  - c) Normal
  - d) Super
- 2) Magnetizing current drawn by induction motor is the cause of their \_\_\_\_\_ power factor.
  - a) Zero
  - b) Unity
  - c) Lagging
  - d) Leading
- 3) Salient poles are generally used on
  - a) High speed prime movers only
  - b) Medium speed prime movers only
  - c) Low speed prime movers only
  - d) Low and medium speed prime movers
- 4) Magnitude of EMF generated by an alternator depends upon
  - a) No. of poles
  - b) Rotor speed
  - c) Flux per pole
  - d) All of the above
- 5) KVA rating of alternator delivering a load of 100 KW at 0.8 p.f. is
  - a) 80 KVA
  - b) 100 KVA
  - c) 200 KVA
  - d) 0 KVA

P.T.O.



- 6) The crawling in the induction motor is caused by
- a) Improper design of the machine
  - b) Low supply voltage
  - c) High loads
  - d) Harmonics developed in the motor
- 7) Iron losses in the rotor of a 3-phase induction motor are negligible, because
- a) Frequency of rotor emf is too low
  - b) Flux linking the rotor is of constant magnitude
  - c) Flux density in the rotor parts is too low
  - d) None of the above
- 8) The term 'cogging' is associated with
- a) Transformers
  - b) Compound generator
  - c) DC series motor
  - d) Induction motor
- 9) The no-load current of a 3-phase induction motor in terms of its full-load current is of the order of
- a) 5%
  - b) 10%
  - c) 25%
  - d) 50%
- 10) A capacitor start capacitor run single phase induction motor will usually have
- a) Low p.f.
  - b) High p.f.
  - c) Low efficiency
  - d) High starting torque
- 11) The torque developed by a split phase motor is proportional to
- a) Sine of angle between  $I_m$  and  $I_s$
  - b) Cosine of angle between  $I_m$  and  $I_s$
  - c) Main winding current,  $I_m$
  - d) Auxiliary winding current,  $I_s$
- 12) Large air-gap in 3-phase induction motor
- a) Increases pf
  - b) Decreases pf
  - c) Unaffected on pf
  - d) None of the above
- 13) Alternator field is excited by
- a) AC supply
  - b) DC supply
  - c) Pulse supply
  - d) Triangular wave supply
- 14) Rating of alternator is expressed in
- a) KW
  - b) HP
  - c) KVA
  - d) KVAR
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**S.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
AC MACHINES**

Day and Date : Wednesday, 22-11-2017

Marks : 56

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

SECTION – I

2. Attempt **any four** : **(4×4=16)**

- a) Derive the condition for maximum running torque of an induction motor.
- b) An 8-pole, 3-phase, 50Hz induction motor running with a slip of 4% is taking 20 kW. Stator losses amount to 0.5 kW. If the mechanical torque lost in friction is 16.25 N-m, find (i) BHP (ii) Efficiency.
- c) What is the necessity of starters ? Explain about star-delta starter with neat diagram. Derive the relation between the  $T_{st}$  and  $T_{fl}$ .
- d) Derive :  $P_i : P_c : P_m = I : S : (1 - S)$ . Where  $P_i$  = Rotor input ;  $P_c$  = Rotor Cu loss and  $P_m$  = Mechanical power developed.
- e) Draw slip-torque characteristics of 3-phase induction motor when rotor resistance  $R_2$  is varied. Explain the shapes of the curve why are modified in such shapes.

3. Attempt **any two** : **(2×6=12)**

- a) Give the constructional details of 3 phase induction motor with suitable sketches.
- b) A 100 kW, 3300 V, 50Hz, 3- phase, Y connected induction motor has a  $N_s = 500$  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.
- c) Explain how rotating magnetic field is created when 3-phase supply voltage is given to the stator winding. Give the important assumptions in this case.

**Set S**



## SECTION – II

4. Attempt **any four** : **(4×4=16)**
- a) What is armature reaction in alternators and what effect will it produce for R-C load ?
  - b) Explain parallel operation of two alternators.
  - c) Write the industrial applications of synchronous motor.
  - d) Derive the power equation for smooth cylindrical rotor alternator.
  - e) Derive EMF equation of alternator with short pitched coils and distributed winding.
5. Attempt **any two** : **(2×6=12)**
- a) With neat vector diagram explain V and inverted V curves of synchronous motor. Draw both the curves.
  - b) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs  $\delta$  characteristics.
  - c) Find the no load line voltage of a star connected 4 pole, 50 Hz alternator from the following data :  
Flux per pole = 0.12 Wb ; no. of slots/pole = 4 ; conductors/slot = 4 ; two layer winding with coil span 150 degrees.
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Set **P**

**S.E. (E and E) (Part – II) (CGPA) Examination, 2017  
ELECTRICAL AND ELECTRONICS MEASUREMENTS**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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 mark each)**

- 1) In the single phase induction meter, in order to obtain true value of energy, the shunt magnet flux should lag behind the applied voltage by
  - a)  $90^\circ$
  - b)  $0^\circ$
  - c)  $45^\circ$
  - d) None of the above
- 2) The most preferred material for the control spring is
  - a) German silver
  - b) Platinum silver
  - c) Silicon bronze
  - d) Phosphor bronze
- 3) A CT has rating of 100/5 A. Its magnetizing and loss component of exciting current are 1A and 0.6A respectively and secondary winding burden is purely resistive, its transformation ratio at rated current is
  - a) 20.12
  - b) 20.2
  - c) 200.2
  - d) none
- 4) In frequency multiplexing system, if the subcarrier frequency deviations are proportional to centre frequency, scheme is referred to having
  - a) Proportional to bandwidth format
  - b) Constant bandwidth format
  - c) Variable bandwidth format
  - d) Consistent bandwidth format

P.T.O.



- 5) Which of the following devices may be used for extending the range of instruments ?
- Shunts
  - Multipliers
  - Current transformers and potential transformers
  - All of the above
- 6) A dynamometer wattmeter can be used for
- both D.C. and A.C.
  - D.C. only
  - A.C. only
  - any of the above
- 7) In a low power factor wattmeter the pressure coil is connected
- to the supply side of the current coil
  - to the load side of the current coil
  - in any of the two meters at connection
  - none of the above
- 8) In a 3-phase power measurement by two wattmeter method, both the watt meters had identical readings. The power factor of the load was
- unity
  - 0.8 lagging
  - 0.8 leading
  - zero
- 9) The adjustment of position of shading bands, in an energy meter is done to provide
- friction compensation
  - creep compensation
  - braking torque
  - none of the above
- 10) An ohmmeter is a
- moving iron instrument
  - moving coil instrument
  - dynamometer instrument
  - none of the above
- 11) The electrical power to a meggar is provided by
- battery
  - permanent magnet D.C. generator
  - AC. Generator
  - any of the above
- 12) For measurement of inductance having high value, we should use
- Maxwell's bridge
  - Maxwell Wein bridge
  - Hay's bridge
  - Any of the above
- 13) For handling greater currents induction wattmeters are used in conjunction with
- potential transformers
  - current transformers
  - power transformers
  - either of the above
- 14) In terms of the division on screen, the voltage of the waveform in CRO is
- average voltage
  - rms voltage
  - peak to peak voltage
  - maximum voltage



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**S.E. (E and E) (Part – II) (CGPA) Examination, 2017  
ELECTRICAL AND ELECTRONICS MEASUREMENTS**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**SECTION – I**

2. Attempt **any four** questions : **(4×4=16)**

- a) Explain construction and working of LPF wattmeter in detail.
- b) Derive the torque equation for moving iron instruments.
- c) Explain Kelvin's double bridge for measurement of unknown resistance.
- d) Explain construction and operation of MI type instrument.
- e) Explain construction and operation of potential transformer in detail.
- f) Explain construction and working of electrodynamic type wattmeter with neat diagram.

3. Attempt **any two** : **(6×2=12)**

- a) A 1000/5A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of  $1.6\Omega$ . The primary winding has one turn. Calculate flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5W at full load. The magnetizing mmf is 100A.
- b) Explain the effect of power factor on the readings of wattmeter.
- c) Explain the Anderson's bridge with neat phasor diagram at balanced condition.



## SECTION – II

4. Solve **any four** : **(4×4=16)**
- 1) Explain X-Y recorder with neat diagram.
  - 2) Explain working of Q-meter with neat diagram.
  - 3) Explain resistance thermometer with neat diagram.
  - 4) Explain true rms reading voltmeter with neat diagram.
  - 5) Explain LCD display with diagram also states its advantages.
  - 6) State selection criteria for transducer.
5. Solve **any two** : **(6×2=12)**
- 1) Explain construction and operation of dual trace oscilloscope.
  - 2) With neat sketch describe an electronic multimeter for different parameter measurement.
  - 3) Explain construction and working of LVDT also state its advantages and disadvantages.
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Set **Q**

**S.E. (E and E) (Part – II) (CGPA) Examination, 2017  
ELECTRICAL AND ELECTRONICS MEASUREMENTS**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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 mark each)**

- 1) In a 3-phase power measurement by two wattmeter method, both the watt meters had identical readings. The power factor of the load was
  - a) unity
  - b) 0.8 lagging
  - c) 0.8 leading
  - d) zero
- 2) The adjustment of position of shading bands, in an energy meter is done to provide
  - a) friction compensation
  - b) creep compensation
  - c) braking torque
  - d) none of the above
- 3) An ohmmeter is a
  - a) moving iron instrument
  - b) moving coil instrument
  - c) dynamometer instrument
  - d) none of the above
- 4) The electrical power to a meggar is provided by
  - a) battery
  - b) permanent magnet D.C. generator
  - c) AC. Generator
  - d) any of the above
- 5) For measurement of inductance having high value, we should use
  - a) Maxwell's bridge
  - b) Maxwell Wein bridge
  - c) Hay's bridge
  - d) Any of the above

P.T.O.



- 6) For handling greater currents induction wattmeters are used in conjunction with
- a) potential transformers
  - b) current transformers
  - c) power transformers
  - d) either of the above
- 7) In terms of the division on screen, the voltage of the waveform in CRO is
- a) average voltage
  - b) rms voltage
  - c) peak to peak voltage
  - d) maximum voltage
- 8) In the single phase induction meter, in order to obtain true value of energy, the shunt magnet flux should lag behind the applied voltage by
- a)  $90^\circ$
  - b)  $0^\circ$
  - c)  $45^\circ$
  - d) None of the above
- 9) The most preferred material for the control spring is
- a) German silver
  - b) Platinum silver
  - c) Silicon bronze
  - d) Phosphor bronze
- 10) A CT has rating of 100/5 A. Its magnetizing and loss component of exciting current are 1A and 0.6A respectively and secondary winding burden is purely resistive, its transformation ratio at rated current is
- a) 20.12
  - b) 20.2
  - c) 200.2
  - d) none
- 11) In frequency multiplexing system, if the subcarrier frequency deviations are proportional to centre frequency, scheme is referred to having
- a) Proportional to bandwidth format
  - b) Constant bandwidth format
  - c) Variable bandwidth format
  - d) Consistent bandwidth format
- 12) Which of the following devices may be used for extending the range of instruments ?
- a) Shunts
  - b) Multipliers
  - c) Current transformers and potential transformers
  - d) All of the above
- 13) A dynamometer wattmeter can be used for
- a) both D.C. and A.C.
  - b) D.C. only
  - c) A.C. only
  - d) any of the above
- 14) In a low power factor wattmeter the pressure coil is connected
- a) to the supply side of the current coil
  - b) to the load side of the current coil
  - c) in any of the two meters at connection
  - d) none of the above



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**S.E. (E and E) (Part – II) (CGPA) Examination, 2017  
ELECTRICAL AND ELECTRONICS MEASUREMENTS**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**SECTION – I**

2. Attempt **any four** questions : **(4×4=16)**

- a) Explain construction and working of LPF wattmeter in detail.
- b) Derive the torque equation for moving iron instruments.
- c) Explain Kelvin's double bridge for measurement of unknown resistance.
- d) Explain construction and operation of MI type instrument.
- e) Explain construction and operation of potential transformer in detail.
- f) Explain construction and working of electrodynamic type wattmeter with neat diagram.

3. Attempt **any two** : **(6×2=12)**

- a) A 1000/5A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of  $1.6\Omega$ . The primary winding has one turn. Calculate flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5W at full load. The magnetizing mmf is 100A.
- b) Explain the effect of power factor on the readings of wattmeter.
- c) Explain the Anderson's bridge with neat phasor diagram at balanced condition.



## SECTION – II

4. Solve **any four** : **(4×4=16)**
- 1) Explain X-Y recorder with neat diagram.
  - 2) Explain working of Q-meter with neat diagram.
  - 3) Explain resistance thermometer with neat diagram.
  - 4) Explain true rms reading voltmeter with neat diagram.
  - 5) Explain LCD display with diagram also states its advantages.
  - 6) State selection criteria for transducer.
5. Solve **any two** : **(6×2=12)**
- 1) Explain construction and operation of dual trace oscilloscope.
  - 2) With neat sketch describe an electronic multimeter for different parameter measurement.
  - 3) Explain construction and working of LVDT also state its advantages and disadvantages.
-





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Set **R**

**S.E. (E and E) (Part – II) (CGPA) Examination, 2017  
ELECTRICAL AND ELECTRONICS MEASUREMENTS**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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 mark each)**

- 1) Which of the following devices may be used for extending the range of instruments ?
  - a) Shunts
  - b) Multipliers
  - c) Current transformers and potential transformers
  - d) All of the above
- 2) A dynamometer wattmeter can be used for
  - a) both D.C. and A.C.
  - b) D.C. only
  - c) A.C. only
  - d) any of the above
- 3) In a low power factor wattmeter the pressure coil is connected
  - a) to the supply side of the current coil
  - b) to the load side of the current coil
  - c) in any of the two meters at connection
  - d) none of the above
- 4) In a 3-phase power measurement by two wattmeter method, both the watt meters had identical readings. The power factor of the load was
  - a) unity
  - b) 0.8 lagging
  - c) 0.8 leading
  - d) zero

P.T.O.



- 5) The adjustment of position of shading bands, in an energy meter is done to provide
- a) friction compensation
  - b) creep compensation
  - c) braking torque
  - d) none of the above
- 6) An ohmmeter is a
- a) moving iron instrument
  - b) moving coil instrument
  - c) dynamometer instrument
  - d) none of the above
- 7) The electrical power to a meggar is provided by
- a) battery
  - b) permanent magnet D.C. generator
  - c) AC. Generator
  - d) any of the above
- 8) For measurement of inductance having high value, we should use
- a) Maxwell's bridge
  - b) Maxwell Wein bridge
  - c) Hay's bridge
  - d) Any of the above
- 9) For handling greater currents induction wattmeters are used in conjunction with
- a) potential transformers
  - b) current transformers
  - c) power transformers
  - d) either of the above
- 10) In terms of the division on screen, the voltage of the waveform in CRO is
- a) average voltage
  - b) rms voltage
  - c) peak to peak voltage
  - d) maximum voltage
- 11) In the single phase induction meter, in order to obtain true value of energy, the shunt magnet flux should lag behind the applied voltage by
- a)  $90^\circ$
  - b)  $0^\circ$
  - c)  $45^\circ$
  - d) None of the above
- 12) The most preferred material for the control spring is
- a) German silver
  - b) Platinum silver
  - c) Silicon bronze
  - d) Phosphor bronze
- 13) A CT has rating of 100/5 A. Its magnetizing and loss component of exciting current are 1A and 0.6A respectively and secondary winding burden is purely resistive, its transformation ratio at rated current is
- a) 20.12
  - b) 20.2
  - c) 200.2
  - d) none
- 14) In frequency multiplexing system, if the subcarrier frequency deviations are proportional to centre frequency, scheme is referred to having
- a) Proportional to bandwidth format
  - b) Constant bandwidth format
  - c) Variable bandwidth format
  - d) Consistent bandwidth format



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**S.E. (E and E) (Part – II) (CGPA) Examination, 2017  
ELECTRICAL AND ELECTRONICS MEASUREMENTS**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**SECTION – I**

2. Attempt **any four** questions : **(4×4=16)**
- a) Explain construction and working of LPF wattmeter in detail.
  - b) Derive the torque equation for moving iron instruments.
  - c) Explain Kelvin's double bridge for measurement of unknown resistance.
  - d) Explain construction and operation of MI type instrument.
  - e) Explain construction and operation of potential transformer in detail.
  - f) Explain construction and working of electrodynamic type wattmeter with neat diagram.
3. Attempt **any two** : **(6×2=12)**
- a) A 1000/5A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of  $1.6\Omega$ . The primary winding has one turn. Calculate flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5W at full load. The magnetizing mmf is 100A.
  - b) Explain the effect of power factor on the readings of wattmeter.
  - c) Explain the Anderson's bridge with neat phasor diagram at balanced condition.



## SECTION – II

4. Solve **any four** : **(4×4=16)**
- 1) Explain X-Y recorder with neat diagram.
  - 2) Explain working of Q-meter with neat diagram.
  - 3) Explain resistance thermometer with neat diagram.
  - 4) Explain true rms reading voltmeter with neat diagram.
  - 5) Explain LCD display with diagram also states its advantages.
  - 6) State selection criteria for transducer.
5. Solve **any two** : **(6×2=12)**
- 1) Explain construction and operation of dual trace oscilloscope.
  - 2) With neat sketch describe an electronic multimeter for different parameter measurement.
  - 3) Explain construction and working of LVDT also state its advantages and disadvantages.
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SLR-TJ – 445

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**S.E. (E and E) (Part – II) (CGPA) Examination, 2017  
ELECTRICAL AND ELECTRONICS MEASUREMENTS**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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 mark each)

- 1) An ohmmeter is a
  - a) moving iron instrument
  - b) moving coil instrument
  - c) dynamometer instrument
  - d) none of the above
- 2) The electrical power to a meggar is provided by
  - a) battery
  - b) permanent magnet D.C. generator
  - c) AC. Generator
  - d) any of the above
- 3) For measurement of inductance having high value, we should use
  - a) Maxwell's bridge
  - b) Maxwell Wein bridge
  - c) Hay's bridge
  - d) Any of the above
- 4) For handling greater currents induction wattmeters are used in conjunction with
  - a) potential transformers
  - b) current transformers
  - c) power transformers
  - d) either of the above
- 5) In terms of the division on screen, the voltage of the waveform in CRO is
  - a) average voltage
  - b) rms voltage
  - c) peak to peak voltage
  - d) maximum voltage

P.T.O.



- 6) In the single phase induction meter, in order to obtain true value of energy, the shunt magnet flux should lag behind the applied voltage by  
a)  $90^\circ$                       b)  $0^\circ$                       c)  $45^\circ$                       d) None of the above
- 7) The most preferred material for the control spring is  
a) German silver                      b) Platinum silver  
c) Silicon bronze                      d) Phosphor bronze
- 8) A CT has rating of 100/5 A. Its magnetizing and loss component of exciting current are 1A and 0.6A respectively and secondary winding burden is purely resistive, its transformation ratio at rated current is  
a) 20.12                      b) 20.2                      c) 200.2                      d) none
- 9) In frequency multiplexing system, if the subcarrier frequency deviations are proportional to centre frequency, scheme is referred to having  
a) Proportional to bandwidth format  
b) Constant bandwidth format  
c) Variable bandwidth format  
d) Consistent bandwidth format
- 10) Which of the following devices may be used for extending the range of instruments ?  
a) Shunts  
b) Multipliers  
c) Current transformers and potential transformers  
d) All of the above
- 11) A dynamometer wattmeter can be used for  
a) both D.C. and A.C.                      b) D.C. only  
c) A.C. only                      d) any of the above
- 12) In a low power factor wattmeter the pressure coil is connected  
a) to the supply side of the current coil  
b) to the load side of the current coil  
c) in any of the two meters at connection  
d) none of the above
- 13) In a 3-phase power measurement by two wattmeter method, both the watt meters had identical readings. The power factor of the load was  
a) unity                      b) 0.8 lagging                      c) 0.8 leading                      d) zero
- 14) The adjustment of position of shading bands, in an energy meter is done to provide  
a) friction compensation                      b) creep compensation  
c) braking torque                      d) none of the above
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**S.E. (E and E) (Part – II) (CGPA) Examination, 2017  
ELECTRICAL AND ELECTRONICS MEASUREMENTS**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**SECTION – I**

2. Attempt **any four** questions : **(4×4=16)**
- a) Explain construction and working of LPF wattmeter in detail.
  - b) Derive the torque equation for moving iron instruments.
  - c) Explain Kelvin's double bridge for measurement of unknown resistance.
  - d) Explain construction and operation of MI type instrument.
  - e) Explain construction and operation of potential transformer in detail.
  - f) Explain construction and working of electrodynamic type wattmeter with neat diagram.
3. Attempt **any two** : **(6×2=12)**
- a) A 1000/5A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of  $1.6\Omega$ . The primary winding has one turn. Calculate flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5W at full load. The magnetizing mmf is 100A.
  - b) Explain the effect of power factor on the readings of wattmeter.
  - c) Explain the Anderson's bridge with neat phasor diagram at balanced condition.



## SECTION – II

4. Solve **any four** : **(4×4=16)**
- 1) Explain X-Y recorder with neat diagram.
  - 2) Explain working of Q-meter with neat diagram.
  - 3) Explain resistance thermometer with neat diagram.
  - 4) Explain true rms reading voltmeter with neat diagram.
  - 5) Explain LCD display with diagram also states its advantages.
  - 6) State selection criteria for transducer.
5. Solve **any two** : **(6×2=12)**
- 1) Explain construction and operation of dual trace oscilloscope.
  - 2) With neat sketch describe an electronic multimeter for different parameter measurement.
  - 3) Explain construction and working of LVDT also state its advantages and disadvantages.
-





SLR-TJ – 446

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**S.E. (Electrical & Electronics Engineering)  
(Part – II) (CGPA) Examination, 2017  
SIGNALS AND SYSTEMS**

Day and Date : Friday, 24-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3.  
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** indicated **full** marks.  
4) Assume suitable data if **necessary**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

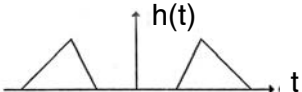
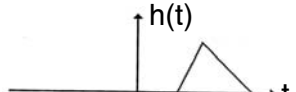
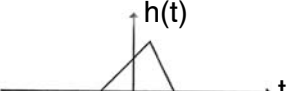

1. Choose the correct answer :

**14**

- 1) The discrete-time signal  $x(n) = (-1)^n$  is periodic with fundamental period  
A) 6                      B) 4                      C) 2                      D) 0
- 2) The frequency of a continuous time signal  $x(t)$  changes on transformation from  $x(t)$  to  $x(\alpha, t)$   $\alpha > 0$  by a factor  
A)  $\alpha$                       B)  $\frac{1}{\alpha}$                       C)  $\alpha^2$                       D)  $\sqrt{\alpha}$
- 3) A useful property of the unit impulse  $\delta(t)$  is that  
A)  $\delta(at) = a\delta(t)$     B)  $\delta(at) = \delta(t)$     C)  $\delta(t) = \frac{1}{a}\delta(t)$     D)  $\delta(at) = [\delta(t)]^a$
- 4)  $x(t)$  is the combination of  
A) ramp and unit component                      B) sing and cos component  
C) even and odd component                      D) similar and dissimilar component
- 5) The z-transform of the function  $\sum_{k=-\infty}^0 \delta(n-k)$  has the following region convergence  
A)  $|z| > 1$                       B)  $|z| = 1$                       C)  $|z| < 1$                       D)  $0 < |z| < 1$

P.T.O.



- 6) Region of convergence of a causal LTI system  
 A) is the entire s-plane  
 B) is the right-half of s-plane  
 C) is the left-half of s-plane  
 D) does not exist
- 7) A continuous-time periodic signal  $x(t)$ , having a period  $T$ , is convolved with itself. The resulting signal is  
 A) not periodic  
 B) periodic having a period  $T$   
 C) periodic having a period  $2T$   
 D) periodic having a period  $T/2$
- 8) The region of convergence of a causal finite duration discrete-time signal is  
 A) the entire z-plane except  $z = 0$   
 B) the entire z-plane except  $z = \infty$   
 C) the entire z-plane  
 D) a strip in z-plane enclosing  $j\omega$ -axis
- 9) The DFT of a signal  $x(n)$  of length  $N$  is  $X(k)$ . When  $X(k)$  is given and  $x(n)$  is computed from it, the length of  $x(n)$  ?  
 A) is increased to infinity  
 B) remains  $N$   
 C) becomes  $2N - 1$   
 D) becomes  $N^2$
- 10) The Fourier transform of  $u(t)$  is  
 A)  $\frac{1}{j2\pi f}$   
 B)  $j2\pi f$   
 C)  $\frac{1}{1 + j2\pi f}$   
 D) none of these
- 11) Which of the following can be impulse response of a casual system ?
- A) 
- B) 
- C) 
- D) 
- 12) Under which conditions does an initially relaxed system become unstable ?  
 A) only if bounded input generates unbounded output  
 B) only if bounded input generates bounded output  
 C) only if unbounded input generates unbounded output  
 D) only if unbounded input generates bounded output
- 13) Flat-top sampling of lowpass signal.  
 A) Give rise to aperture effect  
 B) Implies oversampling  
 C) Lead to aliasing  
 D) Introduction delay distortion
- 14) Product of two functions in spatial domain is what, in frequency domain  
 A) correlation  
 B) convolution  
 C) fourier transform  
 D) fast fourier transform



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**S.E. (Electrical & Electronics Engineering)  
(Part – II) (CGPA) Examination, 2017  
SIGNALS AND SYSTEMS**

Day and Date : Friday, 24-11-2017

Marks : 56

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

- Instructions :** 1) *All questions are compulsory.*  
2) *Figures to the right indicated full marks.*  
3) *Assume suitable data if necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

- a) Find signal are energy, power signals.  
1)  $x(t) = e^{-3t} u(t)$
- b) State and prove Parseval's theorem for continuous time periodic signal.
- c) Find the fundamental period T of the following signal if they are periodic  
 $X(t) = 4 \cos 5 \pi t$ .
- d) Find even and odd components of signals.  
 $x(t) = \cos t + \sin t + \cos t \sin t$
- e) Find system is time-variant or time-invariant.

$$x(t) = \frac{dy(t)}{dt} + 5ty(t)$$

3. Solve **any two** : **(2×8=16)**

- a) Find convolution of  $x(t)$  and  $h(t)$   
 $x(t) = e^{-2t}u(t)$       $h(t) = u(t + 2)$
- b) Find the Laplace transform and ROC.
  - i)  $x(t) = 2e^{-2t} u(t) + 4e^{-4t}u(t)$
  - ii)  $x(t) = \sin \Omega_0 t$
- c) Determine the Laplace transform of the signal

$$x(t) = \sin (\pi t) ; 0 < t < 1$$
$$= 0 ; \text{ otherwise}$$



## SECTION – II

4. Solve **any three** : **(4×3=12)**

- a) What are Aliasing effects ?
- b) Determine the z-transform of  $x_1(n) = \alpha^n u(n)$  and  $x_2(n) = -\alpha^n u(-n-1)$  and indicate their regions of convergence.
- c) Using z transform find the convolution of two sequence  
 $x_1(n) = \{1, 2, -1, 0, 3\}$        $x_2(n) = \{1, 2, -1\}$ .
- d) Derive the scaling property of z transform

5. Solve **any two** : **(2×8=16)**

- a) Determine the inverse Z transform of the following  $X(z)$  by the partial fraction expansion method.

$$X(z) = \frac{z+2}{2z^2 - 7z + 3}$$

if the ROCs are i)  $|z| > 3$ ,      ii)  $z < \frac{1}{2}$ .

- b) Using long division determine the inverse z transform  $\frac{1+2z^{-1}}{1-z^{-1}+z^{-2}}$
- c) Determine the Nyquist sampling rate and Nyquist sampling intervals for the following signal
  - i)  $\sin c^2(200\pi t)$
  - ii)  $\sin c(200\pi t) + 3 \text{ sinc}^2(120\pi t)$ .



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**S.E. (Electrical & Electronics Engineering)  
(Part – II) (CGPA) Examination, 2017  
SIGNALS AND SYSTEMS**

Day and Date : Friday, 24-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3.  
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** indicated **full** marks.  
4) Assume suitable data if **necessary**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

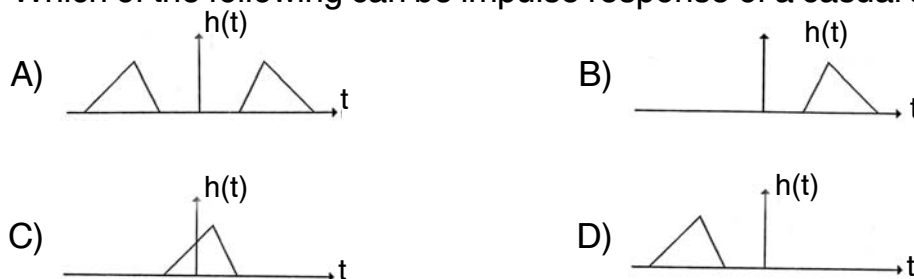
1. Choose the correct answer :

**14**

- The region of convergence of a causal finite duration discrete-time signal is
  - the entire z-plane except  $z = 0$
  - the entire z-plane except  $z = \infty$
  - the entire z-plane
  - a strip in z-plane enclosing  $j\omega$ -axis
- The DFT of a signal  $x(n)$  of length  $N$  is  $X(k)$ . When  $X(k)$  is given and  $x(n)$  is computed from it, the length of  $x(n)$  ?
  - is increased to infinity
  - remains  $N$
  - becomes  $2N - 1$
  - becomes  $N^2$
- The Fourier transform of  $u(t)$  is

- A)  $\frac{1}{j2\pi f}$                       B)  $j2\pi f$                       C)  $\frac{1}{1 + j2\pi f}$                       D) none of these

4) Which of the following can be impulse response of a casual system ?





- 5) Under which conditions does an initially relaxed system become unstable ?  
 A) only if bounded input generates unbounded output  
 B) only if bounded input generates bounded output  
 C) only if unbounded input generates unbounded output  
 D) only if unbounded input generates bounded output
- 6) Flat-top sampling of lowpass signal.  
 A) Give rise to aperture effect                      B) Implies oversampling  
 C) Lead to aliasing                                      D) Introduction delay distortion
- 7) Product of two functions in spatial domain is what, in frequency domain  
 A) correlation                                              B) convolution  
 C) fourier transform                                      D) fast fourier transform
- 8) The discrete-time signal  $x(n) = (-1)^n$  is periodic with fundamental period  
 A) 6                                      B) 4                                      C) 2                                      D) 0
- 9) The frequency of a continuous time signal  $x(t)$  changes on transformation from  $x(t)$  to  $x(\alpha, t)$   $\alpha > 0$  by a factor  
 A)  $\alpha$                                       B)  $\frac{1}{\alpha}$                                       C)  $\alpha^2$                                       D)  $\sqrt{\alpha}$
- 10) A useful property of the unit impulse  $\delta(t)$  is that  
 A)  $\delta(at) = a\delta(t)$     B)  $\delta(at) = \delta(t)$     C)  $\delta(t) = \frac{1}{a}\delta(t)$     D)  $\delta(at) = [\delta(t)]^a$
- 11)  $x(t)$  is the combination of  
 A) ramp and unit component                      B) sing and cos component  
 C) even and odd component                      D) similar and dissimilar component
- 12) The z-transform of the function  $\sum_{k=-\infty}^0 \delta(n-k)$  has the following region of convergence  
 A)  $|z| > 1$                       B)  $|z| = 1$                       C)  $|z| < 1$                       D)  $0 < |z| < 1$
- 13) Region of convergence of a causal LTI system  
 A) is the entire s-plane                      B) is the right-half of s-plane  
 C) is the left-half of s-plane                      D) does not exist
- 14) A continuous-time periodic signal  $x(t)$ , having a period  $T$ , is convolved with itself. The resulting signal is  
 A) not periodic                                      B) periodic having a period  $T$   
 C) periodic having a period  $2T$                       D) periodic having a period  $T/2$



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**S.E. (Electrical & Electronics Engineering)  
(Part – II) (CGPA) Examination, 2017  
SIGNALS AND SYSTEMS**

Day and Date : Friday, 24-11-2017

Marks : 56

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

- Instructions :** 1) *All questions are compulsory.*  
2) *Figures to the right indicated full marks.*  
3) *Assume suitable data if necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

- a) Find signal are energy, power signals.
  - 1)  $x(t) = e^{-3t} u(t)$
- b) State and prove Parseval's theorem for continuous time periodic signal.
- c) Find the fundamental period T of the following signal if they are periodic  
 $X(t) = 4 \cos 5 \pi t$ .
- d) Find even and odd components of signals.  
 $x(t) = \cos t + \sin t + \cos t \sin t$
- e) Find system is time-variant or time-invariant.

$$x(t) = \frac{dy(t)}{dt} + 5ty(t)$$

3. Solve **any two** : **(2×8=16)**

- a) Find convolution of  $x(t)$  and  $h(t)$   
 $x(t) = e^{-2t}u(t)$       $h(t) = u(t + 2)$
- b) Find the Laplace transform and ROC.
  - i)  $x(t) = 2e^{-2t} u(t) + 4e^{-4t}u(t)$
  - ii)  $x(t) = \sin \Omega_0 t$
- c) Determine the Laplace transform of the signal

$$x(t) = \sin (\pi t) ; 0 < t < 1$$
$$= 0 \quad ; \text{ otherwise}$$

**Set Q**



## SECTION – II

4. Solve **any three** : **(4×3=12)**

- a) What are Aliasing effects ?
- b) Determine the z-transform of  $x_1(n) = \alpha^n u(n)$  and  $x_2(n) = -\alpha^n u(-n-1)$  and indicate their regions of convergence.
- c) Using z transform find the convolution of two sequence  
 $x_1(n) = \{1, 2, -1, 0, 3\}$        $x_2(n) = \{1, 2, -1\}$ .
- d) Derive the scaling property of z transform.

5. Solve **any two** : **(2×8=16)**

- a) Determine the inverse Z transform of the following  $X(z)$  by the partial fraction expansion method.

$$X(z) = \frac{z + 2}{2z^2 - 7z + 3}$$

if the ROCs are i)  $|z| > 3$ ,      ii)  $z < \frac{1}{2}$ .

- b) Using long division determine the inverse z transform  $\frac{1 + 2z^{-1}}{1 - z^{-1} + z^{-2}}$ .
- c) Determine the Nyquist sampling rate and Nyquist sampling intervals for the following signal
  - i)  $\sin c^2(200 \pi t)$
  - ii)  $\sin c(200 \pi t) + 3 \text{sinc}^2(120 \pi t)$ .





SLR-TJ – 446

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**S.E. (Electrical & Electronics Engineering)  
(Part – II) (CGPA) Examination, 2017  
SIGNALS AND SYSTEMS**

Day and Date : Friday, 24-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3.  
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** indicated **full** marks.  
4) Assume suitable data if **necessary**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer :

**14**

- 1) The z-transform of the function  $\sum_{k=-\infty}^0 \delta(n-k)$  has the following region of convergence
- A)  $|z| > 1$                       B)  $|z| = 1$                       C)  $|z| < 1$                       D)  $0 < |z| < 1$
- 2) Region of convergence of a causal LTI system
- A) is the entire s-plane                      B) is the right-half of s-plane  
C) is the left-half of s-plane                      D) does not exist
- 3) A continuous-time periodic signal  $x(t)$ , having a period  $T$ , is convolved with itself. The resulting signal is
- A) not periodic                      B) periodic having a period  $T$   
C) periodic having a period  $2T$                       D) periodic having a period  $T/2$
- 4) The region of convergence of a causal finite duration discrete-time signal is
- A) the entire z-plane except  $z = 0$                       B) the entire z-plane except  $z = \infty$   
C) the entire z-plane                      D) a strip in z-plane enclosing  $j\omega$ -axis

P.T.O.



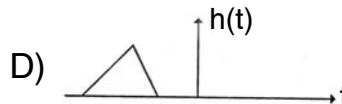
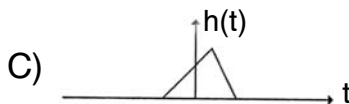
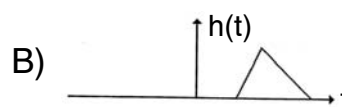
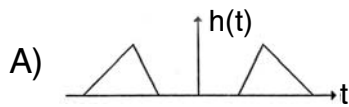
5) The DFT of a signal  $x(n)$  of length  $N$  is  $X(k)$ . When  $X(k)$  is given and  $x(n)$  is computed from it, the length of  $x(n)$  ?

- A) is increased to infinity      B) remains  $N$   
 C) becomes  $2N - 1$       D) becomes  $N^2$

6) The Fourier transform of  $u(t)$  is

- A)  $\frac{1}{j2\pi f}$       B)  $j2\pi f$       C)  $\frac{1}{1 + j2\pi f}$       D) none of these

7) Which of the following can be impulse response of a casual system ?



8) Under which conditions does an initially relaxed system become unstable ?

- A) only if bounded input generates unbounded output  
 B) only if bounded input generates bounded output  
 C) only if unbounded input generates unbounded output  
 D) only if unbounded input generates bounded output

9) Flat-top sampling of lowpass signal.

- A) Give rise to aperture effect      B) Implies oversampling  
 C) Lead to aliasing      D) Introduction delay distortion

10) Product of two functions in spatial domain is what, in frequency domain

- A) correlation      B) convolution  
 C) fourier transform      D) fast fourier transform

11) The discrete-time signal  $x(n) = (-1)^n$  is periodic with fundamental period

- A) 6      B) 4      C) 2      D) 0

12) The frequency of a continuous time signal  $x(t)$  changes on transformation from  $x(t)$  to  $x(\alpha, t)$   $\alpha > 0$  by a factor

- A)  $\alpha$       B)  $\frac{1}{\alpha}$       C)  $\alpha^2$       D)  $\sqrt{\alpha}$

13) A useful property of the unit impulse  $\delta(t)$  is that

- A)  $\delta(at) = a\delta(t)$       B)  $\delta(at) = \delta(t)$       C)  $\delta(t) = \frac{1}{a}\delta(t)$       D)  $\delta(at) = [\delta(t)]^a$

14)  $x(t)$  is the combination of

- A) ramp and unit component      B) sing and cos component  
 C) even and odd component      D) similar and dissimilar component



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**S.E. (Electrical & Electronics Engineering)  
(Part – II) (CGPA) Examination, 2017  
SIGNALS AND SYSTEMS**

Day and Date : Friday, 24-11-2017

Marks : 56

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

- Instructions :** 1) *All questions are compulsory.*  
2) *Figures to the right indicated full marks.*  
3) *Assume suitable data if necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

- a) Find signal are energy, power signals.
  - 1)  $x(t) = e^{-3t} u(t)$
- b) State and prove Parseval's theorem for continuous time periodic signal.
- c) Find the fundamental period T of the following signal if they are periodic  
 $X(t) = 4 \cos 5 \pi t$ .
- d) Find even and odd components of signals.  
 $x(t) = \cos t + \sin t + \cos t \sin t$
- e) Find system is time-variant or time-invariant.

$$x(t) = \frac{dy(t)}{dt} + 5ty(t)$$

3. Solve **any two** : **(2×8=16)**

- a) Find convolution of  $x(t)$  and  $h(t)$   
 $x(t) = e^{-2t}u(t)$       $h(t) = u(t + 2)$
- b) Find the Laplace transform and ROC.
  - i)  $x(t) = 2e^{-2t} u(t) + 4e^{-4t}u(t)$
  - ii)  $x(t) = \sin \Omega_0 t$
- c) Determine the Laplace transform of the signal  
 $x(t) = \sin (\pi t) ; 0 < t < 1$   
 $= 0$  ; otherwise

Set R



## SECTION – II

4. Solve **any three** : **(4×3=12)**

- a) What are Aliasing effects ?
- b) Determine the z-transform of  $x_1(n) = \alpha^n u(n)$  and  $x_2(n) = -\alpha^n u(-n-1)$  and indicate their regions of convergence.
- c) Using z transform find the convolution of two sequence  
 $x_1(n) = \{1, 2, -1, 0, 3\}$        $x_2(n) = \{1, 2, -1\}$ .
- d) Derive the scaling property of z transform.

5. Solve **any two** : **(2×8=16)**

- a) Determine the inverse Z transform of the following  $X(z)$  by the partial fraction expansion method.

$$X(z) = \frac{z + 2}{2z^2 - 7z + 3}$$

if the ROCs are i)  $|z| > 3$ ,      ii)  $z < \frac{1}{2}$ .

- b) Using long division determine the inverse z transform  $\frac{1 + 2z^{-1}}{1 - z^{-1} + z^{-2}}$ .

- c) Determine the Nyquist sampling rate and Nyquist sampling intervals for the following signal

- i)  $\sin c^2(200 \pi t)$
- ii)  $\sin c(200 \pi t) + 3 \text{sinc}^2(120 \pi t)$ .



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**S.E. (Electrical & Electronics Engineering)  
(Part – II) (CGPA) Examination, 2017  
SIGNALS AND SYSTEMS**

Day and Date : Friday, 24-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on Page No. 3.  
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** indicated **full** marks.  
4) Assume suitable data if **necessary**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

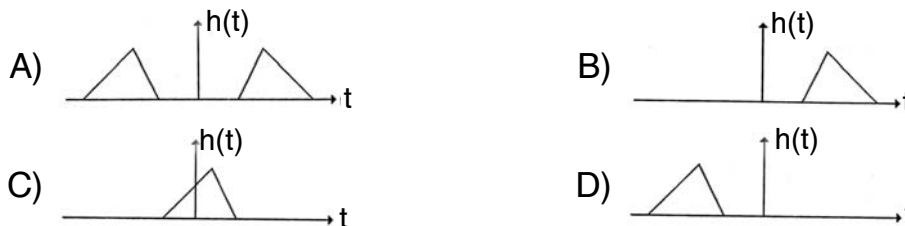
Marks : 14

1. Choose the correct answer : 14

1) The Fourier transform of  $u(t)$  is

- A)  $\frac{1}{j2\pi f}$       B)  $j2\pi f$       C)  $\frac{1}{1 + j2\pi f}$       D) none of these

2) Which of the following can be impulse response of a casual system ?



3) Under which conditions does an initially relaxed system become unstable ?

- A) only if bounded input generates unbounded output  
B) only if bounded input generates bounded output  
C) only if unbounded input generates unbounded output  
D) only if unbounded input generates bounded output

4) Flat-top sampling of lowpass signal.

- A) Give rise to aperture effect      B) Implies oversampling  
C) Lead to aliasing      D) Introduction delay distortion



- 5) Product of two functions in spatial domain is what, in frequency domain  
 A) correlation  
 B) convolution  
 C) fourier transform  
 D) fast fourier transform
- 6) The discrete-time signal  $x(n) = (-1)^n$  is periodic with fundamental period  
 A) 6  
 B) 4  
 C) 2  
 D) 0
- 7) The frequency of a continuous time signal  $x(t)$  changes on transformation from  $x(t)$  to  $x(\alpha, t)$   $\alpha > 0$  by a factor  
 A)  $\alpha$   
 B)  $\frac{1}{\alpha}$   
 C)  $\alpha^2$   
 D)  $\sqrt{\alpha}$
- 8) A useful property of the unit impulse  $\delta(t)$  is that  
 A)  $\delta(at) = a\delta(t)$   
 B)  $\delta(at) = \delta(t)$   
 C)  $\delta(t) = \frac{1}{a}\delta(t)$   
 D)  $\delta(at) = [\delta(t)]^a$
- 9)  $x(t)$  is the combination of  
 A) ramp and unit component  
 B) sing and cos component  
 C) even and odd component  
 D) similar and dissimilar component
- 10) The z-transform of the function  $\sum_{k=-\infty}^0 \delta(n-k)$  has the following region of convergence  
 A)  $|z| > 1$   
 B)  $|z| = 1$   
 C)  $|z| < 1$   
 D)  $0 < |z| < 1$
- 11) Region of convergence of a causal LTI system  
 A) is the entire s-plane  
 B) is the right-half of s-plane  
 C) is the left-half of s-plane  
 D) does not exist
- 12) A continuous-time periodic signal  $x(t)$ , having a period  $T$ , is convolved with itself. The resulting signal is  
 A) not periodic  
 B) periodic having a period  $T$   
 C) periodic having a period  $2T$   
 D) periodic having a period  $T/2$
- 13) The region of convergence of a causal finite duration discrete-time signal is  
 A) the entire z-plane except  $z = 0$   
 B) the entire z-plane except  $z = \infty$   
 C) the entire z-plane  
 D) a strip in z-plane enclosing  $j\omega$ -axis
- 14) The DFT of a signal  $x(n)$  of length  $N$  is  $X(k)$ . When  $X(k)$  is given and  $x(n)$  is computed from it, the length of  $x(n)$  ?  
 A) is increased to infinity  
 B) remains  $N$   
 C) becomes  $2N - 1$   
 D) becomes  $N^2$



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**S.E. (Electrical & Electronics Engineering)  
(Part – II) (CGPA) Examination, 2017  
SIGNALS AND SYSTEMS**

Day and Date : Friday, 24-11-2017

Marks : 56

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

- Instructions :** 1) *All questions are compulsory.*  
2) *Figures to the right indicated full marks.*  
3) *Assume suitable data if necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

- a) Find signal are energy, power signals.
  - 1)  $x(t) = e^{-3t} u(t)$
- b) State and prove Parseval's theorem for continuous time periodic signal.
- c) Find the fundamental period T of the following signal if they are periodic  
 $X(t) = 4 \cos 5 \pi t$ .
- d) Find even and odd components of signals.  
 $x(t) = \cos t + \sin t + \cos t \sin t$
- e) Find system is time-variant or time-invariant.

$$x(t) = \frac{dy(t)}{dt} + 5ty(t)$$

3. Solve **any two** : **(2×8=16)**

- a) Find convolution of  $x(t)$  and  $h(t)$   
 $x(t) = e^{-2t}u(t)$       $h(t) = u(t + 2)$
- b) Find the Laplace transform and ROC.
  - i)  $x(t) = 2e^{-2t} u(t) + 4e^{-4t}u(t)$
  - ii)  $x(t) = \sin \Omega_0 t$
- c) Determine the Laplace transform of the signal  
 $x(t) = \sin (\pi t) ; 0 < t < 1$   
 $= 0$  ; otherwise

**Set S**



## SECTION – II

4. Solve **any three** : **(4×3=12)**

- a) What are Aliasing effects ?
- b) Determine the z-transform of  $x_1(n) = \alpha^n u(n)$  and  $x_2(n) = -\alpha^n u(-n-1)$  and indicate their regions of convergence.
- c) Using z transform find the convolution of two sequence  
 $x_1(n) = \{1, 2, -1, 0, 3\}$        $x_2(n) = \{1, 2, -1\}$ .
- d) Derive the scaling property of z transform.

5. Solve **any two** : **(2×8=16)**

- a) Determine the inverse Z transform of the following  $X(z)$  by the partial fraction expansion method.

$$X(z) = \frac{z + 2}{2z^2 - 7z + 3}$$

if the ROCs are i)  $|z| > 3$ ,      ii)  $z < \frac{1}{2}$ .

- b) Using long division determine the inverse z transform  $\frac{1 + 2z^{-1}}{1 - z^{-1} + z^{-2}}$ .

- c) Determine the Nyquist sampling rate and Nyquist sampling intervals for the following signal

- i)  $\sin c^2(200 \pi t)$
- ii)  $\sin c(200 \pi t) + 3 \text{sinc}^2(120 \pi t)$ .





SLR-TJ – 447

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**S.E. (E & E) Part – II Examination, 2017  
DIGITAL TECHNIQUES (CGPA)**

Day and Date : Saturday, 25-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**  
2) **Figures to the 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 : 14

1. Choose the correct answer :

(14×1=14)

- 1) BCD code is
  - a) Error detecting code
  - b) Error correcting code
  - c) Both
  - d) None
- 2) In a 4-variable K-map, the function contains all minterms then the minimal expression is
  - a) A
  - b) 1
  - c) 0
  - d) Don't care
- 3) Multiplexer is represented by
  - a) AND-OR
  - b) OR-AND
  - c) NAND-OR
  - d) NOR-AND
- 4) The number of full adders in a 4-bit parallel adder is
  - a) One
  - b) Two
  - c) Four
  - d) Sixteen
- 5) The Fan-out for TTL family is
  - a) 5
  - b) 10
  - c) 15
  - d) 20
- 6) The following number system is used in k-map representation
  - a) Binary
  - b) BCD
  - c) Gray
  - d) Hexadecimal
- 7) In a look ahead carry adder, the carry of each stage (except initial stage) is a function of
  - a) carry propagate
  - b) carry generator
  - c) both
  - d) none

P.T.O.



- 8) In which flip flop race around condition occurs ?  
a) J-K flip flop      b) S-R flip flop      c) T flip flop      d) D flip flop
- 9) A shift registers using flip flops is called a  
a) Dynamic flip flops      b) Flip flop shift registers  
c) Static shift registers      d) Buffer shift registers
- 10) The minimum number of flip flops required for mod-12 ripple counter is  
a) 3      b) 4      c) 6      d) 12
- 11) A mod-2 counter followed by mod-5 counter is  
a) the same as mod-2 counter followed by mod-5 counter  
b) a decade counter  
c) a mod-7 counter  
d) none of the above
- 12) The design of clocked sequential circuit requires  
a) the state reduction      b) the state assignment  
c) the design of next state decoder      d) all of the above
- 13) A sequential circuit with ten states will have  
a) 10 flip flops      b) 5 flip flops      c) 4 flip flops      d) 0 flip flops
- 14) A 4-bit presettable up-counter has present input 0101. The presetting operation takes place as soon as counter becomes maximum i.e. 1111. The modulus of this counter is  
a) 5      b) 10      c) 11      d) 15
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**S.E. (E & E) Part – II Examination, 2017  
DIGITAL TECHNIQUES (CGPA)**

Day and Date : Saturday, 25-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Figures to the right indicate full marks.**  
3) **Assume suitable data wherever necessary.**

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**
- 1) Explain SOP and POS.
  - 2) Write a short note on priority encoder.
  - 3) Implement the following function  
 $f(A, B, C, D) = \sum m (0, 1, 3, 4, 7, 10, 14)$  using 4 : 1 Mux.
  - 4) Compare TTL and CMOS logic family.
  - 5) Explain look ahead carry generator.
3. Solve **any two** of the following : **(2×6=12)**
- 1) Explain the following function terms associated with TTL gate.
    - i) Noise margin.
    - ii) Transfer characteristic.
    - iii) Fan in.
  - 2) Design gray to binary code converter.
  - 3) Design full adder by using two half adders.



## SECTION – II

4. Solve **any four** of the following : **(4×4=16)**
- 1) Explain the applications of flip flops.
  - 2) Compare synchronous and asynchronous counters.
  - 3) Explain the significance of characteristics and excitation table.
  - 4) Explain the types of shift registers.
  - 5) Explain the operation of SR flip flop.
5. Solve **any two** of the following : **(2×6=12)**
- 1) What is flip flop ? Draw and explain how to construct the T & D from SR flip flop.
  - 2) Design a type T counter that goes through the states 0, 3, 5, 6, 0 . . . Is the counter self starting ?
  - 3) Draw and explain 4 bit up/down counter with negative edge triggering.
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**S.E. (E & E) Part – II Examination, 2017  
DIGITAL TECHNIQUES (CGPA)**

Day and Date : Saturday, 25-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) Figures to the **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 : 14

1. Choose the correct answer : **(14×1=14)**
- 1) In which flip flop race around condition occurs ?  
a) J-K flip flop      b) S-R flip flop      c) T flip flop      d) D flip flop
  - 2) A shift registers using flip flops is called a  
a) Dynamic flip flops      b) Flip flop shift registers  
c) Static shift registers      d) Buffer shift registers
  - 3) The minimum number of flip flops required for mod-12 ripple counter is  
a) 3      b) 4      c) 6      d) 12
  - 4) A mod-2 counter followed by mod-5 counter is  
a) the same as mod-2 counter followed by mod-5 counter  
b) a decade counter  
c) a mod-7 counter  
d) none of the above
  - 5) The design of clocked sequential circuit requires  
a) the state reduction      b) the state assignment  
c) the design of next state decoder      d) all of the above
  - 6) A sequential circuit with ten states will have  
a) 10 flip flops      b) 5 flip flops      c) 4 flip flops      d) 0 flip flops

P.T.O.



- 7) A 4-bit presettable up-counter has present input 0101. The presetting operation takes place as soon as counter becomes maximum i.e. 1111. The modulus of this counter is
- a) 5                      b) 10                      c) 11                      d) 15
- 8) BCD code is
- a) Error detecting code                      b) Error correcting code  
c) Both                      d) None
- 9) In a 4-variable K-map, the function contains all minterms then the minimal expression is
- a) A                      b) 1                      c) 0                      d) Don't care
- 10) Multiplexer is represented by
- a) AND-OR                      b) OR-AND                      c) NAND-OR                      d) NOR-AND
- 11) The number of full adders in a 4-bit parallel adder is
- a) One                      b) Two                      c) Four                      d) Sixteen
- 12) The Fan-out for TTL family is
- a) 5                      b) 10                      c) 15                      d) 20
- 13) The following number system is used in k-map representation
- a) Binary                      b) BCD                      c) Gray                      d) Hexadecimal
- 14) In a look ahead carry adder, the carry of each stage (except initial stage) is a function of
- a) carry propagate                      b) carry generator  
c) both                      d) none
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**S.E. (E & E) Part – II Examination, 2017  
DIGITAL TECHNIQUES (CGPA)**

Day and Date : Saturday, 25-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Figures to the right indicate full marks.**  
3) **Assume suitable data wherever necessary.**

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**
- 1) Explain SOP and POS.
  - 2) Write a short note on priority encoder.
  - 3) Implement the following function  
 $f(A, B, C, D) = \sum m (0, 1, 3, 4, 7, 10, 14)$  using 4 : 1 Mux.
  - 4) Compare TTL and CMOS logic family.
  - 5) Explain look ahead carry generator.
3. Solve **any two** of the following : **(2×6=12)**
- 1) Explain the following function terms associated with TTL gate.
    - i) Noise margin.
    - ii) Transfer characteristic.
    - iii) Fan in.
  - 2) Design gray to binary code converter.
  - 3) Design full adder by using two half adders.



## SECTION – II

4. Solve **any four** of the following : **(4×4=16)**
- 1) Explain the applications of flip flops.
  - 2) Compare synchronous and asynchronous counters.
  - 3) Explain the significance of characteristics and excitation table.
  - 4) Explain the types of shift registers.
  - 5) Explain the operation of SR flip flop.
5. Solve **any two** of the following : **(2×6=12)**
- 1) What is flip flop ? Draw and explain how to construct the T & D from SR flip flop.
  - 2) Design a type T counter that goes through the states 0, 3, 5, 6, 0 . . . Is the counter self starting ?
  - 3) Draw and explain 4 bit up/down counter with negative edge triggering.
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**S.E. (E & E) Part – II Examination, 2017  
DIGITAL TECHNIQUES (CGPA)**

Day and Date : Saturday, 25-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**  
2) **Figures to the 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 : 14

1. Choose the correct answer : **(14×1=14)**

- 1) The Fan-out for TTL family is  
a) 5                                      b) 10                                      c) 15                                      d) 20
- 2) The following number system is used in k-map representation  
a) Binary                                      b) BCD                                      c) Gray                                      d) Hexadecimal
- 3) In a look ahead carry adder, the carry of each stage (except initial stage) is a function of  
a) carry propagate                                      b) carry generator  
c) both                                      d) none
- 4) In which flip flop race around condition occurs ?  
a) J-K flip flop                                      b) S-R flip flop                                      c) T flip flop                                      d) D flip flop
- 5) A shift registers using flip flops is called a  
a) Dynamic flip flops                                      b) Flip flop shift registers  
c) Static shift registers                                      d) Buffer shift registers
- 6) The minimum number of flip flops required for mod-12 ripple counter is  
a) 3                                      b) 4                                      c) 6                                      d) 12
- 7) A mod-2 counter followed by mod-5 counter is  
a) the same as mod-2 counter followed by mod-5 counter  
b) a decade counter  
c) a mod-7 counter  
d) none of the above

P.T.O.



- 8) The design of clocked sequential circuit requires  
a) the state reduction                      b) the state assignment  
c) the design of next state decoder      d) all of the above
- 9) A sequential circuit with ten states will have  
a) 10 flip flops      b) 5 flip flops      c) 4 flip flops      d) 0 flip flops
- 10) A 4-bit presettable up-counter has present input 0101. The presetting operation takes place as soon as counter becomes maximum i.e. 1111. The modulus of this counter is  
a) 5                      b) 10                      c) 11                      d) 15
- 11) BCD code is  
a) Error detecting code                      b) Error correcting code  
c) Both                      d) None
- 12) In a 4-variable K-map, the function contains all minterms then the minimal expression is  
a) A                      b) 1                      c) 0                      d) Don't care
- 13) Multiplexer is represented by  
a) AND-OR                      b) OR-AND                      c) NAND-OR                      d) NOR-AND
- 14) The number of full adders in a 4-bit parallel adder is  
a) One                      b) Two                      c) Four                      d) Sixteen
-



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**S.E. (E & E) Part – II Examination, 2017  
DIGITAL TECHNIQUES (CGPA)**

Day and Date : Saturday, 25-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Figures to the right indicate full marks.**  
3) **Assume suitable data wherever necessary.**

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**
- 1) Explain SOP and POS.
  - 2) Write a short note on priority encoder.
  - 3) Implement the following function  
 $f(A, B, C, D) = \sum m (0, 1, 3, 4, 7, 10, 14)$  using 4 : 1 Mux.
  - 4) Compare TTL and CMOS logic family.
  - 5) Explain look ahead carry generator.
3. Solve **any two** of the following : **(2×6=12)**
- 1) Explain the following function terms associated with TTL gate.
    - i) Noise margin.
    - ii) Transfer characteristic.
    - iii) Fan in.
  - 2) Design gray to binary code converter.
  - 3) Design full adder by using two half adders.



## SECTION – II

4. Solve **any four** of the following : **(4×4=16)**
- 1) Explain the applications of flip flops.
  - 2) Compare synchronous and asynchronous counters.
  - 3) Explain the significance of characteristics and excitation table.
  - 4) Explain the types of shift registers.
  - 5) Explain the operation of SR flip flop.
5. Solve **any two** of the following : **(2×6=12)**
- 1) What is flip flop ? Draw and explain how to construct the T & D from SR flip flop.
  - 2) Design a type T counter that goes through the states 0, 3, 5, 6, 0 . . . Is the counter self starting ?
  - 3) Draw and explain 4 bit up/down counter with negative edge triggering.
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**S.E. (E & E) Part – II Examination, 2017  
DIGITAL TECHNIQUES (CGPA)**

Day and Date : Saturday, 25-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- Instructions:** 1) **All questions are compulsory.**  
2) Figures to the **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 : 14

1. Choose the correct answer : **(14×1=14)**
- 1) The minimum number of flip flops required for mod-12 ripple counter is  
a) 3                                      b) 4                                      c) 6                                      d) 12
  - 2) A mod-2 counter followed by mod-5 counter is  
a) the same as mod-2 counter followed by mod-5 counter  
b) a decade counter  
c) a mod-7 counter  
d) none of the above
  - 3) The design of clocked sequential circuit requires  
a) the state reduction                      b) the state assignment  
c) the design of next state decoder      d) all of the above
  - 4) A sequential circuit with ten states will have  
a) 10 flip flops      b) 5 flip flops      c) 4 flip flops      d) 0 flip flops
  - 5) A 4-bit presettable up-counter has present input 0101. The presetting operation takes place as soon as counter becomes maximum i.e. 1111. The modulus of this counter is  
a) 5                                      b) 10                                      c) 11                                      d) 15
  - 6) BCD code is  
a) Error detecting code                      b) Error correcting code  
c) Both                                      d) None

P.T.O.



- 7) In a 4-variable K-map, the function contains all minterms then the minimal expression is  
a) A                      b) 1                      c) 0                      d) Don't care
- 8) Multiplexer is represented by  
a) AND-OR              b) OR-AND              c) NAND-OR              d) NOR-AND
- 9) The number of full adders in a 4-bit parallel adder is  
a) One                      b) Two                      c) Four                      d) Sixteen
- 10) The Fan-out for TTL family is  
a) 5                      b) 10                      c) 15                      d) 20
- 11) The following number system is used in k-map representation  
a) Binary                      b) BCD                      c) Gray                      d) Hexadecimal
- 12) In a look ahead carry adder, the carry of each stage (except initial stage) is a function of  
a) carry propagate                      b) carry generator  
c) both                      d) none
- 13) In which flip flop race around condition occurs ?  
a) J-K flip flop              b) S-R flip flop              c) T flip flop              d) D flip flop
- 14) A shift registers using flip flops is called a  
a) Dynamic flip flops                      b) Flip flop shift registers  
c) Static shift registers                      d) Buffer shift registers
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**S.E. (E & E) Part – II Examination, 2017  
DIGITAL TECHNIQUES (CGPA)**

Day and Date : Saturday, 25-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Figures to the right indicate full marks.**  
3) **Assume suitable data wherever necessary.**

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**
- 1) Explain SOP and POS.
  - 2) Write a short note on priority encoder.
  - 3) Implement the following function  
 $f(A, B, C, D) = \sum m (0, 1, 3, 4, 7, 10, 14)$  using 4 : 1 Mux.
  - 4) Compare TTL and CMOS logic family.
  - 5) Explain look ahead carry generator.
3. Solve **any two** of the following : **(2×6=12)**
- 1) Explain the following function terms associated with TTL gate.
    - i) Noise margin.
    - ii) Transfer characteristic.
    - iii) Fan in.
  - 2) Design gray to binary code converter.
  - 3) Design full adder by using two half adders.



## SECTION – II

4. Solve **any four** of the following : **(4×4=16)**
- 1) Explain the applications of flip flops.
  - 2) Compare synchronous and asynchronous counters.
  - 3) Explain the significance of characteristics and excitation table.
  - 4) Explain the types of shift registers.
  - 5) Explain the operation of SR flip flop.
5. Solve **any two** of the following : **(2×6=12)**
- 1) What is flip flop ? Draw and explain how to construct the T & D from SR flip flop.
  - 2) Design a type T counter that goes through the states 0, 3, 5, 6, 0 . . . Is the counter self starting ?
  - 3) Draw and explain 4 bit up/down counter with negative edge triggering.
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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELECTROMAGNETIC ENGINEERING**

Day and Date : Wednesday, 29-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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 : 14

1. Choose the correct alternative : **14**
- 1) The lines of force due to charged particles are  
a) Always straight                      b) Always curved  
c) Sometimes curved                      d) None of the above
- 2) The co-ordinate system for cylindrical co-ordinate system are  
a)  $(r, \phi, z)$                       b)  $(r, b, z)$                       c)  $(r, z, \phi)$                       d)  $(x, y, z)$
- 3) If dot product of two vectors is zero, the vectors are  
a) Perpendicular      b) Parallel                      c) Oblique                      d) None of these
- 4) The electric field at a point situated at a distance  $d$  from straight charged conductor is  
a) Proportional to  $d$                       b) Inversely proportional to  $d$   
c) Directly proportional to  $d$                       d) None of the above
- 5) A charge of  $2 \times 10^{-7}$  C is acted upon by a force of 0.1 N. Determine the distance to the other charge of  $4.5 \times 10^{-7}$  C; both the charges are in vacuum.  
a) 0.03                                              b) 0.05  
c) 0.07                                              d) 0.09

P.T.O.





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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELECTROMAGNETIC ENGINEERING**

Day and Date : Wednesday, 29-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumptions if necessary.**

SECTION – I

2. Solve **any three** : **(3×4=12)**

- 1) Three vectors are given as  $\bar{A} = 2\bar{a}_x - 2\bar{a}_y - \bar{a}_z$ ;  $\bar{B} = \bar{a}_x + \bar{a}_y + \bar{a}_z$  and  $\bar{C} = \bar{a}_x + 2\bar{a}_y - 2\bar{a}_z$ ; Find  
1)  $\bar{A} \times (\bar{B} \times \bar{C})$       2)  $\bar{A} \cdot \bar{B} \times \bar{C}$
- 2) Differentiate between cross product and dot product.
- 3) Derive the integral form of the Gauss's law.
- 4) State and prove coulomb's law.
- 5) On the line described by  $X = 2$  m,  $Y = -4$  m there is a uniform charge distribution  $\rho_l = 20$  nC / m . Determine  $\bar{E}$  at  $(-2, -1, 4)$ .

3. Solve **any two** : **(2×8=16)**

- 1) Uniform line charge of 120 nc/m lie along the entire extent of the three Co-ordinate axes. Assuming few space conditions, find E at P( -3, 2, -1).
- 2) Derive the expression for electric field intensity due to infinitely long line charge.
- 3) Explain the concept of boundary condition for electric field.



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- 1) Explain Biot-savart law in detail.
  - 2) A current filament of  $3\bar{a}_x$  amp. Lies along the x-axis. Find H components at  $P(-1, 3, 2)$ .
  - 3) What is Lorenz force ?
  - 4) Write a short note on self and mutual inductance.
  - 5) Describe physical significance of Maxwell's equation.
5. Solve **any two** : **(2×8=16)**
- 1) Derive an expression for magnetic field intensity due to infinite long straight current filament.
  - 2) Explain boundary conditions in magnetic fields.
  - 3) Find  $\bar{J}_d$  in air space within a large power distribution transformer where  $\bar{B} = 1.1 \cos [1.257 \times 10^{-6} (3 \times 10^8 t - y)] \bar{a}_x$  wb/m<sup>2</sup>.
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SLR-TJ – 448

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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELECTROMAGNETIC ENGINEERING**

Day and Date : Wednesday, 29-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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 : 14

1. Choose the correct alternative : **14**
- 1) A charge is placed in a square container. The position of the charge with respect to the origin can be found by
    - a) Spherical system
    - b) Circular system
    - c) Cartesian system
    - d) Space coordinate system
  - 2) Find the electric field intensity of two charges 2C and – 1C separated by a distance 1 m in air.
    - a)  $18 \times 10^9$
    - b)  $9 \times 10^9$
    - c)  $36 \times 10^9$
    - d)  $-18 \times 10^9$
  - 3) If  $\nabla \cdot D = 0$  then vector is called
    - a) Irrotational
    - b) Solenoidal
    - c) Torsional
    - d) Irreversible
  - 4) The electric field in free space
    - a)  $D/\epsilon_0$
    - b)  $D/u_0$
    - c)  $\epsilon_0 D$
    - d)  $u_0/\epsilon_0$
  - 5) Lorentz force equation is
    - a)  $F = Q \times [E + V \times B]$
    - b)  $F = Q + [E + V \times B]$
    - c)  $F = Q \times [V + E \times B]$
    - d)  $F = Q [B + V \times B]$

P.T.O.



- 6) The dot product of two vectors is a scalar. The cross product of two vectors is a vector. State true/false.  
a) True                      b) False
- 7) If the flux density is  $10 \text{ wb/m}^2$  and the area of the coil is  $2\text{m}^2$ , the flux is  
a) 10 wb                      b) 20 wb                      c) 5 wb                      d) 40 wb
- 8) The lines of force due to charged particles are  
a) Always straight                      b) Always curved  
c) Sometimes curved                      d) None of the above
- 9) The co-ordinate system for cylindrical co-ordinate system are  
a)  $(r, \phi, z)$                       b)  $(r, b, z)$                       c)  $(r, z, \phi)$                       d)  $(x, y, z)$
- 10) If dot product of two vectors is zero, the vectors are  
a) Perpendicular                      b) Parallel                      c) Oblique                      d) None of these
- 11) The electric field at a point situated at a distance  $d$  from straight charged conductor is  
a) Proportional to  $d$                       b) Inversely proportional to  $d$   
c) Directly proportional to  $d$                       d) None of the above
- 12) A charge of  $2 \times 10^{-7} \text{ C}$  is acted upon by a force of  $0.1 \text{ N}$ . Determine the distance to the other charge of  $4.5 \times 10^{-7} \text{ C}$ ; both the charges are in vacuum.  
a) 0.03                      b) 0.05  
c) 0.07                      d) 0.09
- 13) Relation between potential  $V$  and electric field  
a)  $E = -\nabla V$                       b)  $E = \nabla V$   
c)  $V = -\nabla E$                       d)  $\nabla V = \nabla E$
- 14)  $\nabla^2 V = -\rho_v / \epsilon$  is  
a) Ohm's law                      b) Faraday's law  
c) Poisson's equation                      d) None of these
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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELECTROMAGNETIC ENGINEERING**

Day and Date : Wednesday, 29-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

**Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumptions if necessary.**

SECTION – I

2. Solve **any three** : **(3×4=12)**

1) Three vectors are given as  $\bar{A} = 2\bar{a}_x - 2\bar{a}_y - \bar{a}_z$ ;  $\bar{B} = \bar{a}_x + \bar{a}_y + \bar{a}_z$  and  $\bar{C} = \bar{a}_x + 2\bar{a}_y - 2\bar{a}_z$ ; Find

1)  $\bar{A} \times (\bar{B} \times \bar{C})$       2)  $\bar{A} \cdot \bar{B} \times \bar{C}$

2) Differentiate between cross product and dot product.

3) Derive the integral form of the Gauss's law.

4) State and prove coulomb's law.

5) On the line described by  $X = 2$  m,  $Y = -4$  m there is a uniform charge distribution  $\rho_l = 20$  nC / m . Determine  $\bar{E}$  at  $(-2, -1, 4)$ .

3. Solve **any two** : **(2×8=16)**

1) Uniform line charge of 120 nc/m lie along the entire extent of the three Co-ordinate axes. Assuming few space conditions, find E at P( -3, 2, -1).

2) Derive the expression for electric field intensity due to infinitely long line charge.

3) Explain the concept of boundary condition for electric field.



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- 1) Explain Biot-savart law in detail.
  - 2) A current filament of  $3\bar{a}_x$  amp. Lies along the x-axis. Find H components at  $P(-1, 3, 2)$ .
  - 3) What is Lorenz force ?
  - 4) Write a short note on self and mutual inductance.
  - 5) Describe physical significance of Maxwell's equation.
5. Solve **any two** : **(2×8=16)**
- 1) Derive an expression for magnetic field intensity due to infinite long straight current filament.
  - 2) Explain boundary conditions in magnetic fields.
  - 3) Find  $\bar{J}_d$  in air space within a large power distribution transformer where  $\bar{B} = 1.1 \cos [1.257 \times 10^{-6} (3 \times 10^8 t - y)] \bar{a}_x$  wb/m<sup>2</sup>.
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- 5) Find the electric field intensity of two charges 2C and – 1C separated by a distance 1 m in air.  
a)  $18 \times 10^9$       b)  $9 \times 10^9$       c)  $36 \times 10^9$       d)  $-18 \times 10^9$
- 6) If  $\nabla \cdot D = 0$  then vector is called  
a) Irrotational      b) Solenoidal      c) Torsional      d) Irreversible
- 7) The electric field in free space  
a)  $D/\epsilon_0$       b)  $D/u_0$       c)  $\epsilon_0 D$       d)  $u_0/\epsilon_0$
- 8) Lorentz force equation is  
a)  $F = Q \times [E + V \times B]$       b)  $F = Q + [E + V \times B]$   
c)  $F = Q \times [V + E \times B]$       d)  $F = Q [B + V \times B]$
- 9) The dot product of two vectors is a scalar. The cross product of two vectors is a vector. State true/false.  
a) True      b) False
- 10) If the flux density is 10 wb/m<sup>2</sup> and the area of the coil is 2m<sup>2</sup>, the flux is  
a) 10 wb      b) 20 wb      c) 5 wb      d) 40 wb
- 11) The lines of force due to charged particles are  
a) Always straight      b) Always curved  
c) Sometimes curved      d) None of the above
- 12) The co-ordinate system for cylindrical co-ordinate system are  
a)  $(r, \phi, z)$       b)  $(r, b, z)$       c)  $(r, z, \phi)$       d)  $(x, y, z)$
- 13) If dot product of two vectors is zero, the vectors are  
a) Perpendicular      b) Parallel      c) Oblique      d) None of these
- 14) The electric field at a point situated at a distance d from straight charged conductor is  
a) Proportional to d      b) Inversely proportional to d  
c) Directly proportional to d      d) None of the above
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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELECTROMAGNETIC ENGINEERING**

Day and Date : Wednesday, 29-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

**Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumptions if necessary.**

SECTION – I

2. Solve **any three** : **(3×4=12)**

1) Three vectors are given as  $\bar{A} = 2\bar{a}_x - 2\bar{a}_y - \bar{a}_z$ ;  $\bar{B} = \bar{a}_x + \bar{a}_y + \bar{a}_z$  and  $\bar{C} = \bar{a}_x + 2\bar{a}_y - 2\bar{a}_z$ ; Find

1)  $\bar{A} \times (\bar{B} \times \bar{C})$       2)  $\bar{A} \cdot \bar{B} \times \bar{C}$

2) Differentiate between cross product and dot product.

3) Derive the integral form of the Gauss's law.

4) State and prove coulomb's law.

5) On the line described by  $X = 2$  m,  $Y = -4$  m there is a uniform charge distribution  $\rho_l = 20$  nC / m . Determine  $\bar{E}$  at  $(-2, -1, 4)$ .

3. Solve **any two** : **(2×8=16)**

1) Uniform line charge of 120 nc/m lie along the entire extent of the three Co-ordinate axes. Assuming few space conditions, find E at P( -3, 2, -1).

2) Derive the expression for electric field intensity due to infinitely long line charge.

3) Explain the concept of boundary condition for electric field.



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- 1) Explain Biot-savart law in detail.
  - 2) A current filament of  $3\bar{a}_x$  amp. Lies along the x-axis. Find H components at  $P(-1, 3, 2)$ .
  - 3) What is Lorenz force ?
  - 4) Write a short note on self and mutual inductance.
  - 5) Describe physical significance of Maxwell's equation.
5. Solve **any two** : **(2×8=16)**
- 1) Derive an expression for magnetic field intensity due to infinite long straight current filament.
  - 2) Explain boundary conditions in magnetic fields.
  - 3) Find  $\bar{J}_d$  in air space within a large power distribution transformer where  $\bar{B} = 1.1 \cos [1.257 \times 10^{-6} (3 \times 10^8 t - y)] \bar{a}_x$  wb/m<sup>2</sup>.
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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELECTROMAGNETIC ENGINEERING**

Day and Date : Wednesday, 29-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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 : 14

1. Choose the correct alternative :

14

- 1) If  $\nabla \cdot D = 0$  then vector is called  
a) Irrotational      b) Solenoidal      c) Torsional      d) Irreversible
- 2) The electric field in free space  
a)  $D/\epsilon_0$       b)  $D/u_0$       c)  $\epsilon_0 D$       d)  $u_0/\epsilon_0$
- 3) Lorentz force equation is  
a)  $F = Q \times [E + V \times B]$       b)  $F = Q + [E + V \times B]$   
c)  $F = Q \times [V + E \times B]$       d)  $F = Q [B + V \times B]$
- 4) The dot product of two vectors is a scalar. The cross product of two vectors is a vector. State true/false.  
a) True      b) False
- 5) If the flux density is  $10 \text{ wb/m}^2$  and the area of the coil is  $2\text{m}^2$ , the flux is  
a) 10 wb      b) 20 wb      c) 5 wb      d) 40 wb
- 6) The lines of force due to charged particles are  
a) Always straight      b) Always curved  
c) Sometimes curved      d) None of the above

P.T.O.



- 7) The co-ordinate system for cylindrical co-ordinate system are  
a)  $(r, \phi, z)$       b)  $(r, b, z)$       c)  $(r, z, \phi)$       d)  $(x, y, z)$
- 8) If dot product of two vectors is zero, the vectors are  
a) Perpendicular    b) Parallel      c) Oblique      d) None of these
- 9) The electric field at a point situated at a distance  $d$  from straight charged conductor is  
a) Proportional to  $d$       b) Inversely proportional to  $d$   
c) Directly proportional to  $d$       d) None of the above
- 10) A charge of  $2 \times 10^{-7}$  C is acted upon by a force of 0.1 N. Determine the distance to the other charge of  $4.5 \times 10^{-7}$  C; both the charges are in vacuum.  
a) 0.03      b) 0.05  
c) 0.07      d) 0.09
- 11) Relation between potential  $V$  and electric field  
a)  $E = -\nabla V$       b)  $E = \nabla V$   
c)  $V = -\nabla E$       d)  $\nabla V = \nabla E$
- 12)  $\nabla^2 V = -\rho_v / \epsilon$  is  
a) Ohm's law      b) Faraday's law  
c) Poisson's equation      d) None of these
- 13) A charge is placed in a square container. The position of the charge with respect to the origin can be found by  
a) Spherical system      b) Circular system  
c) Cartesian system      d) Space coordinate system
- 14) Find the electric field intensity of two charges  $2C$  and  $-1C$  separated by a distance 1 m in air.  
a)  $18 \times 10^9$       b)  $9 \times 10^9$       c)  $36 \times 10^9$       d)  $-18 \times 10^9$
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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELECTROMAGNETIC ENGINEERING**

Day and Date : Wednesday, 29-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

**Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumptions if necessary.**

SECTION – I

2. Solve **any three** : **(3×4=12)**

1) Three vectors are given as  $\bar{A} = 2\bar{a}_x - 2\bar{a}_y - \bar{a}_z$ ;  $\bar{B} = \bar{a}_x + \bar{a}_y + \bar{a}_z$  and  $\bar{C} = \bar{a}_x + 2\bar{a}_y - 2\bar{a}_z$ ; Find

1)  $\bar{A} \times (\bar{B} \times \bar{C})$       2)  $\bar{A} \cdot \bar{B} \times \bar{C}$

2) Differentiate between cross product and dot product.

3) Derive the integral form of the Gauss's law.

4) State and prove coulomb's law.

5) On the line described by  $X = 2$  m,  $Y = -4$  m there is a uniform charge distribution  $\rho_l = 20$  nC / m . Determine  $\bar{E}$  at  $(-2, -1, 4)$ .

3. Solve **any two** : **(2×8=16)**

1) Uniform line charge of 120 nc/m lie along the entire extent of the three Co-ordinate axes. Assuming few space conditions, find E at P( -3, 2, -1).

2) Derive the expression for electric field intensity due to infinitely long line charge.

3) Explain the concept of boundary condition for electric field.



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- 1) Explain Biot-savart law in detail.
  - 2) A current filament of  $3\bar{a}_x$  amp. Lies along the x-axis. Find H components at  $P(-1, 3, 2)$ .
  - 3) What is Lorenz force ?
  - 4) Write a short note on self and mutual inductance.
  - 5) Describe physical significance of Maxwell's equation.
5. Solve **any two** : **(2×8=16)**
- 1) Derive an expression for magnetic field intensity due to infinite long straight current filament.
  - 2) Explain boundary conditions in magnetic fields.
  - 3) Find  $\bar{J}_d$  in air space within a large power distribution transformer where  $\bar{B} = 1.1 \cos [1.257 \times 10^{-6} (3 \times 10^8 t - y)] \bar{a}_x$  wb/m<sup>2</sup>.
-





SLR-TJ – 449

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Set **P**

**T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA)  
Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Saturday, 2-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) Assume suitable data *wherever necessary*.
  - 2) Non-programmable calculators are **permitted**.
  - 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**
- 1) A buffer amplifier has gain of
    - a) Infinity
    - b) Zero
    - c) Unity
    - d) Dependent upon the circuit parameters
  - 2) The gain of 741 OPAMP falls at low frequency of
    - a) 10 kHz
    - b) 10 Hz
    - c) 100 Hz
    - d) 1000 Hz
  - 3) A low pass RC filter acts as a pure differentiator when \_\_\_\_\_  
(where  $\omega$  is applied frequency and  $\tau$  is the time constant of RC circuit).
    - a)  $\omega\tau = 1$
    - b)  $\omega\tau \ll 1$
    - c)  $\omega\tau \gg 1$
    - d)  $\omega\tau = 0$
  - 4) The FM telemetry as compared with AM telemetry requires a channel that is
    - a) Equal to that of AM telemetry
    - b) Smaller than what is required for AM telemetry
    - c) 100 times of that required for AM telemetry
    - d) 10 times of that required for AM telemetry
  - 5) Digital instruments have input impedance of the order of
    - a)  $\Omega$
    - b) K  $\Omega$
    - c) M  $\Omega$
    - d) m  $\Omega$

P.T.O.



- 6) LEDs emit light
- Only in red colour
  - Only in yellow colour
  - Only in green colour
  - In red, green, yellow and amber colour
- 7) An LCD requires power of
- 20 W
  - 20 mW
  - 20  $\mu$ W
  - 20 nW
- 8) The switching time of LEDs is of the order of
- 1 s
  - 1 ms
  - 1  $\mu$ s
  - 1 ns
- 9) The power requirement of an LED is
- 40 mW per numeral
  - 40  $\mu$ W per numeral
  - 10 W per numeral
  - 10  $\mu$ W per numeral
- 10) Two strain gauges are used to measure strain in cantilever. One gauge is mounted on top of the cantilever and the other is placed at the bottom. The two strain gauges form two arms of a voltage sensitive Wheatstone's bridge. This bridge configuration is called
- A quarter bridge
  - A half bridge
  - A full bridge
  - A null bridge
- 11) Dummy strain gauges are used for
- Compensation of temperature changes
  - Increasing the sensitivity of bridge in which they are included
  - Compensating for different expansion
  - Calibration of strain gauges
- 12) Strain gauge rosettes are used
- When the direction of principal stress is known
  - When the direction of principal stress is unknown
  - When the direction of hoop stress is not known
  - When the direction of longitudinal stress is not known
- 13) Piezoelectric accelerometers meter,
- Should not be used for high frequencies above 100 Hz
  - Should be used for low frequencies
  - Should use a monitoring source of low input impedance
  - Have a low natural frequency
- 14) A thermocouple
- Has a low time constant when it is bare
  - Has a low time constant if it is provided with a sheath
  - Has the same time constant whether it is bare or is provided with sheath
  - None of these



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**T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA)  
Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Saturday, 2-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) Assume suitable data *whenever* necessary.  
2) Non-programmable calculators are **permitted**.

SECTION – I

2. Solve **any three** : **(3×4=12)**

a) Define following static characteristics :

- 1) Accuracy
- 2) Errors
- 3) Uncertainty
- 4) Linearity

b) Draw and explain block diagram of instrumentation system. Explain function of each block.

c) Draw and explain instrumentation amplifier.

d) Explain DAC with its block diagram.

3. Solve **any two** : **(8×2=16)**

a) What is mean by Active filters and derive the frequency response of 1<sup>st</sup> and 2<sup>nd</sup> order filter ?

b) Explain Modulator and Demodulator with suitable diagram.

c) Why there is need of signal conditioning in instrumentation system ? Give any one example of signal conditioning equipment with necessary diagram.

**Set P**



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- a) Explain position telemetry system with block diagram.
  - b) What is the need of digital display ? State its types and also define.
  - c) Write a short note on LED.
  - d) Draw the architecture of PLC and explain it in brief.
5. Solve **any two** : **(8×2=16)**
- a) Draw and explain block diagram of digital data transmission system. Give its advantages and disadvantages and applications.
  - b) Give the classification of recorders. Explain strip chart recorder with necessary diagram.
  - c) Explain function generator and spectrum analyzer.
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SLR-TJ – 449

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Set **Q**

**T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA)  
Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Saturday, 2-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) Assume suitable data *wherever* necessary.  
2) Non-programmable calculators are **permitted**.  
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**

- 1) The switching time of LEDs is of the order of  
a) 1 s                      b) 1 ms                      c) 1  $\mu$ s                      d) 1 ns
- 2) The power requirement of an LED is  
a) 40 mW per numeral                      b) 40  $\mu$ W per numeral  
c) 10 W per numeral                      d) 10  $\mu$ W per numeral
- 3) Two strain gauges are used to measure strain in cantilever. One gauge is mounted on top of the cantilever and the other is placed at the bottom. The two strain gauges form two arms of a voltage sensitive Wheatstone's bridge. This bridge configuration is called  
a) A quarter bridge                      b) A half bridge  
c) A full bridge                      d) A null bridge
- 4) Dummy strain gauges are used for  
a) Compensation of temperature changes  
b) Increasing the sensitivity of bridge in which they are included  
c) Compensating for different expansion  
d) Calibration of strain gauges
- 5) Strain gauge rosettes are used  
a) When the direction of principal stress is known  
b) When the direction of principal stress is unknown  
c) When the direction of hoop stress is not known  
d) When the direction of longitudinal stress is not known

P.T.O.



- 6) Piezoelectric accelerometers meter,
- Should not be used for high frequencies above 100 Hz
  - Should be used for low frequencies
  - Should use a monitoring source of low input impedance
  - Have a low natural frequency
- 7) A thermocouple
- Has a low time constant when it is bare
  - Has a low time constant if it is provided with a sheath
  - Has the same time constant whether it is bare or is provided with sheath
  - None of these
- 8) A buffer amplifier has gain of
- Infinity
  - Zero
  - Unity
  - Dependent upon the circuit parameters
- 9) The gain of 741 OPAMP falls at low frequency of
- 10 kHz
  - 10 Hz
  - 100 Hz
  - 1000 Hz
- 10) A low pass RC filter acts as a pure differentiator when \_\_\_\_\_  
(where  $\omega$  is applied frequency and  $\tau$  is the time constant of RC circuit).
- $\omega\tau = 1$
  - $\omega\tau \ll 1$
  - $\omega\tau \gg 1$
  - $\omega\tau = 0$
- 11) The FM telemetry as compared with AM telemetry requires a channel that is
- Equal to that of AM telemetry
  - Smaller than what is required for AM telemetry
  - 100 times of that required for AM telemetry
  - 10 times of that required for AM telemetry
- 12) Digital instruments have input impedance of the order of
- $\Omega$
  - K  $\Omega$
  - M  $\Omega$
  - m  $\Omega$
- 13) LEDs emit light
- Only in red colour
  - Only in yellow colour
  - Only in green colour
  - In red, green, yellow and amber colour
- 14) An LCD requires power of
- 20 W
  - 20 mW
  - 20  $\mu$ W
  - 20 nW
-



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**T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA)  
Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Saturday, 2-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) Assume suitable data *whenever* necessary.  
2) Non-programmable calculators are **permitted**.

SECTION – I

2. Solve **any three** : **(3×4=12)**

a) Define following static characteristics :

- 1) Accuracy
- 2) Errors
- 3) Uncertainty
- 4) Linearity

b) Draw and explain block diagram of instrumentation system. Explain function of each block.

c) Draw and explain instrumentation amplifier.

d) Explain DAC with its block diagram.

3. Solve **any two** : **(8×2=16)**

a) What is mean by Active filters and derive the frequency response of 1<sup>st</sup> and 2<sup>nd</sup> order filter ?

b) Explain Modulator and Demodulator with suitable diagram.

c) Why there is need of signal conditioning in instrumentation system ? Give any one example of signal conditioning equipment with necessary diagram.

**Set Q**



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- a) Explain position telemetry system with block diagram.
  - b) What is the need of digital display ? State its types and also define.
  - c) Write a short note on LED.
  - d) Draw the architecture of PLC and explain it in brief.
5. Solve **any two** : **(8×2=16)**
- a) Draw and explain block diagram of digital data transmission system. Give its advantages and disadvantages and applications.
  - b) Give the classification of recorders. Explain strip chart recorder with necessary diagram.
  - c) Explain function generator and spectrum analyzer.
-





SLR-TJ – 449

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Set **R**

**T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA)  
Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Saturday, 2-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) Assume suitable data **wherever** necessary.
  - 2) Non-programmable calculators are **permitted**.
  - 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

- 1) Digital instruments have input impedance of the order of  
a)  $\Omega$                       b)  $K \Omega$                       c)  $M \Omega$                       d)  $m \Omega$
- 2) LEDs emit light  
a) Only in red colour  
b) Only in yellow colour  
c) Only in green colour  
d) In red, green, yellow and amber colour
- 3) An LCD requires power of  
a) 20 W                      b) 20 mW                      c) 20  $\mu$ W                      d) 20 nW
- 4) The switching time of LEDs is of the order of  
a) 1 s                      b) 1 ms                      c) 1  $\mu$ s                      d) 1 ns
- 5) The power requirement of an LED is  
a) 40 mW per numeral                      b) 40  $\mu$ W per numeral  
c) 10 W per numeral                      d) 10  $\mu$ W per numeral
- 6) Two strain gauges are used to measure strain in cantilever. One gauge is mounted on top of the cantilever and the other is placed at the bottom. The two strain gauges form two arms of a voltage sensitive Wheatstone's bridge. This bridge configuration is called  
a) A quarter bridge                      b) A half bridge  
c) A full bridge                      d) A null bridge

P.T.O.



- 7) Dummy strain gauges are used for
- Compensation of temperature changes
  - Increasing the sensitivity of bridge in which they are included
  - Compensating for different expansion
  - Calibration of strain gauges
- 8) Strain gauge rosettes are used
- When the direction of principal stress is known
  - When the direction of principal stress is unknown
  - When the direction of hoop stress is not known
  - When the direction of longitudinal stress is not known
- 9) Piezoelectric accelerometers meter,
- Should not be used for high frequencies above 100 Hz
  - Should be used for low frequencies
  - Should use a monitoring source of low input impedance
  - Have a low natural frequency
- 10) A thermocouple
- Has a low time constant when it is bare
  - Has a low time constant if it is provided with a sheath
  - Has the same time constant whether it is bare or is provided with sheath
  - None of these
- 11) A buffer amplifier has gain of
- Infinity
  - Zero
  - Unity
  - Dependent upon the circuit parameters
- 12) The gain of 741 OPAMP falls at low frequency of
- 10 kHz
  - 10 Hz
  - 100 Hz
  - 1000 Hz
- 13) A low pass RC filter acts as a pure differentiator when \_\_\_\_\_  
(where  $\omega$  is applied frequency and  $\tau$  is the time constant of RC circuit).
- $\omega\tau = 1$
  - $\omega\tau \ll 1$
  - $\omega\tau \gg 1$
  - $\omega\tau = 0$
- 14) The FM telemetry as compared with AM telemetry requires a channel that is
- Equal to that of AM telemetry
  - Smaller than what is required for AM telemetry
  - 100 times of that required for AM telemetry
  - 10 times of that required for AM telemetry
-



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**T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA)  
Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Saturday, 2-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) Assume suitable data *whenever* necessary.  
2) Non-programmable calculators are **permitted**.

SECTION – I

2. Solve **any three** : **(3×4=12)**

a) Define following static characteristics :

- 1) Accuracy
- 2) Errors
- 3) Uncertainty
- 4) Linearity

b) Draw and explain block diagram of instrumentation system. Explain function of each block.

c) Draw and explain instrumentation amplifier.

d) Explain DAC with its block diagram.

3. Solve **any two** : **(8×2=16)**

a) What is mean by Active filters and derive the frequency response of 1<sup>st</sup> and 2<sup>nd</sup> order filter ?

b) Explain Modulator and Demodulator with suitable diagram.

c) Why there is need of signal conditioning in instrumentation system ? Give any one example of signal conditioning equipment with necessary diagram.

**Set R**



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- a) Explain position telemetry system with block diagram.
  - b) What is the need of digital display ? State its types and also define.
  - c) Write a short note on LED.
  - d) Draw the architecture of PLC and explain it in brief.
5. Solve **any two** : **(8×2=16)**
- a) Draw and explain block diagram of digital data transmission system. Give its advantages and disadvantages and applications.
  - b) Give the classification of recorders. Explain strip chart recorder with necessary diagram.
  - c) Explain function generator and spectrum analyzer.
-



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Set

S

**T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA)  
Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Saturday, 2-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) Assume suitable data **wherever** necessary.
  - 2) Non-programmable calculators are **permitted**.
  - 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

- 1) Two strain gauges are used to measure strain in cantilever. One gauge is mounted on top of the cantilever and the other is placed at the bottom. The two strain gauges form two arms of a voltage sensitive Wheatstone's bridge. This bridge configuration is called
  - a) A quarter bridge
  - b) A half bridge
  - c) A full bridge
  - d) A null bridge
- 2) Dummy strain gauges are used for
  - a) Compensation of temperature changes
  - b) Increasing the sensitivity of bridge in which they are included
  - c) Compensating for different expansion
  - d) Calibration of strain gauges
- 3) Strain gauge rosettes are used
  - a) When the direction of principal stress is known
  - b) When the direction of principal stress is unknown
  - c) When the direction of hoop stress is not known
  - d) When the direction of longitudinal stress is not known
- 4) Piezoelectric accelerometers meter,
  - a) Should not be used for high frequencies above 100 Hz
  - b) Should be used for low frequencies
  - c) Should use a monitoring source of low input impedance
  - d) Have a low natural frequency

P.T.O.



- 5) A thermocouple
- Has a low time constant when it is bare
  - Has a low time constant if it is provided with a sheath
  - Has the same time constant whether it is bare or is provided with sheath
  - None of these
- 6) A buffer amplifier has gain of
- Infinity
  - Zero
  - Unity
  - Dependent upon the circuit parameters
- 7) The gain of 741 OPAMP falls at low frequency of
- 10 kHz
  - 10 Hz
  - 100 Hz
  - 1000 Hz
- 8) A low pass RC filter acts as a pure differentiator when \_\_\_\_\_  
(where  $\omega$  is applied frequency and  $\tau$  is the time constant of RC circuit).
- $\omega\tau = 1$
  - $\omega\tau \ll 1$
  - $\omega\tau \gg 1$
  - $\omega\tau = 0$
- 9) The FM telemetry as compared with AM telemetry requires a channel that is
- Equal to that of AM telemetry
  - Smaller than what is required for AM telemetry
  - 100 times of that required for AM telemetry
  - 10 times of that required for AM telemetry
- 10) Digital instruments have input impedance of the order of
- $\Omega$
  - K  $\Omega$
  - M  $\Omega$
  - m  $\Omega$
- 11) LEDs emit light
- Only in red colour
  - Only in yellow colour
  - Only in green colour
  - In red, green, yellow and amber colour
- 12) An LCD requires power of
- 20 W
  - 20 mW
  - 20  $\mu$ W
  - 20 nW
- 13) The switching time of LEDs is of the order of
- 1 s
  - 1 ms
  - 1  $\mu$ s
  - 1 ns
- 14) The power requirement of an LED is
- 40 mW per numeral
  - 40  $\mu$ W per numeral
  - 10 W per numeral
  - 10  $\mu$ W per numeral
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**T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA)  
Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Saturday, 2-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) Assume suitable data *whenever* necessary.  
2) Non-programmable calculators are **permitted**.

SECTION – I

2. Solve **any three** : **(3×4=12)**

a) Define following static characteristics :

- 1) Accuracy
- 2) Errors
- 3) Uncertainty
- 4) Linearity

b) Draw and explain block diagram of instrumentation system. Explain function of each block.

c) Draw and explain instrumentation amplifier.

d) Explain DAC with its block diagram.

3. Solve **any two** : **(8×2=16)**

a) What is mean by Active filters and derive the frequency response of 1<sup>st</sup> and 2<sup>nd</sup> order filter ?

b) Explain Modulator and Demodulator with suitable diagram.

c) Why there is need of signal conditioning in instrumentation system ? Give any one example of signal conditioning equipment with necessary diagram.

**Set S**



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- a) Explain position telemetry system with block diagram.
  - b) What is the need of digital display ? State its types and also define.
  - c) Write a short note on LED.
  - d) Draw the architecture of PLC and explain it in brief.
5. Solve **any two** : **(8×2=16)**
- a) Draw and explain block diagram of digital data transmission system. Give its advantages and disadvantages and applications.
  - b) Give the classification of recorders. Explain strip chart recorder with necessary diagram.
  - c) Explain function generator and spectrum analyzer.
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**T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017  
MICROPROCESSOR AND ITS APPLICATION (CGPA)**

Day and Date : Tuesday, 5-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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) Figures to **right** indicate **full** marks.
  - 5) Assume suitable data if **necessary**.
  - 6) Draw **neat** diagrams **where** required.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose correct answer :

14

- 1) What is the store by register ?  
a) data                      b) operands                      c) memory                      d) none of these
- 2) Which is not the control bus signal ?  
a) READ                      b) WRITE                      c) RESET                      d) None of these
- 3) INTR: it implies the \_\_\_\_\_ signal.  
a) INTRRUPT REQUEST                      b) INTRRUPT RIGHT  
c) INTRRUPT RONGH                      d) INTRRUPT RESET
- 4) The first microprocessor built by the Intel Corporation was called  
a) 8008                      b) 8080                      c) 4004                      d) 8800
- 5) A microprocessor retires instructions from  
a) Control memory      b) Cache memory      c) Main memory      d) Virtual memory
- 6) NMI stand for  
a) Non Mask able Interrupt                      b) Non Mistake Interrupt  
c) Both                      d) None of these
- 7) If memory chip size is  $1 \times 8$  bits then how many chips are required to make 1K byte memory ?  
a) 4                      b) 2                      c) 1                      d) 32
- 8) Programmable one shot mode of 8253 is  
a) mode 0                      b) mode 2                      c) mode 3                      d) mode 1

P.T.O.



- 9) The control word for 8255 to configure all ports as output in mode 0 is  
a) 20 H                      b) 60 H                      c) 88 H                      d) None
- 10) The delay provided by 8253 is a function of  
a) Count value only                      b) Count value and 8085 clock  
c) Count value and 8253 clock                      d) Both b and c
- 11) Power supply voltage range for DAC 0808 is  
a) 4.5 V to 18 V                      b)  $\pm 4.5$  V to  $\pm 18$  V  
c) 5 V to 15 V                      d) None
- 12) BSR mode is available in  
a) 8255                      b) 8253                      c) 8279                      d) 8251
- 13) Maximum number of I/O devices that can be addressed by INTEL 8085 is  
a) 65,536                      b) 205                      c) 512                      d) 256
- 14) USART chip provides  
a) half duplex operation                      b) full duplex operation  
c) duplex operation                      d) all
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**T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017  
MICROPROCESSOR AND ITS APPLICATION (CGPA)**

Day and Date : Tuesday, 5-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*  
2) *Figures to **right** indicate **full** marks.*  
3) *Assume suitable data if **necessary**.*  
4) *Draw **neat** diagrams **where** required.*

SECTION – I

2. Attempt **any three** : **(4×3=12)**

- 1) What do you mean by word size and byte size expansion ?
- 2) List the various registers of 8085.
- 3) Draw opcode fetch machine cycle of 8085 and discuss.
- 4) What is to be done if a particular part of a program is not to be interrupted by RST 7.5, RST 6.5, RST 5.5 and INTR ?

3. Attempt **any two** : **(2×8=16)**

- 1) Memory of capacity 1KB is interfaced with 8085 having starting address 1000 H. Write ALP to fetch 5 bytes from the last five locations and store the result of their average at any location in memory map.
- 2) Explain the various states of microprocessor by considering following :
  - a) When it acquires the state ?
  - b) What will happen to the buses and internal resistors ?
  - c) How to come out of that state ?
- 3) Explain DAD instruction. Add draw its timing diagram.

**Set P**



## SECTION – II

4. Attempt **any three** : **(4×3=12)**
- 1) Draw suitable block diagram of 8253/54. Comment on control word format.
  - 2) Define the terms synchronous and asynchronous transmission, half and full duplex transmission.
  - 3) Explain in brief successive approximation ADC.
  - 4) Explain DC motor speed control by using processor.
5. Attempt **any two** : **(2×8=16)**
- 1) Show detailed interfacing of 8251 with 8085. Assume suitable addresses.
  - 2) Draw the interface connection of microprocessor based over current relay and explain how it is realized.
  - 3) Explain the block diagram of ADC0808.
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SLR-TJ – 450

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**T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017  
MICROPROCESSOR AND ITS APPLICATION (CGPA)**

Day and Date : Tuesday, 5-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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) Figures to **right** indicate **full** marks.
  - 5) Assume suitable data if **necessary**.
  - 6) Draw **neat** diagrams **where** required.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose correct answer :

14

- 1) Programmable one shot mode of 8253 is
  - a) mode 0
  - b) mode 2
  - c) mode 3
  - d) mode 1
- 2) The control word for 8255 to configure all ports as output in mode 0 is
  - a) 20 H
  - b) 60 H
  - c) 88 H
  - d) None
- 3) The delay provided by 8253 is a function of
  - a) Count value only
  - b) Count value and 8085 clock
  - c) Count value and 8253 clock
  - d) Both b and c
- 4) Power supply voltage range for DAC 0808 is
  - a) 4.5 V to 18 V
  - b)  $\pm 4.5$  V to  $\pm 18$  V
  - c) 5 V to 15 V
  - d) None
- 5) BSR mode is available in
  - a) 8255
  - b) 8253
  - c) 8279
  - d) 8251
- 6) Maximum number of I/O devices that can be addressed by INTEL 8085 is
  - a) 65,536
  - b) 205
  - c) 512
  - d) 256
- 7) USART chip provides
  - a) half duplex operation
  - b) full duplex operation
  - c) duplex operation
  - d) all
- 8) What is the store by register ?
  - a) data
  - b) operands
  - c) memory
  - d) none of these

P.T.O.



- 9) Which is not the control bus signal ?  
a) READ                      b) WRITE                      c) RESET                      d) None of these
- 10) INTR: it implies the \_\_\_\_\_ signal.  
a) INTRRUPT REQUEST                      b) INTRRUPT RIGHT  
c) INTRRUPT RONGH                      d) INTRRUPT RESET
- 11) The first microprocessor built by the Intel Corporation was called  
a) 8008                      b) 8080                      c) 4004                      d) 8800
- 12) A microprocessor retires instructions from  
a) Control memory      b) Cache memory      c) Main memory      d) Virtual memory
- 13) NMI stand for  
a) Non Mask able Interrupt                      b) Non Mistake Interrupt  
c) Both                      d) None of these
- 14) If memory chip size is  $1 \times 8$  bits then how many chips are required to make 1K byte memory ?  
a) 4                      b) 2                      c) 1                      d) 32
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**T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017  
MICROPROCESSOR AND ITS APPLICATION (CGPA)**

Day and Date : Tuesday, 5-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*  
2) *Figures to **right** indicate **full** marks.*  
3) *Assume suitable data if **necessary**.*  
4) *Draw **neat** diagrams **where** required.*

SECTION – I

2. Attempt **any three** : **(4×3=12)**

- 1) What do you mean by word size and byte size expansion ?
- 2) List the various registers of 8085.
- 3) Draw opcode fetch machine cycle of 8085 and discuss.
- 4) What is to be done if a particular part of a program is not to be interrupted by RST 7.5, RST 6.5, RST 5.5 and INTR ?

3. Attempt **any two** : **(2×8=16)**

- 1) Memory of capacity 1KB is interfaced with 8085 having starting address 1000 H. Write ALP to fetch 5 bytes from the last five locations and store the result of their average at any location in memory map.
- 2) Explain the various states of microprocessor by considering following :
  - a) When it acquires the state ?
  - b) What will happen to the buses and internal resistors ?
  - c) How to come out of that state ?
- 3) Explain DAD instruction. Add draw its timing diagram.

**Set Q**



## SECTION – II

4. Attempt **any three** : **(4×3=12)**
- 1) Draw suitable block diagram of 8253/54. Comment on control word format.
  - 2) Define the terms synchronous and asynchronous transmission, half and full duplex transmission.
  - 3) Explain in brief successive approximation ADC.
  - 4) Explain DC motor speed control by using processor.
5. Attempt **any two** : **(2×8=16)**
- 1) Show detailed interfacing of 8251 with 8085. Assume suitable addresses.
  - 2) Draw the interface connection of microprocessor based over current relay and explain how it is realized.
  - 3) Explain the block diagram of ADC0808.
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SLR-TJ – 450

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Set **R**

**T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017  
MICROPROCESSOR AND ITS APPLICATION (CGPA)**

Day and Date : Tuesday, 5-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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) Figures to **right** indicate **full** marks.
  - 5) Assume suitable data if **necessary**.
  - 6) Draw **neat** diagrams **where** required.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose correct answer :

**14**

- 1) A microprocessor retires instructions from
  - a) Control memory
  - b) Cache memory
  - c) Main memory
  - d) Virtual memory
- 2) NMI stand for
  - a) Non Mask able Interrupt
  - b) Non Mistake Interrupt
  - c) Both
  - d) None of these
- 3) If memory chip size is  $1 \times 8$  bits then how many chips are required to make 1K byte memory ?
  - a) 4
  - b) 2
  - c) 1
  - d) 32
- 4) Programmable one shot mode of 8253 is
  - a) mode 0
  - b) mode 2
  - c) mode 3
  - d) mode 1
- 5) The control word for 8255 to configure all ports as output in mode 0 is
  - a) 20 H
  - b) 60 H
  - c) 88 H
  - d) None
- 6) The delay provided by 8253 is a function of
  - a) Count value only
  - b) Count value and 8085 clock
  - c) Count value and 8253 clock
  - d) Both b and c
- 7) Power supply voltage range for DAC 0808 is
  - a) 4.5 V to 18 V
  - b)  $\pm 4.5$  V to  $\pm 18$  V
  - c) 5 V to 15 V
  - d) None

P.T.O.



- 8) BSR mode is available in  
a) 8255                      b) 8253                      c) 8279                      d) 8251
- 9) Maximum number of I/O devices that can be addressed by INTEL 8085 is  
a) 65,536                      b) 205                      c) 512                      d) 256
- 10) USART chip provides  
a) half duplex operation                      b) full duplex operation  
c) duplex operation                      d) all
- 11) What is the store by register ?  
a) data                      b) operands                      c) memory                      d) none of these
- 12) Which is not the control bus signal ?  
a) READ                      b) WRITE                      c) RESET                      d) None of these
- 13) INTR: it implies the \_\_\_\_\_ signal.  
a) INTRRUPT REQUEST                      b) INTRRUPT RIGHT  
c) INTRRUPT RONGH                      d) INTRRUPT RESET
- 14) The first microprocessor built by the Intel Corporation was called  
a) 8008                      b) 8080                      c) 4004                      d) 8800
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**T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017  
MICROPROCESSOR AND ITS APPLICATION (CGPA)**

Day and Date : Tuesday, 5-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*  
2) *Figures to right indicate full marks.*  
3) *Assume suitable data if necessary.*  
4) *Draw neat diagrams where required.*

SECTION – I

2. Attempt **any three** : **(4×3=12)**

- 1) What do you mean by word size and byte size expansion ?
- 2) List the various registers of 8085.
- 3) Draw opcode fetch machine cycle of 8085 and discuss.
- 4) What is to be done if a particular part of a program is not to be interrupted by RST 7.5, RST 6.5, RST 5.5 and INTR ?

3. Attempt **any two** : **(2×8=16)**

- 1) Memory of capacity 1KB is interfaced with 8085 having starting address 1000 H. Write ALP to fetch 5 bytes from the last five locations and store the result of their average at any location in memory map.
- 2) Explain the various states of microprocessor by considering following :
  - a) When it acquires the state ?
  - b) What will happen to the buses and internal registers ?
  - c) How to come out of that state ?
- 3) Explain DAD instruction. Add draw its timing diagram.

**Set R**



## SECTION – II

4. Attempt **any three** : **(4×3=12)**
- 1) Draw suitable block diagram of 8253/54. Comment on control word format.
  - 2) Define the terms synchronous and asynchronous transmission, half and full duplex transmission.
  - 3) Explain in brief successive approximation ADC.
  - 4) Explain DC motor speed control by using processor.
5. Attempt **any two** : **(2×8=16)**
- 1) Show detailed interfacing of 8251 with 8085. Assume suitable addresses.
  - 2) Draw the interface connection of microprocessor based over current relay and explain how it is realized.
  - 3) Explain the block diagram of ADC0808.
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SLR-TJ – 450

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**T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017  
MICROPROCESSOR AND ITS APPLICATION (CGPA)**

Day and Date : Tuesday, 5-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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) Figures to **right** indicate **full** marks.
  - 5) Assume suitable data if **necessary**.
  - 6) Draw **neat** diagrams **where** required.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose correct answer :

14

- 1) The delay provided by 8253 is a function of
  - a) Count value only
  - b) Count value and 8085 clock
  - c) Count value and 8253 clock
  - d) Both b and c
- 2) Power supply voltage range for DAC 0808 is
  - a) 4.5 V to 18 V
  - b)  $\pm 4.5$  V to  $\pm 18$  V
  - c) 5 V to 15 V
  - d) None
- 3) BSR mode is available in
  - a) 8255
  - b) 8253
  - c) 8279
  - d) 8251
- 4) Maximum number of I/O devices that can be addressed by INTEL 8085 is
  - a) 65,536
  - b) 205
  - c) 512
  - d) 256
- 5) USART chip provides
  - a) half duplex operation
  - b) full duplex operation
  - c) duplex operation
  - d) all
- 6) What is the store by register ?
  - a) data
  - b) operands
  - c) memory
  - d) none of these
- 7) Which is not the control bus signal ?
  - a) READ
  - b) WRITE
  - c) RESET
  - d) None of these
- 8) INTR: it implies the \_\_\_\_\_ signal.
  - a) INTERRUPT REQUEST
  - b) INTERRUPT RIGHT
  - c) INTERRUPT RONGH
  - d) INTERRUPT RESET

P.T.O.



- 9) The first microprocessor built by the Intel Corporation was called  
a) 8008                      b) 8080                      c) 4004                      d) 8800
- 10) A microprocessor retires instructions from  
a) Control memory    b) Cache memory    c) Main memory    d) Virtual memory
- 11) NMI stand for  
a) Non Mask able Interrupt                      b) Non Mistake Interrupt  
c) Both                                                      d) None of these
- 12) If memory chip size is  $1 \times 8$  bits then how many chips are required to make 1K byte memory ?  
a) 4                              b) 2                              c) 1                              d) 32
- 13) Programmable one shot mode of 8253 is  
a) mode 0                      b) mode 2                      c) mode 3                      d) mode 1
- 14) The control word for 8255 to configure all ports as output in mode 0 is  
a) 20 H                      b) 60 H                      c) 88 H                      d) None
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**T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017  
MICROPROCESSOR AND ITS APPLICATION (CGPA)**

Day and Date : Tuesday, 5-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) *All questions are compulsory.*  
2) *Figures to right indicate full marks.*  
3) *Assume suitable data if necessary.*  
4) *Draw neat diagrams where required.*

SECTION – I

2. Attempt **any three** : **(4×3=12)**

- 1) What do you mean by word size and byte size expansion ?
- 2) List the various registers of 8085.
- 3) Draw opcode fetch machine cycle of 8085 and discuss.
- 4) What is to be done if a particular part of a program is not to be interrupted by RST 7.5, RST 6.5, RST 5.5 and INTR ?

3. Attempt **any two** : **(2×8=16)**

- 1) Memory of capacity 1KB is interfaced with 8085 having starting address 1000 H. Write ALP to fetch 5 bytes from the last five locations and store the result of their average at any location in memory map.
- 2) Explain the various states of microprocessor by considering following :
  - a) When it acquires the state ?
  - b) What will happen to the buses and internal resistors ?
  - c) How to come out of that state ?
- 3) Explain DAD instruction. Add draw its timing diagram.

**Set S**



## SECTION – II

4. Attempt **any three** : **(4×3=12)**
- 1) Draw suitable block diagram of 8253/54. Comment on control word format.
  - 2) Define the terms synchronous and asynchronous transmission, half and full duplex transmission.
  - 3) Explain in brief successive approximation ADC.
  - 4) Explain DC motor speed control by using processor.
5. Attempt **any two** : **(2×8=16)**
- 1) Show detailed interfacing of 8251 with 8085. Assume suitable addresses.
  - 2) Draw the interface connection of microprocessor based over current relay and explain how it is realized.
  - 3) Explain the block diagram of ADC0808.
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Set **P**

**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELEMENTS OF POWER SYSTEM**

Day and Date : Thursday, 7-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) Figure to the **right** indicates **maximum** marks.
  - 3) Assume the suitable data **whenever** 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 : 14

1. Choose the correct alternative : **(1×14=14)**
- 1) Skin effect results in
    - a) Reduced effective resistance but increased effective internal reactance of the conductor
    - b) Increased effective resistance but reduced effective internal reactance of conductor
    - c) Reduced effective resistance as well as effective internal reactance
    - d) Increased effective resistance as well as effective internal reactance
  - 2) The effect of wind pressure is more predominant on
    - a) Transmission lines
    - b) Neutral wires
    - c) Insulator
    - d) Supporting towers
  - 3) The characteristics impedance of a transmission line depends upon
    - a) Shape of the conductor
    - b) Surface treatment of the conductors
    - c) Conductivity of the material
    - d) Geometrical configuration of the conductors
  - 4) Guard ring transmission line
    - a) Improves power factor
    - b) Reduces earth capacitance of the lowest unit
    - c) Reduces transmission losses
    - d) Improves regulation

P.T.O.



- 5) When transformers or switchgears are to be installed in a transmission line, the poles used are
  - a) I – type
  - b) J – type
  - c) H – type
  - d) L – type
- 6) Presence of ozone as a result of corona is harmful because
  - a) It gives bad odor
  - b) It corrodes the material
  - c) It transfers energy to the ground
  - d) Reduces power factor
- 7) When two conductors each of radius  $r$  are at a distance  $D$ , the capacitance between the two is proportional to
  - a)  $\log_e (D/r)$
  - b)  $\log_e (r/D)$
  - c)  $1/\log_e (D/r)$
  - d)  $1/\log_e (r/D)$
- 8) Stranded conductors are used for transmitting power at high voltages because of
  - a) Increased tensile strength
  - b) Better wind resistance
  - c) Ease-in handling
  - d) Low cost
- 9) In overhead transmission lines the effect of capacitance can be neglected when the length of line is less than
  - a) 200 km
  - b) 160 km
  - c) 100 km
  - d) 80 km
- 10) Bundled conductors in EHV transmission lines
  - a) Increase inductance
  - b) Increase capacitance
  - c) Decrease inductance
  - d) Decrease capacitance
- 11) The permissible voltage variation in transmission and distribution system is
  - a)  $\pm 0.1\%$
  - b)  $\pm 1\%$
  - c)  $\pm 10\%$
  - d)  $\pm 25\%$
- 12) In case the height of transmission tower is increased
  - a) The line capacitance and inductance will not change
  - b) The line capacitance will decrease but line inductance will decrease
  - c) The line capacitance will decrease and line inductance will increase
  - d) The line capacitance will decrease but line inductance will remain unaltered
- 13) Length of the cable is doubled, its capacitance  $C$  will be
  - a) One-fourth
  - b) One-half
  - c) Doubled
  - d) Unchanged
- 14) Which of the following method is used for changing power factor from leading to lagging ?
  - a) Shunt capacitor
  - b) Series Capacitor
  - c) Shunt reactor
  - d) None of the above



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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELEMENTS OF POWER SYSTEM**

Day and Date : Thursday, 7-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

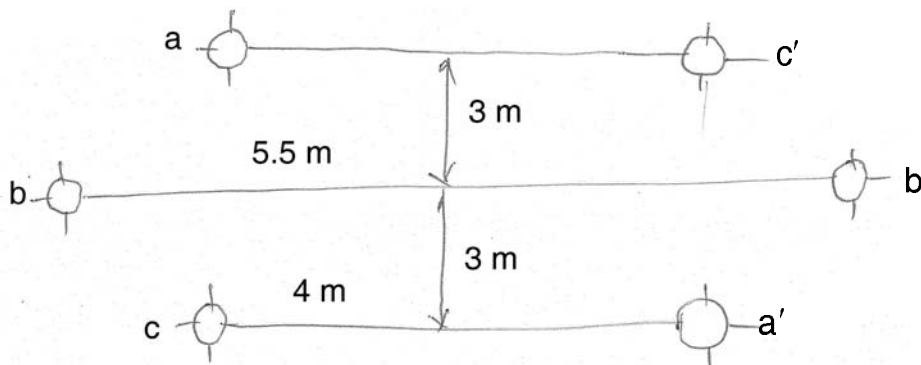
SECTION – I

2. Solve any four : (4×4=16)

- 1) Explain clearance in transmission line with suitable example.
- 2) Write short note on skin effect.
- 3) Write advantages and disadvantages corona.
- 4) Explain inductance of single phase two wire line.
- 5) Write short note on resonant vibration.
- 6) Calculate the inductance of each conductor in a 3 phase, 3-wire system when conductors are arranged in horizontal plane with spacing such that  $D_{31} = 4m$ ,  $D_{12} = D_{23} = 2m$ . The conductors are transposed and have diameter of 2.5cm.

3. Solve any two : (6×2=12)

- 1) Derive expression of voltage distribution in 3 insulators in a string.
- 2) Find the inductance per phase per km of double circuit 3-phase line as shown in fig. Distances are between center to center of conductors. The conductor are transposed and of radius 0.75 cm each. Phase sequence is abc.



- 3) Derive the expression for capacitance of 3-phase transmission line for unsymmetrical spacing.



## SECTION – II

4. Solve **any four** : **(4×4=16)**
- 1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal-  $\Pi$  method along with the equivalent circuit and phasor diagram.
  - 2) Draw and describe the screened type underground cable.
  - 3) Write a note on most economical conductor size in cables.
  - 4) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same ; find the voltages on the intersheath.
  - 5) Determine the generalized constants for medium transmission line using nominal T method.
  - 6) What is power factor ? Explain causes of low power factor.
5. Solve **any two** : **(6×2=12)**
- 1) Explain the capacitance of 3 core belted type cables.
  - 2) A 100 km long 3-phase, 50Hz transmission line has following constants  
Resistance/phase/km =  $0.1 \Omega$   
Reactance/phase/km =  $0.5 \Omega$   
Susceptance/phase/km =  $10 \times 10^{-6} \text{ S}$ .  
If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal-  $\Pi$  method
    - i) Sending end power factor
    - ii) Regulation
    - iii) Transmission efficiency
  - 3) Derive an expression for sending end and receiving end voltage and current for long transmission line (Rigorous method).
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SLR-TJ – 451

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Set **Q**

**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELEMENTS OF POWER SYSTEM**

Day and Date : Thursday, 7-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 70

- Instructions:** 1) **All questions are compulsory.**  
2) Figure to the **right** indicates **maximum** marks.  
3) Assume the suitable data **whenever** 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 : 14

1. Choose the correct alternative : **(1×14=14)**
- Stranded conductors are used for transmitting power at high voltages because of
    - Increased tensile strength
    - Better wind resistance
    - Ease-in handling
    - Low cost
  - In overhead transmission lines the effect of capacitance can be neglected when the length of line is less than
    - 200 km
    - 160 km
    - 100 km
    - 80 km
  - Bundled conductors in EHV transmission lines
    - Increase inductance
    - Increase capacitance
    - Decrease inductance
    - Decrease capacitance
  - The permissible voltage variation in transmission and distribution system is
    - $\pm 0.1\%$
    - $\pm 1\%$
    - $\pm 10\%$
    - $\pm 25\%$
  - In case the height of transmission tower is increased
    - The line capacitance and inductance will not change
    - The line capacitance will decrease but line inductance will decrease
    - The line capacitance will decrease and line inductance will increase
    - The line capacitance will decrease but line inductance will remain unaltered
  - Length of the cable is doubled, its capacitance C will be
    - One-fourth
    - One-half
    - Doubled
    - Unchanged

P.T.O.





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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELEMENTS OF POWER SYSTEM**

Day and Date : Thursday, 7-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

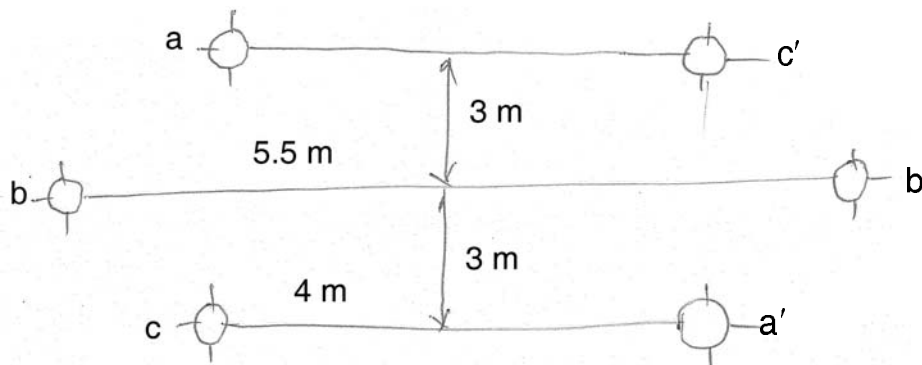
SECTION – I

2. Solve **any four** : **(4×4=16)**

- 1) Explain clearance in transmission line with suitable example.
- 2) Write short note on skin effect.
- 3) Write advantages and disadvantages corona.
- 4) Explain inductance of single phase two wire line.
- 5) Write short note on resonant vibration.
- 6) Calculate the inductance of each conductor in a 3 phase, 3-wire system when conductors are arranged in horizontal plane with spacing such that  $D_{31} = 4m$ ,  $D_{12} = D_{23} = 2m$ . The conductors are transposed and have diameter of 2.5cm.

3. Solve **any two** : **(6×2=12)**

- 1) Derive expression of voltage distribution in 3 insulators in a string.
- 2) Find the inductance per phase per km of double circuit 3-phase line as shown in fig. Distances are between center to center of conductors. The conductor are transposed and of radius 0.75 cm each. Phase sequence is abc.



- 3) Derive the expression for capacitance of 3-phase transmission line for unsymmetrical spacing.



## SECTION – II

4. Solve **any four** : **(4×4=16)**
- 1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal-  $\Pi$  method along with the equivalent circuit and phasor diagram.
  - 2) Draw and describe the screened type underground cable.
  - 3) Write a note on most economical conductor size in cables.
  - 4) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same ; find the voltages on the intersheath.
  - 5) Determine the generalized constants for medium transmission line using nominal T method.
  - 6) What is power factor ? Explain causes of low power factor.
5. Solve **any two** : **(6×2=12)**
- 1) Explain the capacitance of 3 core belted type cables.
  - 2) A 100 km long 3-phase, 50Hz transmission line has following constants  
Resistance/phase/km =  $0.1 \Omega$   
Reactance/phase/km =  $0.5 \Omega$   
Susceptance/phase/km =  $10 \times 10^{-6} \text{ S}$ .  
If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal-  $\Pi$  method
    - i) Sending end power factor
    - ii) Regulation
    - iii) Transmission efficiency
  - 3) Derive an expression for sending end and receiving end voltage and current for long transmission line (Rigorous method).
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SLR-TJ – 451

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Set **R**

**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELEMENTS OF POWER SYSTEM**

Day and Date : Thursday, 7-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 70

- Instructions:** 1) **All questions are compulsory.**  
2) Figure to the **right** indicates **maximum** marks.  
3) Assume the suitable data **whenever** 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 : 14

1. Choose the correct alternative : **(1×14=14)**

- 1) When transformers or switchgears are to be installed in a transmission line, the poles used are  
a) I – type                      b) J – type                      c) H – type                      d) L – type
- 2) Presence of ozone as a result of corona is harmful because  
a) It gives bad odor                      b) It corrodes the material  
c) It transfers energy to the ground      d) Reduces power factor
- 3) When two conductors each of radius  $r$  are at a distance  $D$ , the capacitance between the two is proportional to  
a)  $\log_e (D/r)$                       b)  $\log_e (r/D)$                       c)  $1/\log_e (D/r)$                       d)  $1/\log_e (r/D)$
- 4) Stranded conductors are used for transmitting power at high voltages because of  
a) Increased tensile strength                      b) Better wind resistance  
c) Ease-in handling                      d) Low cost
- 5) In overhead transmission lines the effect of capacitance can be neglected when the length of line is less than  
a) 200 km                      b) 160 km                      c) 100 km                      d) 80 km
- 6) Bundled conductors in EHV transmission lines  
a) Increase inductance                      b) Increase capacitance  
c) Decrease inductance                      d) Decrease capacitance
- 7) The permissible voltage variation in transmission and distribution system is  
a)  $\pm 0.1\%$                       b)  $\pm 1\%$                       c)  $\pm 10\%$                       d)  $\pm 25\%$

P.T.O.



- 8) In case the height of transmission tower is increased
- a) The line capacitance and inductance will not change
  - b) The line capacitance will decrease but line inductance will decrease
  - c) The line capacitance will decrease and line inductance will increase
  - d) The line capacitance will decrease but line inductance will remain unaltered
- 9) Length of the cable is doubled, its capacitance C will be
- a) One-fourth
  - b) One-half
  - c) Doubled
  - d) Unchanged
- 10) Which of the following method is used for changing power factor from leading to lagging ?
- a) Shunt capacitor
  - b) Series Capacitor
  - c) Shunt reactor
  - d) None of the above
- 11) Skin effect results in
- a) Reduced effective resistance but increased effective internal reactance of the conductor
  - b) Increased effective resistance but reduced effective internal reactance of conductor
  - c) Reduced effective resistance as well as effective internal reactance
  - d) Increased effective resistance as well as effective internal reactance
- 12) The effect of wind pressure is more predominant on
- a) Transmission lines
  - b) Neutral wires
  - c) Insulator
  - d) Supporting towers
- 13) The characteristics impedance of a transmission line depends upon
- a) Shape of the conductor
  - b) Surface treatment of the conductors
  - c) Conductivity of the material
  - d) Geometrical configuration of the conductors
- 14) Guard ring transmission line
- a) Improves power factor
  - b) Reduces earth capacitance of the lowest unit
  - c) Reduces transmission losses
  - d) Improves regulation



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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELEMENTS OF POWER SYSTEM**

Day and Date : Thursday, 7-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

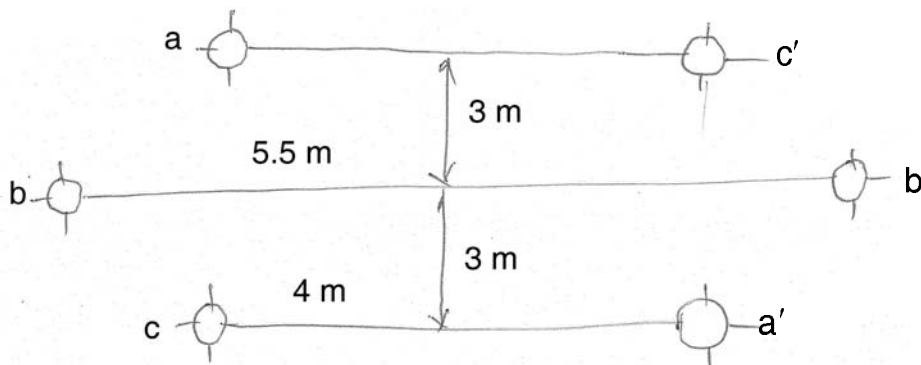
SECTION – I

2. Solve any four : (4×4=16)

- 1) Explain clearance in transmission line with suitable example.
- 2) Write short note on skin effect.
- 3) Write advantages and disadvantages corona.
- 4) Explain inductance of single phase two wire line.
- 5) Write short note on resonant vibration.
- 6) Calculate the inductance of each conductor in a 3 phase, 3-wire system when conductors are arranged in horizontal plane with spacing such that  $D_{31} = 4m$ ,  $D_{12} = D_{23} = 2m$ . The conductors are transposed and have diameter of 2.5cm.

3. Solve any two : (6×2=12)

- 1) Derive expression of voltage distribution in 3 insulators in a string.
- 2) Find the inductance per phase per km of double circuit 3-phase line as shown in fig. Distances are between center to center of conductors. The conductor are transposed and of radius 0.75 cm each. Phase sequence is abc.



- 3) Derive the expression for capacitance of 3-phase transmission line for unsymmetrical spacing.



## SECTION – II

4. Solve **any four** : **(4×4=16)**
- 1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal-  $\Pi$  method along with the equivalent circuit and phasor diagram.
  - 2) Draw and describe the screened type underground cable.
  - 3) Write a note on most economical conductor size in cables.
  - 4) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same ; find the voltages on the intersheath.
  - 5) Determine the generalized constants for medium transmission line using nominal T method.
  - 6) What is power factor ? Explain causes of low power factor.
5. Solve **any two** : **(6×2=12)**
- 1) Explain the capacitance of 3 core belted type cables.
  - 2) A 100 km long 3-phase, 50Hz transmission line has following constants  
Resistance/phase/km =  $0.1 \Omega$   
Reactance/phase/km =  $0.5 \Omega$   
Susceptance/phase/km =  $10 \times 10^{-6} \text{ S}$ .  
If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal-  $\Pi$  method
    - i) Sending end power factor
    - ii) Regulation
    - iii) Transmission efficiency
  - 3) Derive an expression for sending end and receiving end voltage and current for long transmission line (Rigorous method).
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SLR-TJ – 451

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Set **S**

**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELEMENTS OF POWER SYSTEM**

Day and Date : Thursday, 7-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Total Marks : 70

- Instructions:** 1) **All questions are compulsory.**  
2) Figure to the **right** indicates **maximum** marks.  
3) Assume the suitable data **whenever** 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 : 14

1. Choose the correct alternative : **(1×14=14)**
- Bundled conductors in EHV transmission lines
    - Increase inductance
    - Increase capacitance
    - Decrease inductance
    - Decrease capacitance
  - The permissible voltage variation in transmission and distribution system is
    - $\pm 0.1\%$
    - $\pm 1\%$
    - $\pm 10\%$
    - $\pm 25\%$
  - In case the height of transmission tower is increased
    - The line capacitance and inductance will not change
    - The line capacitance will decrease but line inductance will decrease
    - The line capacitance will decrease and line inductance will increase
    - The line capacitance will decrease but line inductance will remain unaltered
  - Length of the cable is doubled, its capacitance C will be
    - One-fourth
    - One-half
    - Doubled
    - Unchanged
  - Which of the following method is used for changing power factor from leading to lagging ?
    - Shunt capacitor
    - Series Capacitor
    - Shunt reactor
    - None of the above

P.T.O.



- 6) Skin effect results in
- a) Reduced effective resistance but increased effective internal reactance of the conductor
  - b) Increased effective resistance but reduced effective internal reactance of conductor
  - c) Reduced effective resistance as well as effective internal reactance
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- 7) The effect of wind pressure is more predominant on
- a) Transmission lines
  - b) Neutral wires
  - c) Insulator
  - d) Supporting towers
- 8) The characteristics impedance of a transmission line depends upon
- a) Shape of the conductor
  - b) Surface treatment of the conductors
  - c) Conductivity of the material
  - d) Geometrical configuration of the conductors
- 9) Guard ring transmission line
- a) Improves power factor
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- a) I – type
  - b) J – type
  - c) H – type
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- 13) Stranded conductors are used for transmitting power at high voltages because of
- a) Increased tensile strength
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  - c) Ease-in handling
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- 14) In overhead transmission lines the effect of capacitance can be neglected when the length of line is less than
- a) 200 km
  - b) 160 km
  - c) 100 km
  - d) 80 km



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**T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017  
ELEMENTS OF POWER SYSTEM**

Day and Date : Thursday, 7-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

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

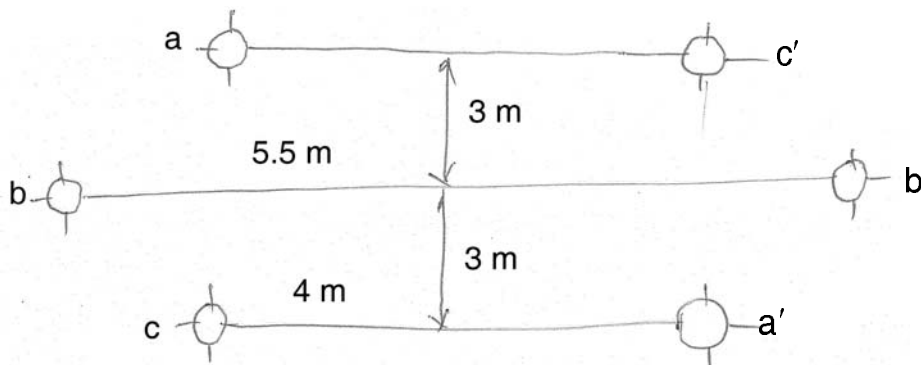
SECTION – I

2. Solve any four : (4×4=16)

- 1) Explain clearance in transmission line with suitable example.
- 2) Write short note on skin effect.
- 3) Write advantages and disadvantages corona.
- 4) Explain inductance of single phase two wire line.
- 5) Write short note on resonant vibration.
- 6) Calculate the inductance of each conductor in a 3 phase, 3-wire system when conductors are arranged in horizontal plane with spacing such that  $D_{31} = 4m$ ,  $D_{12} = D_{23} = 2m$ . The conductors are transposed and have diameter of 2.5cm.

3. Solve any two : (6×2=12)

- 1) Derive expression of voltage distribution in 3 insulators in a string.
- 2) Find the inductance per phase per km of double circuit 3-phase line as shown in fig. Distances are between center to center of conductors. The conductor are transposed and of radius 0.75 cm each. Phase sequence is abc.



- 3) Derive the expression for capacitance of 3-phase transmission line for unsymmetrical spacing.



## SECTION – II

4. Solve **any four** : **(4×4=16)**
- 1) Derive an expression for voltage regulation and efficiency of Medium transmission line consider nominal-  $\Pi$  method along with the equivalent circuit and phasor diagram.
  - 2) Draw and describe the screened type underground cable.
  - 3) Write a note on most economical conductor size in cables.
  - 4) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same ; find the voltages on the intersheath.
  - 5) Determine the generalized constants for medium transmission line using nominal T method.
  - 6) What is power factor ? Explain causes of low power factor.
5. Solve **any two** : **(6×2=12)**
- 1) Explain the capacitance of 3 core belted type cables.
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If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal-  $\Pi$  method
    - i) Sending end power factor
    - ii) Regulation
    - iii) Transmission efficiency
  - 3) Derive an expression for sending end and receiving end voltage and current for long transmission line (Rigorous method).
-







- 9) Which of the following is used to increase the bandwidth of a control system ?
- Phase lag compensator
  - Phase lead compensator
  - Phase lag-lead compensator
  - All of these
- 10) Phase margin of a system is used to specify which of the following ?
- Frequency response
  - Absolute stability
  - Relative stability
  - Time response
- 11) The transfer function of a passive network is given by  $s + \alpha_1 / s + \beta_1$ . Which of the following conditions is necessary such that the network acts as a phase lead compensator ?
- $\alpha_1 = \beta_1$
  - $\alpha_1 > \beta_1$
  - $\alpha_1 = 0$
  - $\alpha_1 < \beta_1$
- 12) The transfer function of a multi-input multi-output system, with the state-space representation of  $\dot{X} = AX + BU$  and  $Y = CX + DU$  where X represents the state, Y the output and U the input vector, will be given by
- $C(sI - A)^{-1} B$
  - $C(sI - A)^{-1} B + D$
  - $(sI - A)^{-1} B$
  - $(sI - A)^{-1} B + D$
- 13) A phase lag lead network introduces \_\_\_\_\_ in the output.
- Lag at all frequencies
  - Lag at high frequencies and lead at low frequencies
  - Lag at low frequencies and lead at high frequencies
  - None of the above
- 14) The transfer function technique is considered inadequate with systems having
- Stability problems
  - Multiple input disturbances
  - Complexities and non-linearity's
  - All of the above
-



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**T.E. (E & E) (Part – I) (CGPA) Examination, 2017  
CONTROL SYSTEM – I**

Day and Date : Saturday, 9-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

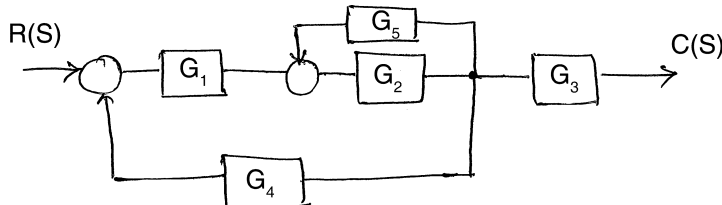
Marks : 56

SECTION – I

2. Solve **any four** :

**(4×4=16)**

a) Using block diagram reduction technique, find the T/F.



b) Derive the expression for transfer function of armature controlled DC servo motors.

c) Explain Mason's gain formula.

d) The open loop transfer function for a unity feedback system is given by

$$G(s) = \frac{K}{s(1 + T_1s)(1 + T_2s)}$$

Find the necessary condition for the system to be stable by using Routh's criteria.

e) Derive the expression for steady state error.

f) The forward path transfer function of a unity feedback control system is given by

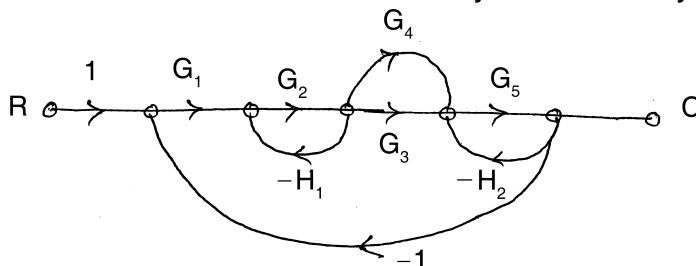
$$G(s) = \frac{1}{s(0.5s + 1)(0.2s + 1)}$$

Determine the step, ramp, parabolic error coefficient. Also determine the type of the system.

3. Solve **any two** :

**(2×6=12)**

a) Find the transfer function of the system below by using Mason's gain formula.



b) The transfer function of a unity feedback control system is given

$$G(s) = \frac{K}{s(2 + s)(4 + s)}$$

Draw Root Locus.



c) The open loop transfer function with unity feedback system is given as

$$G(s) = \frac{4}{s(1+s)}. \text{ Find}$$

- |                  |                   |
|------------------|-------------------|
| 1) Peak time     | 2) Peak overshoot |
| 3) Settling time | 4) Rise time.     |

### SECTION – II

4. Solve **any four** :

**(4×4=16)**

- Explain correlation between time and frequency domain.
- Explain PD controller.
- Explain phase lag compensator.

d) Check the controllability of system below  $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t),$

$$Y(t) = \begin{bmatrix} 1 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

- What is state transition matrix ? Explain its properties.
- Derive transfer function from state model given as below.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t), \quad Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

5. Solve **any two** :

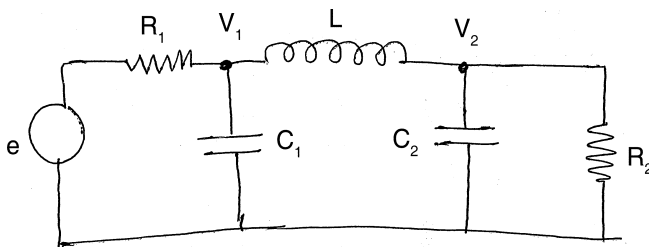
**(2×6=12)**

a) Construct the bode plot for the system whose open loop transfer function is given below and determine

a) gain margin

b) phase margin  $G(s)H(s) = \frac{4}{s(1+0.5s)(1+0.08s)}$ .

b) For the network shown below determine the state model.



c) The closed loop transfer function of a unity feedback system is given below :

$$\frac{C(S)}{R(S)} = \frac{KS + \beta}{S^2 + \alpha S + \beta}. \text{ Determine the steady state error for unit ramp input.}$$





- 7) The transfer function technique is considered inadequate with systems having
- a) Stability problems
  - b) Multiple input disturbances
  - c) Complexities and non-linearity's
  - d) All of the above
- 8) The initial response when the output is not equal to the input is termed \_\_\_\_\_ response.
- a) Dynamic
  - b) Transient
  - c) Error
  - d) None of these
- 9) The steady-state error of feedback control system with an acceleration input becomes finite in a
- a) type 0 system
  - b) type 1 system
  - c) type 2 system
  - d) type 3 system
- 10) Control systems are normally designed with damping factor
- a) Less than unity
  - b) Of unity
  - c) Of zero
  - d) More than unity
- 11) Mass in force-voltage analogy is analogous to
- a) inductance
  - b) charge
  - c) current
  - d) resistance
- 12) Root loci terminates at
- a) Open loop poles
  - b) Closed loop poles
  - c) Open loop zeros
  - d) Closed loop zeros
- 13) The bode plot is applicable to \_\_\_\_\_ phase network.
- a) All
  - b) Maximum
  - c) Minimum
  - d) None of these
- 14) The damping ratio of the characteristics equation  $s^2 + 4s + 16 = 0$  is
- a) 0.25
  - b) 0.5
  - c) 0.75
  - d) 1.0
-



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**T.E. (E & E) (Part – I) (CGPA) Examination, 2017  
CONTROL SYSTEM – I**

Day and Date : Saturday, 9-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

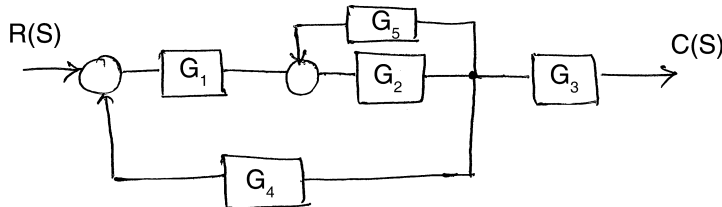
Marks : 56

SECTION – I

2. Solve **any four** :

**(4×4=16)**

a) Using block diagram reduction technique, find the T/F.



b) Derive the expression for transfer function of armature controlled DC servo motors.

c) Explain Mason's gain formula.

d) The open loop transfer function for a unity feedback system is given by

$$G(s) = \frac{K}{s(1 + T_1s)(1 + T_2s)}$$

Find the necessary condition for the system to be stable by using Routh's criteria.

e) Derive the expression for steady state error.

f) The forward path transfer function of a unity feedback control system is given by

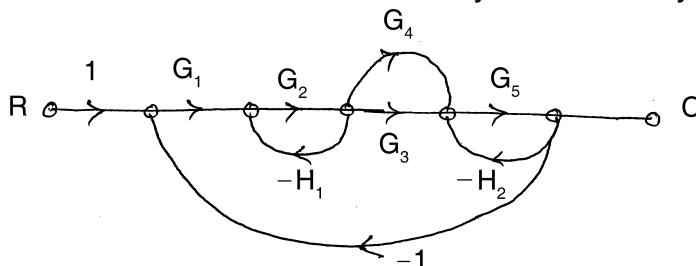
$$G(s) = \frac{1}{s(0.5s + 1)(0.2s + 1)}$$

Determine the step, ramp, parabolic error coefficient. Also determine the type of the system.

3. Solve **any two** :

**(2×6=12)**

a) Find the transfer function of the system below by using Mason's gain formula.



b) The transfer function of a unity feedback control system is given

$$G(s) = \frac{K}{s(2 + s)(4 + s)}$$

Draw Root Locus.



c) The open loop transfer function with unity feedback system is given as

$$G(s) = \frac{4}{s(1+s)}. \text{ Find}$$

- |                  |                   |
|------------------|-------------------|
| 1) Peak time     | 2) Peak overshoot |
| 3) Settling time | 4) Rise time.     |

SECTION – II

4. Solve **any four** :

(4x4=16)

- a) Explain correlation between time and frequency domain.
- b) Explain PD controller.
- c) Explain phase lag compensator.

d) Check the controllability of system below  $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t),$

$$Y(t) = [1 \quad 2] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

- e) What is state transition matrix ? Explain its properties.
- f) Derive transfer function from state model given as below.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t), \quad Y(t) = [1 \quad 0] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

5. Solve **any two** :

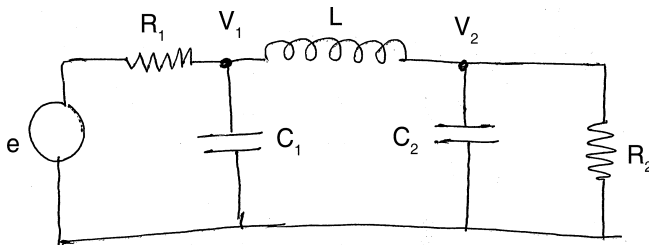
(2x6=12)

a) Construct the bode plot for the system whose open loop transfer function is given below and determine

a) gain margin

b) phase margin  $G(s)H(s) = \frac{4}{s(1+0.5s)(1+0.08s)}$ .

b) For the network shown below determine the state model.



c) The closed loop transfer function of a unity feedback system is given below :

$$\frac{C(S)}{R(S)} = \frac{KS + \beta}{S^2 + \alpha S + \beta}. \text{ Determine the steady state error for unit ramp input.}$$





SLR-TJ – 452

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**T.E. (E & E) (Part – I) (CGPA) Examination, 2017  
CONTROL SYSTEM – I**

Day and Date : Saturday, 9-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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 loci terminates at
  - a) Open loop poles
  - b) Closed loop poles
  - c) Open loop zeros
  - d) Closed loop zeros
- 2) The bode plot is applicable to \_\_\_\_\_ phase network.
  - a) All
  - b) Maximum
  - c) Minimum
  - d) None of these
- 3) The damping ratio of the characteristics equation  $s^2 + 4s + 16 = 0$  is
  - a) 0.25
  - b) 0.5
  - c) 0.75
  - d) 1.0
- 4) Addition of zeros in transfer function causes \_\_\_\_\_ compensation.
  - a) Lag
  - b) Lead
  - c) Lag-lead
  - d) None of these
- 5) Which of the following is used to increase the bandwidth of a control system ?
  - a) Phase lag compensator
  - b) Phase lead compensator
  - c) Phase lag-lead compensator
  - d) All of these
- 6) Phase margin of a system is used to specify which of the following ?
  - a) Frequency response
  - b) Absolute stability
  - c) Relative stability
  - d) Time response
- 7) The transfer function of a passive network is given by  $s + \alpha_1' / s + \beta_1$ . Which of the following conditions is necessary such that the network acts as a phase lead compensator ?
  - a)  $\alpha_1 = \beta_1$
  - b)  $\alpha_1 > \beta_1$
  - c)  $\alpha_1 = 0$
  - d)  $\alpha_1 < \beta_1$

P.T.O.





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**T.E. (E & E) (Part – I) (CGPA) Examination, 2017  
CONTROL SYSTEM – I**

Day and Date : Saturday, 9-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

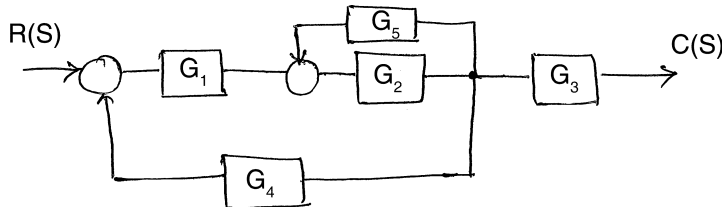
Marks : 56

SECTION – I

2. Solve **any four** :

**(4×4=16)**

a) Using block diagram reduction technique, find the T/F.



b) Derive the expression for transfer function of armature controlled DC servo motors.

c) Explain Mason's gain formula.

d) The open loop transfer function for a unity feedback system is given by

$$G(s) = \frac{K}{s(1 + T_1s)(1 + T_2s)}$$

Find the necessary condition for the system to be stable by using Routh's criteria.

e) Derive the expression for steady state error.

f) The forward path transfer function of a unity feedback control system is given by

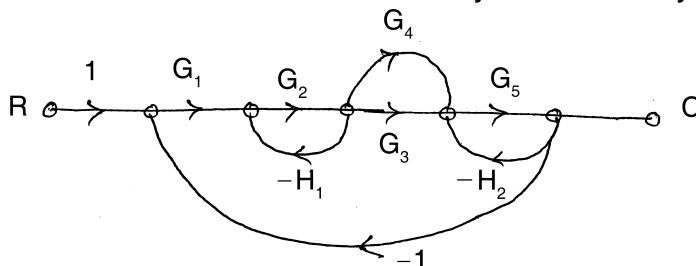
$$G(s) = \frac{1}{s(0.5s + 1)(0.2s + 1)}$$

Determine the step, ramp, parabolic error coefficient. Also determine the type of the system.

3. Solve **any two** :

**(2×6=12)**

a) Find the transfer function of the system below by using Mason's gain formula.



b) The transfer function of a unity feedback control system is given

$$G(s) = \frac{K}{s(2 + s)(4 + s)}$$

Draw Root Locus.



c) The open loop transfer function with unity feedback system is given as

$$G(s) = \frac{4}{s(1+s)}. \text{ Find}$$

- 1) Peak time
- 2) Peak overshoot
- 3) Settling time
- 4) Rise time.

SECTION – II

4. Solve **any four** :

(4x4=16)

- a) Explain correlation between time and frequency domain.
- b) Explain PD controller.
- c) Explain phase lag compensator.

d) Check the controllability of system below  $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t),$

$$Y(t) = \begin{bmatrix} 1 & 2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

- e) What is state transition matrix ? Explain its properties.
- f) Derive transfer function from state model given as below.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t), \quad Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

5. Solve **any two** :

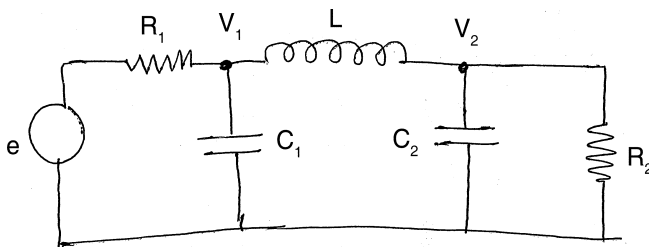
(2x6=12)

a) Construct the bode plot for the system whose open loop transfer function is given below and determine

a) gain margin

b) phase margin  $G(s)H(s) = \frac{4}{s(1+0.5s)(1+0.08s)}$ .

b) For the network shown below determine the state model.



c) The closed loop transfer function of a unity feedback system is given below :

$$\frac{C(S)}{R(S)} = \frac{KS + \beta}{S^2 + \alpha S + \beta}. \text{ Determine the steady state error for unit ramp input.}$$



SLR-TJ – 452

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**T.E. (E & E) (Part – I) (CGPA) Examination, 2017  
CONTROL SYSTEM – I**

Day and Date : Saturday, 9-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- 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) Phase margin of a system is used to specify which of the following ?
  - a) Frequency response
  - b) Absolute stability
  - c) Relative stability
  - d) Time response
- 2) The transfer function of a passive network is given by  $s + \alpha_1 / s + \beta_1$ . Which of the following conditions is necessary such that the network acts as a phase lead compensator ?
  - a)  $\alpha_1 = \beta_1$
  - b)  $\alpha_1 > \beta_1$
  - c)  $\alpha_1 = 0$
  - d)  $\alpha_1 < \beta_1$
- 3) The transfer function of a multi-input multi-output system, with the state-space representation of  $\dot{X} = AX + BU$  and  $Y = CX + DU$  where X represents the state, Y the output and U the input vector, will be given by
  - a)  $C(sI - A)^{-1} B$
  - b)  $C(sI - A)^{-1} B + D$
  - c)  $(sI - A)^{-1} B$
  - d)  $(sI - A)^{-1} B + D$
- 4) A phase lag lead network introduces \_\_\_\_\_ in the output.
  - a) Lag at all frequencies
  - b) Lag at high frequencies and lead at low frequencies
  - c) Lag at low frequencies and lead at high frequencies
  - d) None of the above
- 5) The transfer function technique is considered inadequate with systems having
  - a) Stability problems
  - b) Multiple input disturbances
  - c) Complexities and non-linearity's
  - d) All of the above

P.T.O.



- 6) The initial response when the output is not equal to the input is termed \_\_\_\_\_ response.
- a) Dynamic
  - b) Transient
  - c) Error
  - d) None of these
- 7) The steady-state error of feedback control system with an acceleration input becomes finite in a
- a) type 0 system
  - b) type 1 system
  - c) type 2 system
  - d) type 3 system
- 8) Control systems are normally designed with damping factor
- a) Less than unity
  - b) Of unity
  - c) Of zero
  - d) More than unity
- 9) Mass in force-voltage analogy is analogous to
- a) inductance
  - b) charge
  - c) current
  - d) resistance
- 10) Root loci terminates at
- a) Open loop poles
  - b) Closed loop poles
  - c) Open loop zeros
  - d) Closed loop zeros
- 11) The bode plot is applicable to \_\_\_\_\_ phase network.
- a) All
  - b) Maximum
  - c) Minimum
  - d) None of these
- 12) The damping ratio of the characteristics equation  $s^2 + 4s + 16 = 0$  is
- a) 0.25
  - b) 0.5
  - c) 0.75
  - d) 1.0
- 13) Addition of zeros in transfer function causes \_\_\_\_\_ compensation.
- a) Lag
  - b) Lead
  - c) Lag-lead
  - d) None of these
- 14) Which of the following is used to increase the bandwidth of a control system ?
- a) Phase lag compensator
  - b) Phase lead compensator
  - c) Phase lag-lead compensator
  - d) All of these
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**T.E. (E & E) (Part – I) (CGPA) Examination, 2017  
CONTROL SYSTEM – I**

Day and Date : Saturday, 9-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

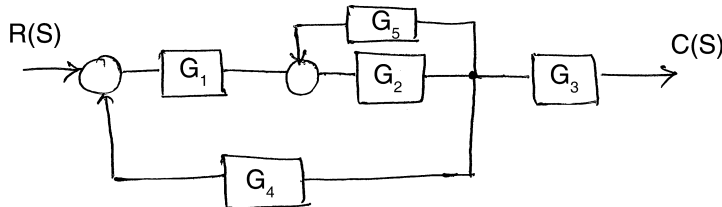
Marks : 56

SECTION – I

2. Solve **any four** :

**(4×4=16)**

a) Using block diagram reduction technique, find the T/F.



b) Derive the expression for transfer function of armature controlled DC servo motors.

c) Explain Mason's gain formula.

d) The open loop transfer function for a unity feedback system is given by

$$G(s) = \frac{K}{s(1 + T_1s)(1 + T_2s)}$$

Find the necessary condition for the system to be stable by using Routh's criteria.

e) Derive the expression for steady state error.

f) The forward path transfer function of a unity feedback control system is given by

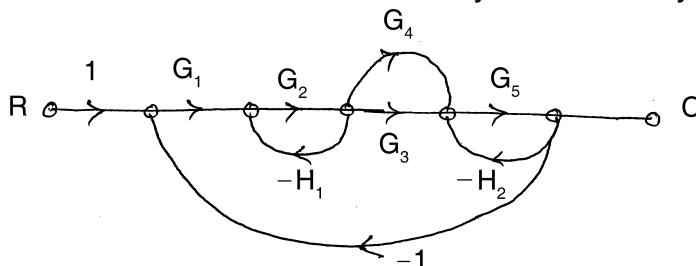
$$G(s) = \frac{1}{s(0.5s + 1)(0.2s + 1)}$$

Determine the step, ramp, parabolic error coefficient. Also determine the type of the system.

3. Solve **any two** :

**(2×6=12)**

a) Find the transfer function of the system below by using Mason's gain formula.



b) The transfer function of a unity feedback control system is given

$$G(s) = \frac{K}{s(2 + s)(4 + s)}$$

Draw Root Locus.



c) The open loop transfer function with unity feedback system is given as

$$G(s) = \frac{4}{s(1+s)}. \text{ Find}$$

- |                  |                   |
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| 1) Peak time     | 2) Peak overshoot |
| 3) Settling time | 4) Rise time.     |

SECTION – II

4. Solve **any four** :

(4x4=16)

- a) Explain correlation between time and frequency domain.
- b) Explain PD controller.
- c) Explain phase lag compensator.

d) Check the controllability of system below  $\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} -1 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t),$

$$Y(t) = [1 \quad 2] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

- e) What is state transition matrix ? Explain its properties.
- f) Derive transfer function from state model given as below.

$$\begin{bmatrix} \dot{x}_1 \\ \dot{x}_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t), \quad Y(t) = [1 \quad 0] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}.$$

5. Solve **any two** :

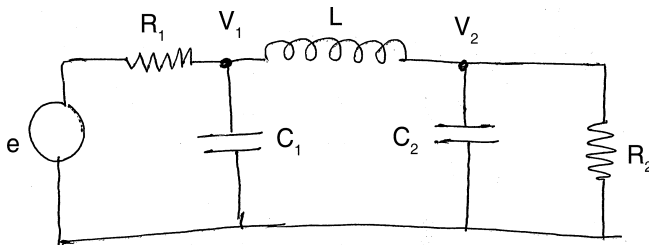
(2x6=12)

a) Construct the bode plot for the system whose open loop transfer function is given below and determine

a) gain margin

b) phase margin  $G(s)H(s) = \frac{4}{s(1+0.5s)(1+0.08s)}$ .

b) For the network shown below determine the state model.



c) The closed loop transfer function of a unity feedback system is given below :

$$\frac{C(S)}{R(S)} = \frac{KS + \beta}{S^2 + \alpha S + \beta}. \text{ Determine the steady state error for unit ramp input.}$$





SLR-TJ – 454

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**T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA)  
Examination, 2017  
POWER ELECTRONICS**

Day and Date : Tuesday, 21-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

**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. Attempt all questions :

**(1×14=14)**

- 1) A IGBT inherently having a
  - a) Diode across it
  - b) SCR across it
  - c) DIAC across it
  - d) Both a) and c)
- 2) The conduction losses in IGBT is
  - a) More than that of MOSFET
  - b) Lower than that of MOSFET
  - c) Equal to that of MOSFET
  - d) Equal to that of BJT
- 3) A MOSFET, for its conduction uses
  - a) Only minority carriers
  - b) Only majority carriers
  - c) Both minority and majority carriers
  - d) None of these
- 4) A single phase fully controlled converter with RL load can operate in
  - a) 4 quadrants
  - b) 3 quadrants
  - c) 2 quadrants
  - d) 1 quadrant
- 5) The switching function of semiconductor devices can be characterized with
  - a) Duty ratio only
  - b) Frequency only
  - c) Duty ratio and frequency
  - d) Duty ratio, frequency and time delay

P.T.O.



- 6) DIAC are specifically designed to trigger  
a) TRIAC                      b) SCR                      c) GTO                      d) Both a) and c)
- 7) In single phase VSI, the harmonic which is not present is  
a) 2<sup>nd</sup>                      b) 3<sup>rd</sup>                      c) 5<sup>th</sup>                      d) 7<sup>th</sup>
- 8) In the SPWM, the modulating signal is  
a) Square wave                      b) Sinusoidal wave  
c) Triangular wave                      d) Saw-tooth
- 9) The phase voltage output of a 180 degrees conduction of inverter having  
a) Step wave                      b) Squire wave  
c) Quasi square                      d) Wave in 6 steps
- 10) In single pulse modulation of PWM inverter, third harmonic can be eliminated if pulse width is equal to  
a) 30°                      b) 60°                      c) 120°                      d) 150°
- 11) In dc chopper the input voltage waveform is \_\_\_\_\_ and the output voltage waveform is  
a) continuous, discontinuous                      b) discontinuous, continuous  
c) continuous, continuous                      d) discontinuous, discontinuous
- 12) The voltage gain  $G(s) = \frac{V_g}{V_s}$  for buck-boost regulator is given by  
a)  $\frac{1}{1-K}$                       b)  $\frac{K}{1-K}$                       c)  $\frac{-K}{1-K}$                       d)  $\frac{-1}{1-K}$
- 13) A chopper has  $V_s$  as source voltage,  $R$  as load resistance and  $\alpha$  as duty cycle, the r.m.s. value of the output voltage is  
a)  $\alpha V_s$                       b)  $\sqrt{\alpha} V_s$                       c)  $\frac{V_s}{\sqrt{\alpha}}$                       d)  $\sqrt{1-\alpha} V_s$
- 14) The line to line voltage output of a 120 degrees conduction of inverter having  
a) Step wave                      b) Squire wave  
c) Quasi square                      d) Wave in 6 steps
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**T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA)  
Examination, 2017  
POWER ELECTRONICS**

Day and Date : Tuesday, 21-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
- a) What is meant by natural commutation ? Explain it.
  - b) Write the application of thyristor in UPS.
  - c) Explain the principle of operation of depletion P-channel MOSFET with its V-I and transfer characteristics.
  - d) Explain the principle of operation of IGBT with its V-I and transfer characteristics.
  - e) Explain the principle of operation 1-phase fully controlled bridge rectifier with R load for a firing angle of  $0^\circ$ .
3. Attempt **any two** questions : **(2×6=12)**
- a) Explain the operation of impulse commutation with neat diagram and waveforms. Derive the expressions for circuit turn off time of both main and auxiliary thyristor.
  - b) A single-phase full-converter, connected to 230 V, 50Hz, is feeding a load  $R = 10\Omega$  in series with a large inductance that makes the load current ripple free. For a firing angle of  $45^\circ$ , calculate
    - i) average load voltage ( $V_L$ )
    - ii) average load current
    - iii) RMS output voltage, RMS output current
    - iv) FF, RF
    - v) output DC power ( $P_{DC}$ ), Output AC Power( $P_{AC}$ ).
  - c) Explain the principle of operation of TRIAC in its 1<sup>st</sup> and 3<sup>rd</sup> Mode with V-I Characteristics.

Set P



## SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
- a) Explain principle of operation of Jones Chopper.
  - b) Explain the voltage control of Inverter.
  - c) Explain principle of operation of single phase to single phase Cycloconverter with RL.
  - d) A single phase half bridge inverter feeds a resistive load of  $R = 7.5 \Omega$ . The dc voltage of the inverter is given as 220v. Determine
    - i) RMS value of output voltage.
    - ii) Output power.
  - e) Explain the principle of operation of class-C Chopper.
5. Attempt **any two** questions : **(2×6=12)**
- a) Draw a neat sketch and explain the 120 degrees conduction mode of 3-phase inverter and derive the line-line voltage and phase voltage expressions.
  - b) Explain the principle of operation of step down chopper and derive the expressions for output voltage, current and RMS output voltage.
  - c) Explain principle of operation of 3 phase to 3 phase 3 pulse Cycloconverter with wave forms.
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SLR-TJ – 454

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**T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA)  
Examination, 2017  
POWER ELECTRONICS**

Day and Date : Tuesday, 21-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

**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. Attempt all questions :

(1×14=14)

- 1) In the SPWM, the modulating signal is
  - a) Square wave
  - b) Sinusoidal wave
  - c) Triangular wave
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- 2) The phase voltage output of a 180 degrees conduction of inverter having
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  - a) 30°
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  - a)  $\frac{1}{1-K}$
  - b)  $\frac{K}{1-K}$
  - c)  $\frac{-K}{1-K}$
  - d)  $\frac{-1}{1-K}$

P.T.O.



- 6) A chopper has  $V_s$  as source voltage,  $R$  as load resistance and  $\alpha$  as duty cycle, the r.m.s. value of the output voltage is
- a)  $\alpha V_s$                       b)  $\sqrt{\alpha} V_s$                       c)  $\frac{V_s}{\sqrt{\alpha}}$                       d)  $\sqrt{1-\alpha} V_s$
- 7) The line to line voltage output of a 120 degrees conduction of inverter having
- a) Step wave                      b) Squire wave  
c) Quasi square                      d) Wave in 6 steps
- 8) A IGBT inherently having a
- a) Diode across it                      b) SCR across it  
c) DIAC across it                      d) Both a) and c)
- 9) The conduction losses in IGBT is
- a) More than that of MOSFET                      b) Lower than that of MOSFET  
c) Equal to that of MOSFET                      d) Equal to that of BJT
- 10) A MOSFET, for its conduction uses
- a) Only minority carriers                      b) Only majority carriers  
c) Both minority and majority carriers                      d) None of these
- 11) A single phase fully controlled converter with RL load can operate in
- a) 4 quadrants                      b) 3 quadrants  
c) 2 quadrants                      d) 1 quadrant
- 12) The switching function of semiconductor devices can be characterized with
- a) Duty ratio only  
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c) Duty ratio and frequency  
d) Duty ratio, frequency and time delay
- 13) DIAC are specifically designed to trigger
- a) TRIAC                      b) SCR                      c) GTO                      d) Both a) and c)
- 14) In single phase VSI, the harmonic which is not present is
- a) 2<sup>nd</sup>                      b) 3<sup>rd</sup>                      c) 5<sup>th</sup>                      d) 7<sup>th</sup>
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**T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA)  
Examination, 2017  
POWER ELECTRONICS**

Day and Date : Tuesday, 21-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
- a) What is meant by natural commutation ? Explain it.
  - b) Write the application of thyristor in UPS.
  - c) Explain the principle of operation of depletion P-channel MOSFET with its V-I and transfer characteristics.
  - d) Explain the principle of operation of IGBT with its V-I and transfer characteristics.
  - e) Explain the principle of operation 1-phase fully controlled bridge rectifier with R load for a firing angle of  $0^\circ$ .
3. Attempt **any two** questions : **(2×6=12)**
- a) Explain the operation of impulse commutation with neat diagram and waveforms. Derive the expressions for circuit turn off time of both main and auxiliary thyristor.
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    - iii) RMS output voltage, RMS output current
    - iv) FF, RF
    - v) output DC power ( $P_{DC}$ ), Output AC Power( $P_{AC}$ ).
  - c) Explain the principle of operation of TRIAC in its 1<sup>st</sup> and 3<sup>rd</sup> Mode with V-I Characteristics.

**Set Q**



## SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
- a) Explain principle of operation of Jones Chopper.
  - b) Explain the voltage control of Inverter.
  - c) Explain principle of operation of single phase to single phase Cycloconverter with RL.
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5. Attempt **any two** questions : **(2×6=12)**
- a) Draw a neat sketch and explain the 120 degrees conduction mode of 3-phase inverter and derive the line-line voltage and phase voltage expressions.
  - b) Explain the principle of operation of step down chopper and derive the expressions for output voltage, current and RMS output voltage.
  - c) Explain principle of operation of 3 phase to 3 phase 3 pulse Cycloconverter with wave forms.
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SLR-TJ – 454

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**T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA)  
Examination, 2017  
POWER ELECTRONICS**

Day and Date : Tuesday, 21-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

**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. Attempt all questions :

**(1×14=14)**

- 1) The switching function of semiconductor devices can be characterized with
  - a) Duty ratio only
  - b) Frequency only
  - c) Duty ratio and frequency
  - d) Duty ratio, frequency and time delay
- 2) DIAC are specifically designed to trigger
  - a) TRIAC
  - b) SCR
  - c) GTO
  - d) Both a) and c)
- 3) In single phase VSI, the harmonic which is not present is
  - a) 2<sup>nd</sup>
  - b) 3<sup>rd</sup>
  - c) 5<sup>th</sup>
  - d) 7<sup>th</sup>
- 4) In the SPWM, the modulating signal is
  - a) Square wave
  - b) Sinusoidal wave
  - c) Triangular wave
  - d) Saw-tooth
- 5) The phase voltage output of a 180 degrees conduction of inverter having
  - a) Step wave
  - b) Square wave
  - c) Quasi square
  - d) Wave in 6 steps
- 6) In single pulse modulation of PWM inverter, third harmonic can be eliminated if pulse width is equal to
  - a) 30°
  - b) 60°
  - c) 120°
  - d) 150°

P.T.O.



- 7) In dc chopper the input voltage waveform is \_\_\_\_\_ and the output voltage waveform is
- a) continuous, discontinuous                      b) discontinuous, continuous  
c) continuous, continuous                         d) discontinuous, discontinuous
- 8) The voltage gain  $G(s) = \frac{V_g}{V_s}$  for buck-boost regulator is given by
- a)  $\frac{1}{1-K}$                       b)  $\frac{K}{1-K}$                       c)  $\frac{-K}{1-K}$                       d)  $\frac{-1}{1-K}$
- 9) A chopper has  $V_s$  as source voltage,  $R$  as load resistance and  $\alpha$  as duty cycle, the r.m.s. value of the output voltage is
- a)  $\alpha V_s$                       b)  $\sqrt{\alpha} V_s$                       c)  $\frac{V_s}{\sqrt{\alpha}}$                       d)  $\sqrt{1-\alpha} V_s$
- 10) The line to line voltage output of a 120 degrees conduction of inverter having
- a) Step wave                                              b) Squire wave  
c) Quasi square                                        d) Wave in 6 steps
- 11) A IGBT inherently having a
- a) Diode across it                                      b) SCR across it  
c) DIAC across it                                      d) Both a) and c)
- 12) The conduction losses in IGBT is
- a) More than that of MOSFET                      b) Lower than that of MOSFET  
c) Equal to that of MOSFET                        d) Equal to that of BJT
- 13) A MOSFET, for its conduction uses
- a) Only minority carriers                              b) Only majority carriers  
c) Both minority and majority carriers            d) None of these
- 14) A single phase fully controlled converter with RL load can operate in
- a) 4 quadrants                                              b) 3 quadrants  
c) 2 quadrants                                              d) 1 quadrant
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**T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA)  
Examination, 2017  
POWER ELECTRONICS**

Day and Date : Tuesday, 21-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
- a) What is meant by natural commutation ? Explain it.
  - b) Write the application of thyristor in UPS.
  - c) Explain the principle of operation of depletion P-channel MOSFET with its V-I and transfer characteristics.
  - d) Explain the principle of operation of IGBT with its V-I and transfer characteristics.
  - e) Explain the principle of operation 1-phase fully controlled bridge rectifier with R load for a firing angle of  $0^\circ$ .
3. Attempt **any two** questions : **(2×6=12)**
- a) Explain the operation of impulse commutation with neat diagram and waveforms. Derive the expressions for circuit turn off time of both main and auxiliary thyristor.
  - b) A single-phase full-converter, connected to 230 V, 50Hz, is feeding a load  $R = 10\Omega$  in series with a large inductance that makes the load current ripple free. For a firing angle of  $45^\circ$ , calculate
    - i) average load voltage ( $V_L$ )
    - ii) average load current
    - iii) RMS output voltage, RMS output current
    - iv) FF, RF
    - v) output DC power ( $P_{DC}$ ), Output AC Power( $P_{AC}$ ).
  - c) Explain the principle of operation of TRIAC in its 1<sup>st</sup> and 3<sup>rd</sup> Mode with V-I Characteristics.

Set R



## SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
- a) Explain principle of operation of Jones Chopper.
  - b) Explain the voltage control of Inverter.
  - c) Explain principle of operation of single phase to single phase Cycloconverter with RL.
  - d) A single phase half bridge inverter feeds a resistive load of  $R = 7.5. \Omega$  The dc voltage of the inverter is given as 220v. Determine
    - i) RMS value of output voltage.
    - ii) Output power.
  - e) Explain the principle of operation of class-C Chopper.
5. Attempt **any two** questions : **(2×6=12)**
- a) Draw a neat sketch and explain the 120 degrees conduction mode of 3-phase inverter and derive the line-line voltage and phase voltage expressions.
  - b) Explain the principle of operation of step down chopper and derive the expressions for output voltage, current and RMS output voltage.
  - c) Explain principle of operation of 3 phase to 3 phase 3 pulse Cycloconverter with wave forms.
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SLR-TJ – 454

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**T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA)  
Examination, 2017  
POWER ELECTRONICS**

Day and Date : Tuesday, 21-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

**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. Attempt all questions :

(1×14=14)

- 1) In single pulse modulation of PWM inverter, third harmonic can be eliminated if pulse width is equal to  
a) 30°                      b) 60°                      c) 120°                      d) 150°
- 2) In dc chopper the input voltage waveform is \_\_\_\_\_ and the output voltage waveform is  
a) continuous, discontinuous                      b) discontinuous, continuous  
c) continuous, continuous                      d) discontinuous, discontinuous
- 3) The voltage gain  $G(s) = \frac{V_g}{V_s}$  for buck-boost regulator is given by  
a)  $\frac{1}{1-K}$                       b)  $\frac{K}{1-K}$                       c)  $\frac{-K}{1-K}$                       d)  $\frac{-1}{1-K}$
- 4) A chopper has  $V_s$  as source voltage,  $R$  as load resistance and  $\alpha$  as duty cycle, the r.m.s. value of the output voltage is  
a)  $\alpha V_s$                       b)  $\sqrt{\alpha} V_s$                       c)  $\frac{V_s}{\sqrt{\alpha}}$                       d)  $\sqrt{1-\alpha} V_s$
- 5) The line to line voltage output of a 120 degrees conduction of inverter having  
a) Step wave                      b) Squire wave  
c) Quasi square                      d) Wave in 6 steps

P.T.O.



- 6) A IGBT inherently having a
- a) Diode across it
  - b) SCR across it
  - c) DIAC across it
  - d) Both a) and c)
- 7) The conduction losses in IGBT is
- a) More than that of MOSFET
  - b) Lower than that of MOSFET
  - c) Equal to that of MOSFET
  - d) Equal to that of BJT
- 8) A MOSFET, for its conduction uses
- a) Only minority carriers
  - b) Only majority carriers
  - c) Both minority and majority carriers
  - d) None of these
- 9) A single phase fully controlled converter with RL load can operate in
- a) 4 quadrants
  - b) 3 quadrants
  - c) 2 quadrants
  - d) 1 quadrant
- 10) The switching function of semiconductor devices can be characterized with
- a) Duty ratio only
  - b) Frequency only
  - c) Duty ratio and frequency
  - d) Duty ratio, frequency and time delay
- 11) DIAC are specifically designed to trigger
- a) TRIAC
  - b) SCR
  - c) GTO
  - d) Both a) and c)
- 12) In single phase VSI, the harmonic which is not present is
- a) 2<sup>nd</sup>
  - b) 3<sup>rd</sup>
  - c) 5<sup>th</sup>
  - d) 7<sup>th</sup>
- 13) In the SPWM, the modulating signal is
- a) Square wave
  - b) Sinusoidal wave
  - c) Triangular wave
  - d) Saw-tooth
- 14) The phase voltage output of a 180 degrees conduction of inverter having
- a) Step wave
  - b) Squire wave
  - c) Quasi square
  - d) Wave in 6 steps
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**T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA)  
Examination, 2017  
POWER ELECTRONICS**

Day and Date : Tuesday, 21-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
- a) What is meant by natural commutation ? Explain it.
  - b) Write the application of thyristor in UPS.
  - c) Explain the principle of operation of depletion P-channel MOSFET with its V-I and transfer characteristics.
  - d) Explain the principle of operation of IGBT with its V-I and transfer characteristics.
  - e) Explain the principle of operation 1-phase fully controlled bridge rectifier with R load for a firing angle of  $0^\circ$ .
3. Attempt **any two** questions : **(2×6=12)**
- a) Explain the operation of impulse commutation with neat diagram and waveforms. Derive the expressions for circuit turn off time of both main and auxiliary thyristor.
  - b) A single-phase full-converter, connected to 230 V, 50Hz, is feeding a load  $R = 10\Omega$  in series with a large inductance that makes the load current ripple free. For a firing angle of  $45^\circ$ , calculate
    - i) average load voltage ( $V_L$ )
    - ii) average load current
    - iii) RMS output voltage, RMS output current
    - iv) FF, RF
    - v) output DC power ( $P_{DC}$ ), Output AC Power( $P_{AC}$ ).
  - c) Explain the principle of operation of TRIAC in its 1<sup>st</sup> and 3<sup>rd</sup> Mode with V-I Characteristics.

Set S



## SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
- a) Explain principle of operation of Jones Chopper.
  - b) Explain the voltage control of Inverter.
  - c) Explain principle of operation of single phase to single phase Cycloconverter with RL.
  - d) A single phase half bridge inverter feeds a resistive load of  $R = 7.5. \Omega$  The dc voltage of the inverter is given as 220v. Determine
    - i) RMS value of output voltage.
    - ii) Output power.
  - e) Explain the principle of operation of class-C Chopper.
5. Attempt **any two** questions : **(2×6=12)**
- a) Draw a neat sketch and explain the 120 degrees conduction mode of 3-phase inverter and derive the line-line voltage and phase voltage expressions.
  - b) Explain the principle of operation of step down chopper and derive the expressions for output voltage, current and RMS output voltage.
  - c) Explain principle of operation of 3 phase to 3 phase 3 pulse Cycloconverter with wave forms.
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**T.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017  
ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date : Wednesday, 22-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:**
- 1) **All questions are compulsory.**
  - 2) Assume **suitable** data if necessary.
  - 3) Figures 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.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) Sinusoidal function is used as basic function in electrical communication because
    - a) Convenience
    - b) Response to linear system is sine wave
    - c) Both a) and b)
    - d) None
  - 2) The positive RF peaks of an AM voltage rise to a maximum value of 12 V and drop to a minimum value of 4 V. The modulation index assuming single tone modulation is
    - a) 3
    - b) 1/3
    - c) 1/4
    - d) 1/2
  - 3) An FM signal can be detected by using
    - a) an LPF
    - b) a PLL
    - c) a discriminator
    - d) an average detector
  - 4) In phase shift SSB modulator, the input signals to one of the balanced modulators are phase shifted by
    - a) 45°
    - b) 90°
    - c) 180°
    - d) 30°

P.T.O.





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**T.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017  
ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date : Wednesday, 22-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) Assume **suitable** data if necessary.  
3) Figures to **right** indicates **full marks.**

SECTION – I

2. Solve **any three** of the following : **(4×3=12)**
- 1) Draw and explain model of communication system.
  - 2) Determine  $\eta$  and percentage of total power carried by sidebands of AM wave for tone modulation when  $\mu = 0.5$  and  $\mu = 0.3$ .
  - 3) Explain the relationship between FM and PM.
  - 4) Explain the concept of pre-emphasis and de-emphasis.
3. Solve **any two** of the following : **(8×2=16)**
- 1) Draw and explain Vestigial Sideband System.
  - 2) A single tone modulating signal  $\text{Cos}(15 \pi 10^3 t)$  frequency modulates a carrier of 10 MHz and produces a frequency deviation of 75 kHz.  
Find
    - a) Modulation index.
    - b) Phase deviation produced in FM wave.
    - c) If another modulating signal produces a modulation index of 100 while maintaining same deviation. Find frequency and amplitude of modulating signal assuming  $K_f = 15 \text{ KHz per volt}$ .
  - 3) Explain classification of signals with examples.



## SECTION – II

4. Solve **any three** of the following : **(4×3=12)**
- 1) What is intersymbol interference ? Explain its effect.
  - 2) What are the advantages of Digital Communication ?
  - 3) 24 telephone channels, each band limited to 3.4 kHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and an 8 kHz sampling frequency.
  - 4) Explain the process of handoff in cellular system.

5. Solve **any two** of the following : **(8×2=16)**
- 1) Draw and explain Scrambler and descrambler in detail.
  - 2) What are different types of line codes ? Explain properties of line codes.
  - 3) Let X be a continuous random variable with following PDF.

$$f_x(x) = \begin{cases} c e^{-x} & x \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

where C is positive constant.

- a) Find C
  - b) Find CDF of X,  $f_x(x)$
  - c) Find  $P(1 < X < 3)$ .
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Set **Q**

**T.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017  
ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date : Wednesday, 22-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) Assume **suitable** data if necessary.
  - 3) Figures 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.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) Pick the odd man out.  
a) PWM                      b) PPM                      c) PDM                      d) PLM
  - 2) Aliasing occurs when the Nyquist rate is  
a)  $2F_m$                       b)  $3F_m$                       c)  $2.5F_m$                       d)  $1.2F_m$
  - 3) The main advantage of PCM is  
a) less bandwidth  
b) less power  
c) better performance in presence of noise  
d) possibility of multiplexing
  - 4) The signal to noise ratio for a sinusoidal signal quantized using 10 bit PCM is  
a) 62dB                      b) 10dB                      c) 60dB                      d) 32dB
  - 5) The stationary process has  
a) ensemble average equal to time average  
b) all statistical properties are dependent on time  
c) all statistical properties are independent on time  
d) zero variance

P.T.O.



- 6) State true or false : Unit of variance is same as unit of random variable.  
a) True                      b) False
- 7) The core concept used in cellular technology is  
a) TDM                                      b) Frequency reuse  
c) Code reuse                              d) None of the above
- 8) Sinusoidal function is used as basic function in electrical communication because  
a) Convenience  
b) Response to linear system is sine wave  
c) Both a) and b)  
d) None
- 9) The positive RF peaks of an AM voltage rise to a maximum value of 12 V and drop to a minimum value of 4 V. The modulation index assuming single tone modulation is  
a) 3                      b) 1/3                      c) 1/4                      d) 1/2
- 10) An FM signal can be detected by using  
a) an LPF                                      b) a PLL  
c) a discriminator                              d) an average detector
- 11) In phase shift SSB modulator, the input signals to one of the balanced modulators are phase shifted by  
a) 45°                      b) 90°                      c) 180°                      d) 30°
- 12) The most suitable method for detecting a modulating signal  $(2.5 + 5 \cos w_m t) \cos w_c t$  is  
a) envelop detector                              b) synchronous detector  
c) ratio detector                              d) a) and b)
- 13) In commercial FM broadcast system, modulating signal frequency is limited to about  
a) 3.4 kHz                      b) 5 kHz                      c) 15 kHz                      d) 20 kHz
- 14) Following is not an advantage of FM over AM  
a) noise immunity                              b) fidelity  
c) capture effect                              d) sputtering effect
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**T.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017  
ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date : Wednesday, 22-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) Assume **suitable** data if necessary.  
3) Figures to **right** indicates **full marks.**

SECTION – I

2. Solve **any three** of the following : **(4×3=12)**
- 1) Draw and explain model of communication system.
  - 2) Determine  $\eta$  and percentage of total power carried by sidebands of AM wave for tone modulation when  $\mu = 0.5$  and  $\mu = 0.3$ .
  - 3) Explain the relationship between FM and PM.
  - 4) Explain the concept of pre-emphasis and de-emphasis.
3. Solve **any two** of the following : **(8×2=16)**
- 1) Draw and explain Vestigial Sideband System.
  - 2) A single tone modulating signal  $\text{Cos}(15 \pi 10^3 t)$  frequency modulates a carrier of 10 MHz and produces a frequency deviation of 75 kHz.  
Find
    - a) Modulation index.
    - b) Phase deviation produced in FM wave.
    - c) If another modulating signal produces a modulation index of 100 while maintaining same deviation. Find frequency and amplitude of modulating signal assuming  $K_f = 15$  KHz per volt.
  - 3) Explain classification of signals with examples.

**Set Q**



## SECTION – II

4. Solve **any three** of the following : **(4×3=12)**
- 1) What is intersymbol interference ? Explain its effect.
  - 2) What are the advantages of Digital Communication ?
  - 3) 24 telephone channels, each band limited to 3.4 kHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and an 8 kHz sampling frequency.
  - 4) Explain the process of handoff in cellular system.

5. Solve **any two** of the following : **(8×2=16)**
- 1) Draw and explain Scrambler and descrambler in detail.
  - 2) What are different types of line codes ? Explain properties of line codes.
  - 3) Let X be a continuous random variable with following PDF.

$$f_x(x) = \begin{cases} c e^{-x} & x \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

where C is positive constant.

- a) Find C
  - b) Find CDF of X,  $f_x(x)$
  - c) Find  $P(1 < X < 3)$ .
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Set **R**

**T.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017  
ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date : Wednesday, 22-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) Assume **suitable** data if necessary.
  - 3) Figures 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.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) The most suitable method for detecting a modulating signal  $(2.5 + 5 \cos \omega_m t) \cos \omega_c t$  is
    - a) envelop detector
    - b) synchronous detector
    - c) ratio detector
    - d) a) and b)
  - 2) In commercial FM broadcast system, modulating signal frequency is limited to about
    - a) 3.4 kHz
    - b) 5 kHz
    - c) 15 kHz
    - d) 20 kHz
  - 3) Following is not an advantage of FM over AM
    - a) noise immunity
    - b) fidelity
    - c) capture effect
    - d) sputtering effect
  - 4) Pick the odd man out.
    - a) PWM
    - b) PPM
    - c) PDM
    - d) PLM
  - 5) Aliasing occurs when the Nyquist rate is
    - a)  $2F_m$
    - b)  $3F_m$
    - c)  $2.5F_m$
    - d)  $1.2F_m$

P.T.O.



- 6) The main advantage of PCM is
- less bandwidth
  - less power
  - better performance in presence of noise
  - possibility of multiplexing
- 7) The signal to noise ratio for a sinusoidal signal quantized using 10 bit PCM is
- 62dB
  - 10dB
  - 60dB
  - 32dB
- 8) The stationary process has
- ensemble average equal to time average
  - all statistical properties are dependent on time
  - all statistical properties are independent on time
  - zero variance
- 9) State true or false : Unit of variance is same as unit of random variable.
- True
  - False
- 10) The core concept used in cellular technology is
- TDM
  - Frequency reuse
  - Code reuse
  - None of the above
- 11) Sinusoidal function is used as basic function in electrical communication because
- Convenience
  - Response to linear system is sine wave
  - Both a) and b)
  - None
- 12) The positive RF peaks of an AM voltage rise to a maximum value of 12 V and drop to a minimum value of 4 V. The modulation index assuming single tone modulation is
- 3
  - 1/3
  - 1/4
  - 1/2
- 13) An FM signal can be detected by using
- an LPF
  - a PLL
  - a discriminator
  - an average detector
- 14) In phase shift SSB modulator, the input signals to one of the balanced modulators are phase shifted by
- 45°
  - 90°
  - 180°
  - 30°
-



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**T.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017  
ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date : Wednesday, 22-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) Assume **suitable** data if necessary.  
3) Figures to **right** indicates **full marks.**

SECTION – I

2. Solve **any three** of the following : **(4×3=12)**
- 1) Draw and explain model of communication system.
  - 2) Determine  $\eta$  and percentage of total power carried by sidebands of AM wave for tone modulation when  $\mu = 0.5$  and  $\mu = 0.3$ .
  - 3) Explain the relationship between FM and PM.
  - 4) Explain the concept of pre-emphasis and de-emphasis.
3. Solve **any two** of the following : **(8×2=16)**
- 1) Draw and explain Vestigial Sideband System.
  - 2) A single tone modulating signal  $\text{Cos}(15 \pi 10^3 t)$  frequency modulates a carrier of 10 MHz and produces a frequency deviation of 75 kHz.  
Find
    - a) Modulation index.
    - b) Phase deviation produced in FM wave.
    - c) If another modulating signal produces a modulation index of 100 while maintaining same deviation. Find frequency and amplitude of modulating signal assuming  $K_f = 15 \text{ KHz per volt}$ .
  - 3) Explain classification of signals with examples.



## SECTION – II

4. Solve **any three** of the following : **(4×3=12)**
- 1) What is intersymbol interference ? Explain its effect.
  - 2) What are the advantages of Digital Communication ?
  - 3) 24 telephone channels, each band limited to 3.4 kHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and an 8 kHz sampling frequency.
  - 4) Explain the process of handoff in cellular system.

5. Solve **any two** of the following : **(8×2=16)**
- 1) Draw and explain Scrambler and descrambler in detail.
  - 2) What are different types of line codes ? Explain properties of line codes.
  - 3) Let X be a continuous random variable with following PDF.

$$f_x(x) = \begin{cases} c e^{-x} & x \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

where C is positive constant.

- a) Find C
  - b) Find CDF of X,  $f_x(x)$
  - c) Find  $P(1 < X < 3)$ .
-



SLR-TJ – 455

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**T.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017  
ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date : Wednesday, 22-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) Assume **suitable** data if necessary.
  - 3) Figures 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.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) The main advantage of PCM is
    - a) less bandwidth
    - b) less power
    - c) better performance in presence of noise
    - d) possibility of multiplexing
  - 2) The signal to noise ratio for a sinusoidal signal quantized using 10 bit PCM is
    - a) 62dB
    - b) 10dB
    - c) 60dB
    - d) 32dB
  - 3) The stationary process has
    - a) ensemble average equal to time average
    - b) all statistical properties are dependent on time
    - c) all statistical properties are independent on time
    - d) zero variance
  - 4) State true or false : Unit of variance is same as unit of random variable.
    - a) True
    - b) False
  - 5) The core concept used in cellular technology is
    - a) TDM
    - b) Frequency reuse
    - c) Code reuse
    - d) None of the above

P.T.O.



- 6) Sinusoidal function is used as basic function in electrical communication because
- Convenience
  - Response to linear system is sine wave
  - Both a) and b)
  - None
- 7) The positive RF peaks of an AM voltage rise to a maximum value of 12 V and drop to a minimum value of 4 V. The modulation index assuming single tone modulation is
- 3
  - 1/3
  - 1/4
  - 1/2
- 8) An FM signal can be detected by using
- an LPF
  - a PLL
  - a discriminator
  - an average detector
- 9) In phase shift SSB modulator, the input signals to one of the balanced modulators are phase shifted by
- 45°
  - 90°
  - 180°
  - 30°
- 10) The most suitable method for detecting a modulating signal  $(2.5 + 5 \cos \omega_m t) \cos \omega_c t$  is
- envelop detector
  - synchronous detector
  - ratio detector
  - a) and b)
- 11) In commercial FM broadcast system, modulating signal frequency is limited to about
- 3.4 kHz
  - 5 kHz
  - 15 kHz
  - 20 kHz
- 12) Following is not an advantage of FM over AM
- noise immunity
  - fidelity
  - capture effect
  - sputtering effect
- 13) Pick the odd man out.
- PWM
  - PPM
  - PDM
  - PLM
- 14) Aliasing occurs when the Nyquist rate is
- 2Fm
  - 3Fm
  - 2.5Fm
  - 1.2Fm
-



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**T.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017  
ELECTRONIC COMMUNICATION ENGINEERING**

Day and Date : Wednesday, 22-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) Assume **suitable** data if necessary.  
3) Figures to **right** indicates **full marks.**

SECTION – I

2. Solve **any three** of the following : **(4×3=12)**
- 1) Draw and explain model of communication system.
  - 2) Determine  $\eta$  and percentage of total power carried by sidebands of AM wave for tone modulation when  $\mu = 0.5$  and  $\mu = 0.3$ .
  - 3) Explain the relationship between FM and PM.
  - 4) Explain the concept of pre-emphasis and de-emphasis.
3. Solve **any two** of the following : **(8×2=16)**
- 1) Draw and explain Vestigial Sideband System.
  - 2) A single tone modulating signal  $\text{Cos}(15 \pi 10^3 t)$  frequency modulates a carrier of 10 MHz and produces a frequency deviation of 75 kHz.  
Find
    - a) Modulation index.
    - b) Phase deviation produced in FM wave.
    - c) If another modulating signal produces a modulation index of 100 while maintaining same deviation. Find frequency and amplitude of modulating signal assuming  $K_f = 15$  KHz per volt.
  - 3) Explain classification of signals with examples.



## SECTION – II

4. Solve **any three** of the following : **(4×3=12)**

- 1) What is intersymbol interference ? Explain its effect.
- 2) What are the advantages of Digital Communication ?
- 3) 24 telephone channels, each band limited to 3.4 kHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and an 8 kHz sampling frequency.
- 4) Explain the process of handoff in cellular system.

5. Solve **any two** of the following : **(8×2=16)**

- 1) Draw and explain Scrambler and descrambler in detail.
- 2) What are different types of line codes ? Explain properties of line codes.
- 3) Let X be a continuous random variable with following PDF.

$$f_x(x) = \begin{cases} c e^{-x} & x \geq 0 \\ 0 & \text{otherwise} \end{cases}$$

where C is positive constant.

- a) Find C
  - b) Find CDF of X,  $f_x(x)$
  - c) Find  $P(1 < X < 3)$ .
-





SLR-TJ – 456

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**T.E. (E&E) (Part – II) (CGPA) Examination, 2017  
POWER SYSTEM ANALYSIS**

Day and Date : Thursday, 23-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

**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 mark each)**
- The zero sequence fault currents are absent when the fault is
    - Single line to ground
    - Line to line
    - Double line to ground
    - None of above
  - In \_\_\_\_\_ method of load flow, convergence is dependent on the choice of slack bus.
    - G-S
    - N-R
    - FD
    - All
  - Negative sequence reactance of a transformer is \_\_\_\_\_
    - Equal to the positive sequence reactance
    - Smaller than positive sequence reactance
    - Larger than positive sequence reactance
    - None of the above
  - The impedance per phase of 3-phase transmission line on a base of 100 MVA, 100 kV is 2 PV, the value of this impedance on a base of 400 MVA and 400 kV would be \_\_\_\_\_
    - 1.5 pu
    - 1.0 pu
    - 0.5 pu
    - 0.25 pu
  - Primitive Y matrix is \_\_\_\_\_
    - Singular
    - Diagonal
    - Sparse
    - Null
  - For a turbo alternator of 100 mva, inertia constant is 5. The value of H for alternator of 50 mva is
    - 8
    - 12
    - 10
    - 15

P.T.O.



- 7) Total generation is equal to total load plus \_\_\_\_\_  
a) Reactive power    b) Losses            c) Generation        d) Demand
- 8) For a fault in power system the term critical clearing time is related to  
a) Reactive power limit                      b) Transient stability limit  
c) Short circuit current limit                d) Steady state stability limit
- 9)  $I d^2 \delta / dt^2 =$  \_\_\_\_\_  
a) Rotor momentum                            b) Accelerating power  
c) Inertia constant                             d) Excitation of generator
- 10) Transients in electric circuits normally disappears within a time equal to  
a)  $4 \times$  time constant                        b)  $2 \times$  time constant  
c)  $8 \times$  time constant                        d) time constant
- 11) In a power system maximum number of buses are  
a) PV buses            b) Slack buses    c) PQ buses        d) All of above
- 12) For accurate load flow calculations on large power systems the best method is  
a) NR method                                    b) GS method  
c) Decoupled method                         d) FDLR method
- 13) Normally Z bus matrix is \_\_\_\_\_ matrix.  
a) Singular            b) Diagonal        c) Sparse            d) Full
- 14) The usual value of  $\delta$  is about  
a) 30                    b) 45                    c) 60                    d) 90
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**T.E. (E&E) (Part – II) (CGPA) Examination, 2017  
POWER SYSTEM ANALYSIS**

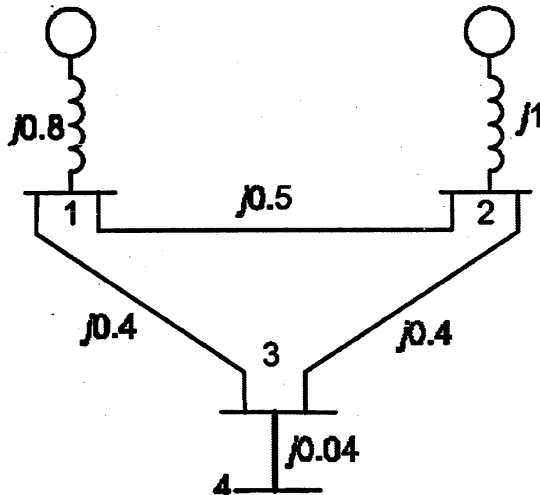
Day and Date : Thursday, 23-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

- a) Explain equal area criterion of stability.
- b) Compare Newton Raphson and Gauss Siedal method of load flow solution.
- c) A 60 Hz, 4 pole turbo generator rated 100 MVA, 13.8 KV has a inertia constant of 10 MJ/MVA. Determine :
  - a) Stored energy in rotor.
  - b) If the mechanical input is suddenly raised to 60 MW for a load of 50 MW, find rotor acceleration ?
- d) For the impedance diagram shown in figure determine bus admittance matrix.

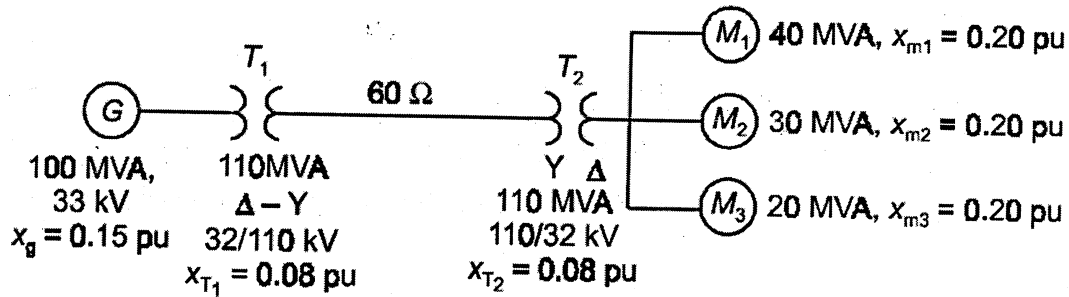


- e) Explain with the help of sample network formation of Y-bus by singular transformation method.
- f) Explain various factors affecting power system stability.



3. Solve the following : (6 marks each)

- a) Write and explain iterative algorithm for the solution of load flow problem by Fast decoupled method.
- b) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



OR

Data for the sample three bus system are given in following tables. Using Gauss siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

| Bus Code<br>i    | Assumed<br>Bus Voltage | Generation |      | Load  |       |
|------------------|------------------------|------------|------|-------|-------|
|                  |                        | MW         | MVAr | MW    | MVAr  |
| 1<br>(slack bus) | 1.05 + j0.0            | –          | –    | 0     | 0     |
| 2                | 1 + j0.0               | 50         | 30   | 305.6 | 140.2 |
| 3                | 1 + j0.0               | 0.0        | 0.0  | 138.6 | 45.2  |

Base MVA = 100

| Bus Code<br>i – k | Impedance<br>Z <sub>ik</sub> |
|-------------------|------------------------------|
| 1-2               | 0.02 + j0.04                 |
| 1-3               | 0.01 + j0.03                 |
| 2-3               | 0.0125 + j0.025              |

SECTION – II

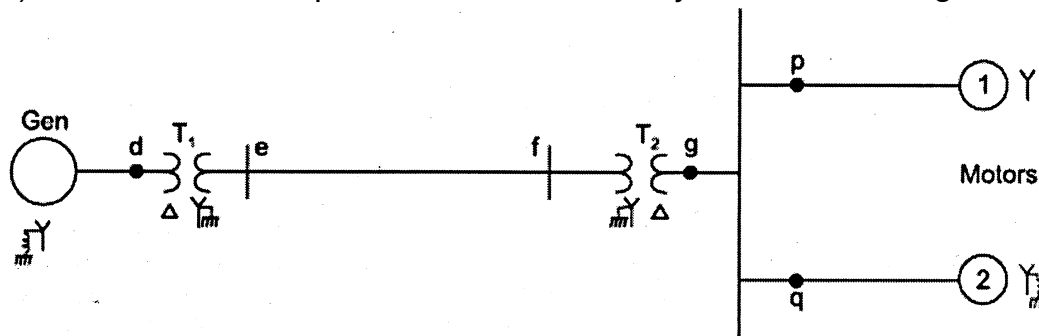
4. Attempt any 4 questions : (4 marks each)

- a) Explain the different types faults occurs in the power system.
- b) Explain how circuit breakers are selected in power system.
- c) The phase voltages across a given load are given as :  
 $V_a = (176 - j132)$  Volts  
 $V_b = (-128 - j96)$  Volts  
 $V_c = (-160 + j100)$  Volts  
 Compute positive, negative and zero sequence components of voltages.

**Set P**

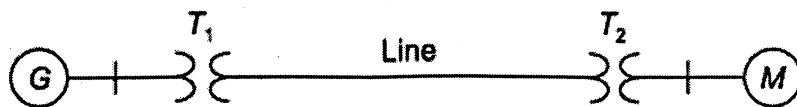


- d) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.
- e) Derive sequence network of unloaded synchronous generator.
- f) Draw the zero sequence network for the system shown in fig.



5. Attempt **any 2** questions : **(6 marks each)**

- a) A synchronous generator and motor each rated at 20 MVA, 12.66 KV having sub transient reactance of 15% are connected through transformers and a line as shown in fig. Transformers are rated at 20 MVA, 12.66/66 KV with leakage reactance of 10% each. The line has reactance of 8% on a base of 20 MVA, 66 KV. The motor is drawing 10 MW at 0.8 leading power factor with a terminal voltage of 11 KV when symmetrical fault occurs on its terminals. Determine the motor and generator currents. Also determine fault current.



- b) Derive the expression for sequences impedances of transmission line and draw their sequence networks.
- c) A 50 MVA, 11 KV, three phase alternator was subjected to different types of faults. The fault currents were :
  - i) 1870 Amp. for three phase fault.
  - ii) 2590 Amp. for L – L fault.
  - iii) 4130 Amp. of L – G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.





SLR-TJ – 456

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**T.E. (E&E) (Part – II) (CGPA) Examination, 2017  
POWER SYSTEM ANALYSIS**

Day and Date : Thursday, 23-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

**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 mark each)**
- For a fault in power system the term critical clearing time is related to
    - Reactive power limit
    - Transient stability limit
    - Short circuit current limit
    - Steady state stability limit
  - $I_d^2 \delta / dt^2 =$  \_\_\_\_\_
    - Rotor momentum
    - Accelerating power
    - Inertia constant
    - Excitation of generator
  - Transients in electric circuits normally disappears within a time equal to
    - $4 \times$  time constant
    - $2 \times$  time constant
    - $8 \times$  time constant
    - time constant
  - In a power system maximum number of buses are
    - PV buses
    - Slack buses
    - PQ buses
    - All of above
  - For accurate load flow calculations on large power systems the best method is
    - NR method
    - GS method
    - Decoupled method
    - FDLR method
  - Normally Z bus matrix is \_\_\_\_\_ matrix.
    - Singular
    - Diagonal
    - Sparse
    - Full
  - The usual value of  $\delta$  is about
    - 30
    - 45
    - 60
    - 90

P.T.O.



- 8) The zero sequence fault currents are absent when the fault is
- a) Single line to ground
  - b) Line to line
  - c) Double line to ground
  - d) None of above
- 9) In \_\_\_\_\_ method of load flow, convergence is dependent on the choice of slack bus.
- a) G-S
  - b) N-R
  - c) FD
  - d) All
- 10) Negative sequence reactance of a transformer is \_\_\_\_\_
- a) Equal to the positive sequence reactance
  - b) Smaller than positive sequence reactance
  - c) Larger than positive sequence reactance
  - d) None of the above
- 11) The impedance per phase of 3-phase transmission line on a base of 100 MVA, 100 kV is 2 PV, the value of this impedance on a base of 400 MVA and 400 kV would be \_\_\_\_\_
- a) 1.5 pu
  - b) 1.0 pu
  - c) 0.5 pu
  - d) 0.25 pu
- 12) Primitive Y matrix is \_\_\_\_\_
- a) Singular
  - b) Diagonal
  - c) Sparse
  - d) Null
- 13) For a turbo alternator of 100 mva, inertia constant is 5. The value of H for alternator of 50 mva is
- a) 8
  - b) 12
  - c) 10
  - d) 15
- 14) Total generation is equal to total load plus \_\_\_\_\_
- a) Reactive power
  - b) Losses
  - c) Generation
  - d) Demand
- \_\_\_\_\_





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**T.E. (E&E) (Part – II) (CGPA) Examination, 2017  
POWER SYSTEM ANALYSIS**

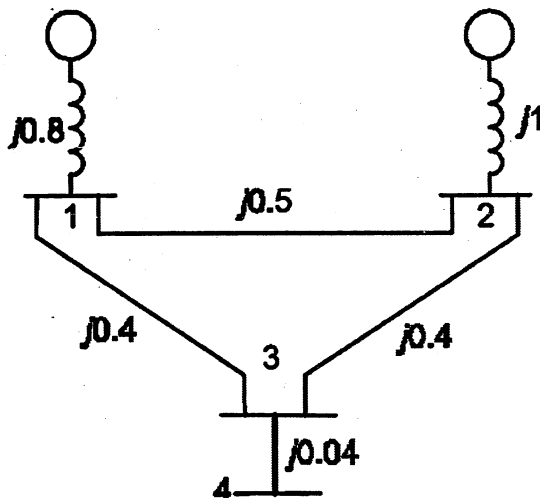
Day and Date : Thursday, 23-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

- a) Explain equal area criterion of stability.
- b) Compare Newton Raphson and Gauss Siedal method of load flow solution.
- c) A 60 Hz, 4 pole turbo generator rated 100 MVA, 13.8 KV has a inertia constant of 10 MJ/MVA. Determine :
  - a) Stored energy in rotor.
  - b) If the mechanical input is suddenly raised to 60 MW for a load of 50 MW, find rotor acceleration ?
- d) For the impedance diagram shown in figure determine bus admittance matrix.

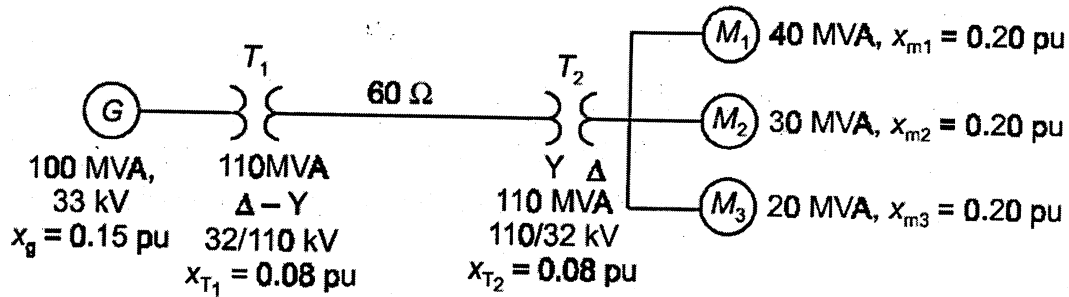


- e) Explain with the help of sample network formation of Y-bus by singular transformation method.
- f) Explain various factors affecting power system stability.



3. Solve the following : (6 marks each)

- a) Write and explain iterative algorithm for the solution of load flow problem by Fast decoupled method.
- b) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



OR

Data for the sample three bus system are given in following tables. Using Gauss siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

| Bus Code<br>i    | Assumed<br>Bus Voltage | Generation |                  | Load  |                  |
|------------------|------------------------|------------|------------------|-------|------------------|
|                  |                        | MW         | MVA <sub>r</sub> | MW    | MVA <sub>r</sub> |
| 1<br>(slack bus) | 1.05 + j0.0            | –          | –                | 0     | 0                |
| 2                | 1 + j0.0               | 50         | 30               | 305.6 | 140.2            |
| 3                | 1 + j0.0               | 0.0        | 0.0              | 138.6 | 45.2             |

Base MVA = 100

| Bus Code<br>i – k | Impedance<br>Z <sub>ik</sub> |
|-------------------|------------------------------|
| 1-2               | 0.02 + j0.04                 |
| 1-3               | 0.01 + j0.03                 |
| 2-3               | 0.0125 + j0.025              |

SECTION – II

4. Attempt any 4 questions : (4 marks each)

- a) Explain the different types faults occurs in the power system.
- b) Explain how circuit breakers are selected in power system.
- c) The phase voltages across a given load are given as :

$$V_a = (176 - j132) \text{ Volts}$$

$$V_b = (-128 - j96) \text{ Volts}$$

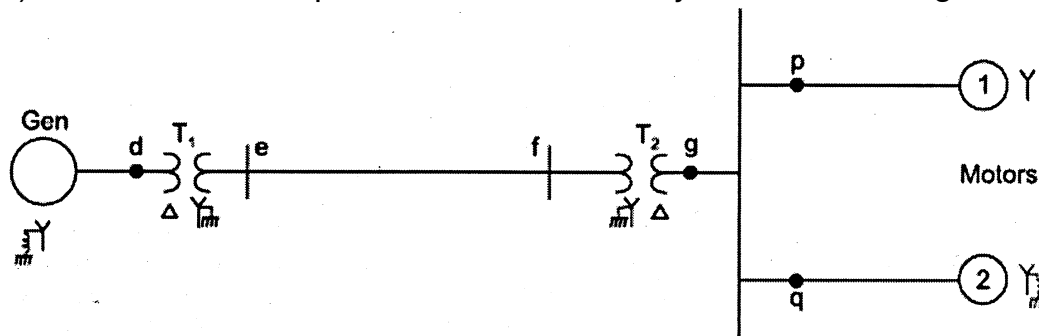
$$V_c = (-160 + j100) \text{ Volts}$$

Compute positive, negative and zero sequence components of voltages.

**Set Q**

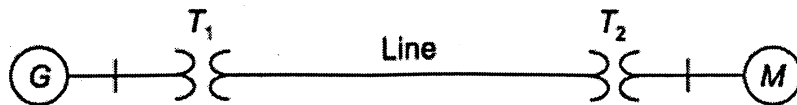


- d) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.
- e) Derive sequence network of unloaded synchronous generator.
- f) Draw the zero sequence network for the system shown in fig.



5. Attempt **any 2** questions : **(6 marks each)**

- a) A synchronous generator and motor each rated at 20 MVA, 12.66 KV having sub transient reactance of 15% are connected through transformers and a line as shown in fig. Transformers are rated at 20 MVA, 12.66/66 KV with leakage reactance of 10% each. The line has reactance of 8% on a base of 20 MVA, 66 KV. The motor is drawing 10 MW at 0.8 leading power factor with a terminal voltage of 11 KV when symmetrical fault occurs on its terminals. Determine the motor and generator currents. Also determine fault current.



- b) Derive the expression for sequences impedances of transmission line and draw their sequence networks.
- c) A 50 MVA, 11 KV, three phase alternator was subjected to different types of faults. The fault currents were :
  - i) 1870 Amp. for three phase fault.
  - ii) 2590 Amp. for L – L fault.
  - iii) 4130 Amp. of L – G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.





SLR-TJ – 456

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**T.E. (E&E) (Part – II) (CGPA) Examination, 2017  
POWER SYSTEM ANALYSIS**

Day and Date : Thursday, 23-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

**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 mark each)**
- 1) Primitive Y matrix is \_\_\_\_\_  
a) Singular                      b) Diagonal                      c) Sparse                      d) Null
  - 2) For a turbo alternator of 100 mva, inertia constant is 5. The value of H for alternator of 50 mva is  
a) 8                                      b) 12                                      c) 10                                      d) 15
  - 3) Total generation is equal to total load plus \_\_\_\_\_  
a) Reactive power                      b) Losses  
c) Generation                                      d) Demand
  - 4) For a fault in power system the term critical clearing time is related to  
a) Reactive power limit                      b) Transient stability limit  
c) Short circuit current limit                      d) Steady state stability limit
  - 5)  $Id^2 \delta / dt^2 =$  \_\_\_\_\_  
a) Rotor momentum                      b) Accelerating power  
c) Inertia constant                                      d) Excitation of generator
  - 6) Transients in electric circuits normally disappears within a time equal to  
a)  $4 \times$  time constant                      b)  $2 \times$  time constant  
c)  $8 \times$  time constant                      d) time constant

P.T.O.





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**T.E. (E&E) (Part – II) (CGPA) Examination, 2017  
POWER SYSTEM ANALYSIS**

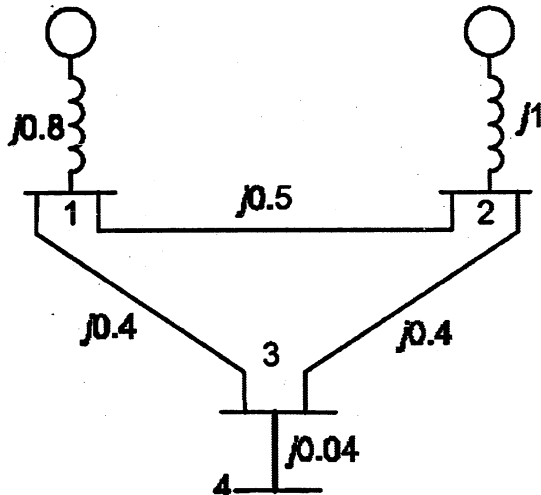
Day and Date : Thursday, 23-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

- a) Explain equal area criterion of stability.
- b) Compare Newton Raphson and Gauss Siedal method of load flow solution.
- c) A 60 Hz, 4 pole turbo generator rated 100 MVA, 13.8 KV has a inertia constant of 10 MJ/MVA. Determine :
  - a) Stored energy in rotor.
  - b) If the mechanical input is suddenly raised to 60 MW for a load of 50 MW, find rotor acceleration ?
- d) For the impedance diagram shown in figure determine bus admittance matrix.

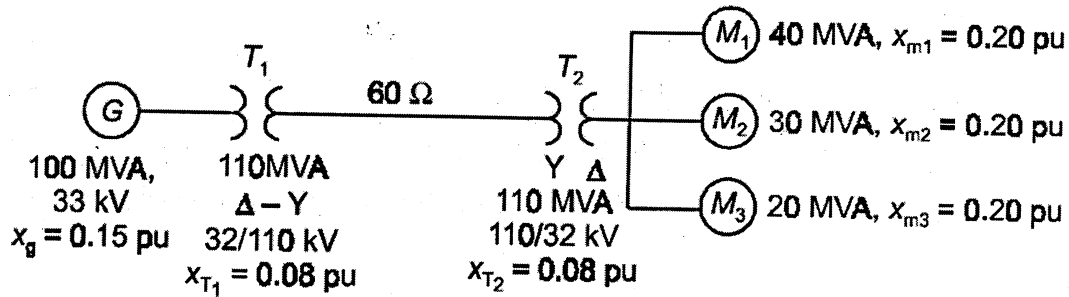


- e) Explain with the help of sample network formation of Y-bus by singular transformation method.
- f) Explain various factors affecting power system stability.



3. Solve the following : (6 marks each)

- a) Write and explain iterative algorithm for the solution of load flow problem by Fast decoupled method.
- b) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



OR

Data for the sample three bus system are given in following tables. Using Gauss siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

| Bus Code<br>i    | Assumed<br>Bus Voltage | Generation |      | Load  |       |
|------------------|------------------------|------------|------|-------|-------|
|                  |                        | MW         | MVAr | MW    | MVAr  |
| 1<br>(slack bus) | $1.05 + j0.0$          | –          | –    | 0     | 0     |
| 2                | $1 + j0.0$             | 50         | 30   | 305.6 | 140.2 |
| 3                | $1 + j0.0$             | 0.0        | 0.0  | 138.6 | 45.2  |

Base MVA = 100

| Bus Code<br>i – k | Impedance<br>$Z_{ik}$ |
|-------------------|-----------------------|
| 1-2               | $0.02 + j0.04$        |
| 1-3               | $0.01 + j0.03$        |
| 2-3               | $0.0125 + j0.025$     |

SECTION – II

4. Attempt any 4 questions : (4 marks each)

- a) Explain the different types faults occurs in the power system.
- b) Explain how circuit breakers are selected in power system.
- c) The phase voltages across a given load are given as :

$$V_a = (176 - j132) \text{ Volts}$$

$$V_b = (-128 - j96) \text{ Volts}$$

$$V_c = (-160 + j100) \text{ Volts}$$

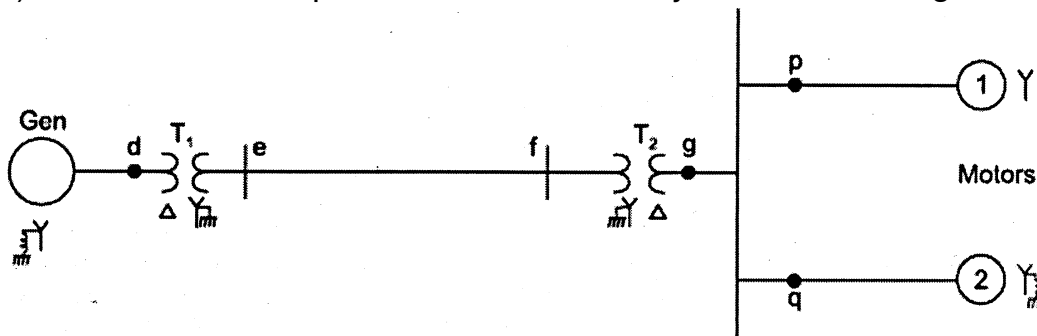
Compute positive, negative and zero sequence components of voltages.

Set R



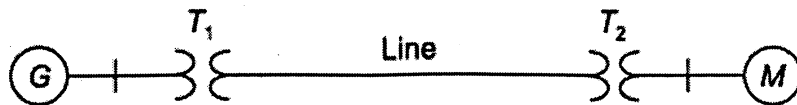


- d) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.
- e) Derive sequence network of unloaded synchronous generator.
- f) Draw the zero sequence network for the system shown in fig.



5. Attempt **any 2** questions : **(6 marks each)**

- a) A synchronous generator and motor each rated at 20 MVA, 12.66 KV having sub transient reactance of 15% are connected through transformers and a line as shown in fig. Transformers are rated at 20 MVA, 12.66/66 KV with leakage reactance of 10% each. The line has reactance of 8% on a base of 20 MVA, 66 KV. The motor is drawing 10 MW at 0.8 leading power factor with a terminal voltage of 11 KV when symmetrical fault occurs on its terminals. Determine the motor and generator currents. Also determine fault current.



- b) Derive the expression for sequences impedances of transmission line and draw their sequence networks.
- c) A 50 MVA, 11 KV, three phase alternator was subjected to different types of faults. The fault currents were :
  - i) 1870 Amp. for three phase fault.
  - ii) 2590 Amp. for L – L fault.
  - iii) 4130 Amp. of L – G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.





SLR-TJ – 456

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**T.E. (E&E) (Part – II) (CGPA) Examination, 2017  
POWER SYSTEM ANALYSIS**

Day and Date : Thursday, 23-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

**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 mark each)**
- Transients in electric circuits normally disappears within a time equal to
    - $4 \times$  time constant
    - $2 \times$  time constant
    - $8 \times$  time constant
    - time constant
  - In a power system maximum number of buses are
    - PV buses
    - Slack buses
    - PQ buses
    - All of above
  - For accurate load flow calculations on large power systems the best method is
    - NR method
    - GS method
    - Decoupled method
    - FDLR method
  - Normally Z bus matrix is \_\_\_\_\_ matrix.
    - Singular
    - Diagonal
    - Sparse
    - Full
  - The usual value of  $\delta$  is about
    - 30
    - 45
    - 60
    - 90
  - The zero sequence fault currents are absent when the fault is
    - Single line to ground
    - Line to line
    - Double line to ground
    - None of above
  - In \_\_\_\_\_ method of load flow, convergence is dependent on the choice of slack bus.
    - G-S
    - N-R
    - FD
    - All

P.T.O.



- 8) Negative sequence reactance of a transformer is \_\_\_\_\_
- a) Equal to the positive sequence reactance
  - b) Smaller than positive sequence reactance
  - c) Larger than positive sequence reactance
  - d) None of the above
- 9) The impedance per phase of 3-phase transmission line on a base of 100 MVA, 100 kV is 2 PV, the value of this impedance on a base of 400 MVA and 400 kV would be \_\_\_\_\_
- a) 1.5 pu
  - b) 1.0 pu
  - c) 0.5 pu
  - d) 0.25 pu
- 10) Primitive Y matrix is \_\_\_\_\_
- a) Singular
  - b) Diagonal
  - c) Sparse
  - d) Null
- 11) For a turbo alternator of 100 mva, inertia constant is 5. The value of H for alternator of 50 mva is
- a) 8
  - b) 12
  - c) 10
  - d) 15
- 12) Total generation is equal to total load plus \_\_\_\_\_
- a) Reactive power
  - b) Losses
  - c) Generation
  - d) Demand
- 13) For a fault in power system the term critical clearing time is related to
- a) Reactive power limit
  - b) Transient stability limit
  - c) Short circuit current limit
  - d) Steady state stability limit
- 14)  $Id^2 \delta / dt^2 =$  \_\_\_\_\_
- a) Rotor momentum
  - b) Accelerating power
  - c) Inertia constant
  - d) Excitation of generator
-



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**T.E. (E&E) (Part – II) (CGPA) Examination, 2017  
POWER SYSTEM ANALYSIS**

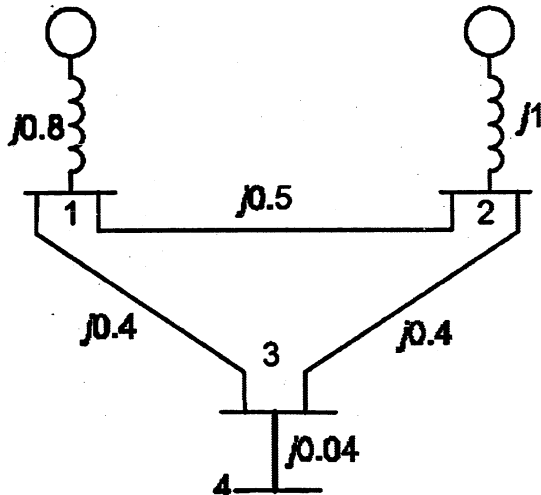
Day and Date : Thursday, 23-11-2017  
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SECTION – I

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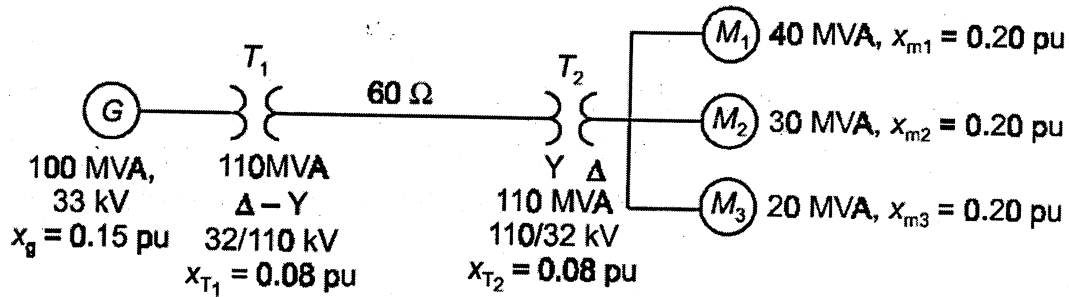


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OR

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Base MVA = 100

| Bus Code<br>i – k | Impedance<br>Z <sub>ik</sub> |
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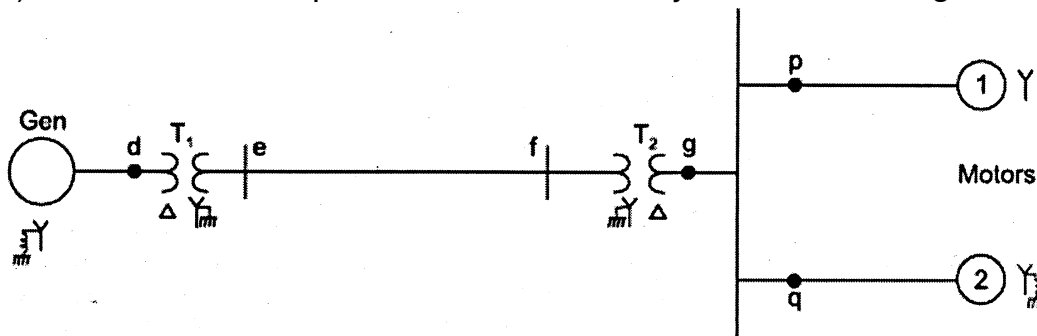
SECTION – II

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- b) Explain how circuit breakers are selected in power system.
- c) The phase voltages across a given load are given as :  
 $V_a = (176 - j132)$  Volts  
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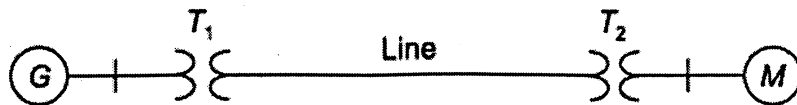


- d) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.
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The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.







SLR-TJ – 457

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**T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2017  
CONTROL SYSTEMS – II**

Day and Date : Friday, 24-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on 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) 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
- 2) \_\_\_\_\_ increases the steady state accuracy.
  - a) Integrator
  - b) Differentiator
  - c) Phase lead compensator
  - d) Phase lag compensator
- 3) A phase lag lead network introduces \_\_\_\_\_ in the output.
  - a) Lag at all frequencies
  - b) Lag at high frequencies and lead at low frequencies
  - c) Lag at low frequencies and lead at high frequencies
  - d) None of the above
- 4) A differentiator is usually not a part of a control system because it
  - a) Reduces damping
  - b) Reduces the gain margin
  - c) Increases input noise
  - d) Increases error
- 5) The State transition matrix for the system  $\dot{X} = AX$  with initial State  $X(0)$  is
  - a)  $(sI - A)^{-1}$
  - b)  $e^{At}X(0)$
  - c) Laplace inverse of  $[(sI - A)^{-1}]$
  - d) Laplace inverse of  $[(sI - A)^{-1}X(0)]$
- 6) A state variable approach can be applied to \_\_\_\_\_ Systems.
  - a) Time variant
  - b) Non-Linear
  - c) Linear and time invariant
  - d) All of the above

P.T.O.



- 7) The eigen values of a linear system are the location of
- Poles of the system
  - Zeros of the system
  - Both a and b
  - Finite pole and zero
- 8) In Lag compensation network \_\_\_\_\_ is dominant.
- Pole
  - Zero
  - Both (a) and (b)
  - None of the above
- 9) The singular points around which the state trajectories are concentric circles or ellipses, are called
- Focus point
  - Centre or vortex
  - Saddle point
  - Nodal point
- 10) Slope of factor K in plotting Bode magnitude plot is
- $0^\circ$
  - $\infty$
  - $90^\circ$
  - none of these
- 11) Which of the following is used to increase the bandwidth of a control system ?
- phase lag compensator
  - phase lead compensator
  - phase lag-lead compensator
  - all of these
- 12) In a non-linear control system limit cycle is self sustained oscillations of
- Variable amplitude
  - Variable frequency
  - Fixed frequency
  - Fixed frequency and amplitude
- 13) The transfer function of the zero order hold is
- $1 - e^{TS}$
  - $(1 - e^{TS})/s$
  - $1 - e^{-TS}$
  - $(1 - e^{-TS})/s$
- 14) Addition of pole to the open loop transfer function has the effect of pulling root locus to
- left
  - right
  - up
  - down
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**T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2017  
CONTROL SYSTEMS – II**

Day and Date : Friday, 24-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Solve **any four** : **(4×4=16)**

- 1) Give steps to design lead compensator using Root locus method.
- 2) Derive the realization of lag compensator network.
- 3) Design a suitable lag compensator for a system whose OLTF is

$$G_C(s) = \frac{K}{s(s+1)(s+4)}$$

to meet the following specifications

- i) Damping ratio = 0.5
  - ii) Settling time = 10 sec
  - iii)  $K_v \geq 5 \text{ sec}^{-1}$
- 4) Define :
- 1) State variable                      2) State space
  - 3) State vector                        4) State trajectory
- 5) Obtain State Transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 0 & -1 \\ 2 & -3 \end{bmatrix}$$

6) Find the transfer matrix of the system having State model.

$$X = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X + \begin{bmatrix} 1 \\ 0 \end{bmatrix} U \text{ and } Y = [1 \ 0] X$$



3. Solve **any two** : (2×6=12)

1) Check the observability and controllability of the system, described by following

differential equation.  $\frac{d^3y}{dt^3} = u(t)$  where  $y(t)$  is the output and  $u(t)$  is input.

2) Consider the system defined by  $\dot{X} = AX + BU$  where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

by using state feedback control  $U = -KX$ ; It is desired to have closed loop poles at  $s = -2 \pm j4$  and  $s = -10$ . Determine the State feedback gain matrix 'K' by any one method.

3) Design a suitable phase lag compensating network for

$$G(s) = \frac{K}{s(1+0.1s)(1+0.2s)}$$

to meet the following specifications

i)  $K_V = 30/\text{sec}$  and phase margin  $\geq 40^\circ$ .

#### SECTION – II

4. Solve **any four** : (4×4=16)

- a) Explain in short jump resonance.
- b) Determine the kind of singularity for the following differential equation  
 $\ddot{y} + 3\dot{y} + 2y = 0$ .
- c) Derive pulse transfer function of cascaded elements.
- d) Explain common physical nonlinearities.
- e) Explain A to D conversion.

5. Solve **any two** : (2×6=12)

- a) Explain in short mapping between s-plane and z-plane.
- b) Examine the stability of the system given, by using Jury's stability test.  
 $2Z^4 + 8Z^3 + 12Z^2 + 5Z + 1 = 0$
- c) Explain construction of phase trajectory by phase plane method.



SLR-TJ – 457

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**T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2017  
CONTROL SYSTEMS – II**

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Duration : 30 Minutes

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a) left  
b) right  
c) up  
d) down

P.T.O.



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**T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2017  
CONTROL SYSTEMS – II**

Day and Date : Friday, 24-11-2017

Marks : 56

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

**SECTION – I**

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**(4×4=16)**

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- b) Examine the stability of the system given, by using Jury's stability test.  
 $2Z^4 + 8Z^3 + 12Z^2 + 5Z + 1 = 0$
- c) Explain construction of phase trajectory by phase plane method.





SLR-TJ – 457

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**T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2017**  
**CONTROL SYSTEMS – II**

Day and Date : Friday, 24-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on 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) The State transition matrix for the system  $\dot{X} = AX$  with initial State  $X(0)$  is
  - a)  $(sI - A)^{-1}$
  - b)  $e^{At}X(0)$
  - c) Laplace inverse of  $[(sI - A)^{-1}]$
  - d) Laplace inverse of  $[(sI - A)^{-1}X(0)]$
- 2) A state variable approach can be applied to \_\_\_\_\_ Systems.
  - a) Time variant
  - b) Non-Linear
  - c) Linear and time invariant
  - d) All of the above
- 3) The eigen values of a linear system are the location of
  - a) Poles of the system
  - b) Zeros of the system
  - c) Both a and b
  - d) Finite pole and zero
- 4) In Lag compensation network \_\_\_\_\_ is dominant.
  - a) Pole
  - b) Zero
  - c) Both (a) and (b)
  - d) None of the above
- 5) The singular points around which the state trajectories are concentric circles or ellipses, are called
  - a) Focus point
  - b) Centre or vortex
  - c) Saddle point
  - d) Nodal point
- 6) Slope of factor K in plotting Bode magnitude plot is
  - a)  $0^\circ$
  - b)  $\infty$
  - c)  $90^\circ$
  - d) none of these
- 7) Which of the following is used to increase the bandwidth of a control system ?
  - a) phase lag compensator
  - b) phase lead compensator
  - c) phase lag-lead compensator
  - d) all of these

P.T.O.



- 8) In a non-linear control system limit cycle is self sustained oscillations of
- a) Variable amplitude
  - b) Variable frequency
  - c) Fixed frequency
  - d) Fixed frequency and amplitude
- 9) The transfer function of the zero order hold is
- a)  $1 - e^{TS}$
  - b)  $(1 - e^{TS})/s$
  - c)  $1 - e^{-TS}$
  - d)  $(1 - e^{-TS})/s$
- 10) Addition of pole to the open loop transfer function has the effect of pulling root locus to
- a) left
  - b) right
  - c) up
  - d) down
- 11) 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
- 12) \_\_\_\_\_ increases the steady state accuracy.
- a) Integrator
  - b) Differentiator
  - c) Phase lead compensator
  - d) Phase lag compensator
- 13) A phase lag lead network introduces \_\_\_\_\_ in the output.
- a) Lag at all frequencies
  - b) Lag at high frequencies and lead at low frequencies
  - c) Lag at low frequencies and lead at high frequencies
  - d) None of the above
- 14) A differentiator is usually not a part of a control system because it
- a) Reduces damping
  - b) Reduces the gain margin
  - c) Increases input noise
  - d) Increases error
-



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**T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2017  
CONTROL SYSTEMS – II**

Day and Date : Friday, 24-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Solve **any four** :

**(4×4=16)**

- 1) Give steps to design lead compensator using Root locus method.
- 2) Derive the realization of lag compensator network.
- 3) Design a suitable lag compensator for a system whose OLTF is

$$G_C(s) = \frac{K}{s(s+1)(s+4)}$$

to meet the following specifications

- i) Damping ratio = 0.5
  - ii) Settling time = 10 sec
  - iii)  $K_v \geq 5 \text{ sec}^{-1}$
- 4) Define :
- 1) State variable
  - 2) State space
  - 3) State vector
  - 4) State trajectory
- 5) Obtain State Transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 0 & -1 \\ 2 & -3 \end{bmatrix}$$

6) Find the transfer matrix of the system having State model.

$$X = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X + \begin{bmatrix} 1 \\ 0 \end{bmatrix} U \text{ and } Y = [1 \ 0] X$$



3. Solve **any two** : (2×6=12)

1) Check the observability and controllability of the system, described by following

differential equation.  $\frac{d^3y}{dt^3} = u(t)$  where  $y(t)$  is the output and  $u(t)$  is input.

2) Consider the system defined by  $\dot{X} = AX + BU$  where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

by using state feedback control  $U = -KX$ ; It is desired to have closed loop poles at  $s = -2 \pm j4$  and  $s = -10$ . Determine the State feedback gain matrix 'K' by any one method.

3) Design a suitable phase lag compensating network for

$$G(s) = \frac{K}{s(1+0.1s)(1+0.2s)}$$

to meet the following specifications

i)  $K_V = 30/\text{sec}$  and phase margin  $\geq 40^\circ$ .

SECTION – II

4. Solve **any four** : (4×4=16)

- a) Explain in short jump resonance.
- b) Determine the kind of singularity for the following differential equation  
 $\ddot{y} + 3\dot{y} + 2y = 0$ .
- c) Derive pulse transfer function of cascaded elements.
- d) Explain common physical nonlinearities.
- e) Explain A to D conversion.

5. Solve **any two** : (2×6=12)

- a) Explain in short mapping between s-plane and z-plane.
- b) Examine the stability of the system given, by using Jury's stability test.  
 $2Z^4 + 8Z^3 + 12Z^2 + 5Z + 1 = 0$
- c) Explain construction of phase trajectory by phase plane method.



SLR-TJ – 457

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**T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2017  
CONTROL SYSTEMS – II**

Day and Date : Friday, 24-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on 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) Slope of factor K in plotting Bode magnitude plot is  
a)  $0^\circ$                       b)  $\infty$                       c)  $90^\circ$                       d) none of these
- 2) Which of the following is used to increase the bandwidth of a control system ?  
a) phase lag compensator                      b) phase lead compensator  
c) phase lag-lead compensator                      d) all of these
- 3) In a non-linear control system limit cycle is self sustained oscillations of  
a) Variable amplitude                      b) Variable frequency  
c) Fixed frequency                      d) Fixed frequency and amplitude
- 4) The transfer function of the zero order hold is  
a)  $1 - e^{TS}$                       b)  $(1 - e^{TS})/s$                       c)  $1 - e^{-TS}$                       d)  $(1 - e^{-TS})/s$
- 5) Addition of pole to the open loop transfer function has the effect of pulling root locus to  
a) left                      b) right                      c) up                      d) down
- 6) 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
- 7) \_\_\_\_\_ increases the steady state accuracy.  
a) Integrator                      b) Differentiator  
c) Phase lead compensator                      d) Phase lag compensator

P.T.O.



- 8) A phase lag lead network introduces \_\_\_\_\_ in the output.
- a) Lag at all frequencies
  - b) Lag at high frequencies and lead at low frequencies
  - c) Lag at low frequencies and lead at high frequencies
  - d) None of the above
- 9) A differentiator is usually not a part of a control system because it
- a) Reduces damping
  - b) Reduces the gain margin
  - c) Increases input noise
  - d) Increases error
- 10) The State transition matrix for the system  $\dot{X} = AX$  with initial State  $X(0)$  is
- a)  $(sI - A)^{-1}$
  - b)  $e^{At}X(0)$
  - c) Laplace inverse of  $[(sI - A)^{-1}]$
  - d) Laplace inverse of  $[(sI - A)^{-1}X(0)]$
- 11) A state variable approach can be applied to \_\_\_\_\_ Systems.
- a) Time variant
  - b) Non-Linear
  - c) Linear and time invariant
  - d) All of the above
- 12) The eigen values of a linear system are the location of
- a) Poles of the system
  - b) Zeros of the system
  - c) Both a and b
  - d) Finite pole and zero
- 13) In Lag compensation network \_\_\_\_\_ is dominant.
- a) Pole
  - b) Zero
  - c) Both (a) and (b)
  - d) None of the above
- 14) The singular points around which the state trajectories are concentric circles or ellipses, are called
- a) Focus point
  - b) Centre or vortex
  - c) Saddle point
  - d) Nodal point
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**T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2017  
CONTROL SYSTEMS – II**

Day and Date : Friday, 24-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 56

SECTION – I

2. Solve **any four** : **(4×4=16)**

- 1) Give steps to design lead compensator using Root locus method.
- 2) Derive the realization of lag compensator network.
- 3) Design a suitable lag compensator for a system whose OLTF is

$$G_C(s) = \frac{K}{s(s+1)(s+4)}$$

to meet the following specifications

- i) Damping ratio = 0.5
  - ii) Settling time = 10 sec
  - iii)  $K_v \geq 5 \text{ sec}^{-1}$
- 4) Define :
- 1) State variable                      2) State space
  - 3) State vector                        4) State trajectory
- 5) Obtain State Transition matrix whose system matrix is given by

$$A = \begin{bmatrix} 0 & -1 \\ 2 & -3 \end{bmatrix}$$

6) Find the transfer matrix of the system having State model.

$$X = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} X + \begin{bmatrix} 1 \\ 0 \end{bmatrix} U \text{ and } Y = [1 \ 0] X$$



3. Solve **any two** : (2×6=12)

1) Check the observability and controllability of the system, described by following

differential equation.  $\frac{d^3y}{dt^3} = u(t)$  where  $y(t)$  is the output and  $u(t)$  is input.

2) Consider the system defined by  $\dot{X} = AX + BU$  where

$$A = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -5 & -6 \end{bmatrix} \quad B = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix}$$

by using state feedback control  $U = -KX$ ; It is desired to have closed loop poles at  $s = -2 \pm j4$  and  $s = -10$ . Determine the State feedback gain matrix 'K' by any one method.

3) Design a suitable phase lag compensating network for

$$G(s) = \frac{K}{s(1+0.1s)(1+0.2s)}$$

to meet the following specifications

i)  $K_V = 30/\text{sec}$  and phase margin  $\geq 40^\circ$ .

#### SECTION – II

4. Solve **any four** : (4×4=16)

- a) Explain in short jump resonance.
- b) Determine the kind of singularity for the following differential equation  
 $\ddot{y} + 3\dot{y} + 2y = 0$ .
- c) Derive pulse transfer function of cascaded elements.
- d) Explain common physical nonlinearities.
- e) Explain A to D conversion.

5. Solve **any two** : (2×6=12)

- a) Explain in short mapping between s-plane and z-plane.
- b) Examine the stability of the system given, by using Jury's stability test.  
 $2Z^4 + 8Z^3 + 12Z^2 + 5Z + 1 = 0$
- c) Explain construction of phase trajectory by phase plane method.





SLR-TJ – 458

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**T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
MICROCONTROLLER AND ITS APPLICATIONS**

Day and Date : Saturday, 25-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:**
- 1) Figures to **right** indicates **full** marks.
  - 2) **All** questions are **compulsory**.
  - 3) Assume suitable data if **necessary**.
  - 4) Use of non-programmable **calculator** is allowed.
  - 5) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.
  - 6) **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) 8051 contains two 16 bit registers  
A) PC and SP    B) PC and DPTR    C) SP and Flag    D) None of these
  - 2) The SFR that contains TI and RI Flag bits for serial communication is  
A) SCON    B) IE    C) IP    D) PIR1
  - 3) The status of the CY and AC flag after the addition of 38H and 2FH.  
MOV A, #38H and ADD A, #2FH  
A) 0, 1    B) 0, 0    C) 1, 1    D) 1, 0
  - 4) If the crystal frequency is 16 MHz then the time to execute ADD A, R1 one cycle in microseconds instruction is  
A) 0.75    B) 0.0075    C) 75000    D) None of these
  - 5) Which of the following flag register is not available in PSW ?  
A) Carry    B) Parity    C) Zero    D) Sign
  - 6) Timer count \_\_\_\_\_ clock pulses while counter count \_\_\_\_\_ clock pules.  
A) External, Internal    B) Internal, External  
C) TH0, TL0    D) None

P.T.O.



- 7) Which statement is false about WR signal ?
- A) WR signal controls the input buffer
  - B) The bar over WR means that this is an active low signal
  - C) The bar over WR means that this is an active high signal
  - D) If WR is 0 then the input data reaches the latch input
- 8) In 8 bit signed no. operations, OV is set to 1 if
- A) Carry is generated from D7 bit
  - B) Carry is generated from D3 bit
  - C) Carry is generated from D7 or D3 bit
  - D) Carry is generated from D7 or D6 bit
- 9) PSEN (Program Store Enable) signal is an \_\_\_\_\_ signal for the 8031/51 microcontroller and must be connected to the OE pin of a \_\_\_\_\_ containing the program code.
- A) Output, RAM
  - B) Input, ROM
  - C) Output, ROM
  - D) Input, RAM
- 10) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 9600
- A) FD
  - B) FA
  - C) F4
  - D) E8
- 11) A memory chip contain  $2^x$  location, where x is the number of
- A) Memory chip pins
  - B) Control pins
  - C) Data pins
  - D) Address pins
- 12) For ADC 0808, the \_\_\_\_\_ analog input channels are multiplexed and selected accordingly using \_\_\_\_\_ address pins.
- A) 16, 4
  - B) 8, 4
  - C) 4, 2
  - D) 8, 3
- 13) RS = 0 for LCD module selects \_\_\_\_\_ register.
- A) Command
  - B) Data
  - C) DPTR
  - D) SAR
- 14) \_\_\_\_\_ data communication is widely used for character-oriented transmissions.
- A) Asynchronous serial
  - B) Synchronous serial
  - C) Asynchronous parallel
  - D) All of above
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**T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
MICROCONTROLLER AND ITS APPLICATIONS**

Day and Date : Saturday, 25-11-2017

Marks : 56

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

- Instructions :**
- 1) *Figures to right indicates full marks.*
  - 2) **All questions are compulsory.**
  - 3) *Assume suitable data if necessary.*
  - 4) *Use of non-programmable calculator is allowed.*

SECTION – I

2. Solve **any three** questions : **(4×3=12)**

- 1) Draw and explain the operation of Port0 pin internal logic circuit.
- 2) Give the operation of each bit in the SFR TCON.
- 3) What is the use of Watch dog timer ?
- 4) What is the difference between ranges for ajmp, sjmp and ljmp instructions ?
- 5) Write a program to perform the following :
  - a) Keep monitoring the P1.2 bit until it becomes high.
  - b) When P1.2 becomes high, write value 45H to port 0.
  - c) Send a high-to-low (H-to-L) pulse to P2.3.

3. Solve **any two** questions : **(8×2=16)**

1) Explain the operation of following instructions with one example.

|   |                  |
|---|------------------|
| A | MOV A, #n        |
| B | XCHD A, @R1      |
| C | SUBB A, add      |
| D | CJNE A, #n, radd |
| E | DIV AB           |

- 2) Assume that XTAL = 11.0592 MHz. What value do we need to load the timer's register if we want to have a time delay of 5 ms (milliseconds) ? Show the program for timer 0 to create a pulse width of 5 ms on P2.3.
- 3) How external memory can be interfaced with 8051 ? Give memory address decoding for 4 KB RAM and 8 KB ROM interfaced with 8051. Draw interfacing diagram.

**Set P**



## SECTION – II

4. Solve **any three** questions : **(4×3=12)**
- 1) Explain SPI protocol for serial communication.
  - 2) Draw and explain interfacing of 4 × 4 matrix keyboard to the microcontroller.
  - 3) Give different features of RTC IC DS1307.
  - 4) How common anode seven segment display can be interfaced with 8051 ?  
What should be done to display digit 8 on it ?
  - 5) Draw and explain serial EEPROM interfacing.
5. Solve **any two** questions : **(8×2=16)**
- 1) Draw SCON register format and explain 9 bit UART mode. How baud rate can be calculated for mode 3 ?
  - 2) Interface DAC 0808 to the microcontroller and write a program to generate triangular wave.
  - 3) Discuss Microcontroller based automatic power factor control system.
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SLR-TJ – 458

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**T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
MICROCONTROLLER AND ITS APPLICATIONS**

Day and Date : Saturday, 25-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions :**
- 1) Figures to **right** indicates **full** marks.
  - 2) **All** questions are **compulsory**.
  - 3) Assume suitable data if **necessary**.
  - 4) Use of non-programmable **calculator** is allowed.
  - 5) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.
  - 6) **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) In 8 bit signed no. operations, OV is set to 1 if
  - A) Carry is generated from D7 bit
  - B) Carry is generated from D3 bit
  - C) Carry is generated from D7 or D3 bit
  - D) Carry is generated from D7 or D6 bit
- 2) PSEN (Program Store Enable) signal is an \_\_\_\_\_ signal for the 8031/51 microcontroller and must be connected to the OE pin of a \_\_\_\_\_ containing the program code.
  - A) Output, RAM
  - B) Input, ROM
  - C) Output, ROM
  - D) Input, RAM
- 3) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 9600
  - A) FD
  - B) FA
  - C) F4
  - D) E8
- 4) A memory chip contain  $2^x$  location, where x is the number of
  - A) Memory chip pins
  - B) Control pins
  - C) Data pins
  - D) Address pins

P.T.O.



- 5) For ADC 0808, the \_\_\_\_\_ analog input channels are multiplexed and selected accordingly using \_\_\_\_\_ address pins.  
A) 16, 4      B) 8, 4      C) 4, 2      D) 8, 3
- 6) RS = 0 for LCD module selects \_\_\_\_\_ register.  
A) Command      B) Data      C) DPTR      D) SAR
- 7) \_\_\_\_\_ data communication is widely used for character-oriented transmissions.  
A) Asynchronous serial      B) Synchronous serial  
C) Asynchronous parallel      D) All of above
- 8) 8051 contains two 16 bit registers  
A) PC and SP      B) PC and DPTR      C) SP and Flag      D) None of these
- 9) The SFR that contains TI and RI Flag bits for serial communication is  
A) SCON      B) IE      C) IP      D) PIR1
- 10) The status of the CY and AC flag after the addition of 38H and 2FH.  
MOV A, #38H and ADD A, #2FH  
A) 0, 1      B) 0, 0      C) 1, 1      D) 1, 0
- 11) If the crystal frequency is 16 MHz then the time to execute ADD A, R1 one cycle in microseconds instruction is  
A) 0.75      B) 0.0075      C) 75000      D) None of these
- 12) Which of the following flag register is not available in PSW ?  
A) Carry      B) Parity      C) Zero      D) Sign
- 13) Timer count \_\_\_\_\_ clock pulses while counter count \_\_\_\_\_ clock pules.  
A) External, Internal      B) Internal, External  
C) TH0, TL0      D) None
- 14) Which statement is false about WR signal ?  
A) WR signal controls the input buffer  
B) The bar over WR means that this is an active low signal  
C) The bar over WR means that this is an active high signal  
D) If WR is 0 then the input data reaches the latch input
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**T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
MICROCONTROLLER AND ITS APPLICATIONS**

Day and Date : Saturday, 25-11-2017

Marks : 56

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

- Instructions :** 1) *Figures to right indicates full marks.*  
 2) **All questions are compulsory.**  
 3) *Assume suitable data if necessary.*  
 4) *Use of non-programmable calculator is allowed.*

SECTION – I

2. Solve **any three** questions : **(4×3=12)**

- 1) Draw and explain the operation of Port0 pin internal logic circuit.
- 2) Give the operation of each bit in the SFR TCON.
- 3) What is the use of Watch dog timer ?
- 4) What is the difference between ranges for ajmp, sjmp and ljmp instructions ?
- 5) Write a program to perform the following :
  - a) Keep monitoring the P1.2 bit until it becomes high.
  - b) When P1.2 becomes high, write value 45H to port 0.
  - c) Send a high-to-low (H-to-L) pulse to P2.3.

3. Solve **any two** questions : **(8×2=16)**

1) Explain the operation of following instructions with one example.

|   |                  |
|---|------------------|
| A | MOV A, #n        |
| B | XCHD A, @R1      |
| C | SUBB A, add      |
| D | CJNE A, #n, radd |
| E | DIV AB           |

- 2) Assume that XTAL = 11.0592 MHz. What value do we need to load the timer's register if we want to have a time delay of 5 ms (milliseconds) ? Show the program for timer 0 to create a pulse width of 5 ms on P2.3.
- 3) How external memory can be interfaced with 8051 ? Give memory address decoding for 4 KB RAM and 8 KB ROM interfaced with 8051. Draw interfacing diagram.

**Set Q**



## SECTION – II

4. Solve **any three** questions : **(4×3=12)**
- 1) Explain SPI protocol for serial communication.
  - 2) Draw and explain interfacing of 4 × 4 matrix keyboard to the microcontroller.
  - 3) Give different features of RTC IC DS1307.
  - 4) How common anode seven segment display can be interfaced with 8051 ?  
What should be done to display digit 8 on it ?
  - 5) Draw and explain serial EEPROM interfacing.
5. Solve **any two** questions : **(8×2=16)**
- 1) Draw SCON register format and explain 9 bit UART mode. How baud rate can be calculated for mode 3 ?
  - 2) Interface DAC 0808 to the microcontroller and write a program to generate triangular wave.
  - 3) Discuss Microcontroller based automatic power factor control system.
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SLR-TJ – 458

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| Set | R |
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**T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
MICROCONTROLLER AND ITS APPLICATIONS**

Day and Date : Saturday, 25-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:**
- 1) Figures to **right** indicates **full** marks.
  - 2) **All** questions are **compulsory**.
  - 3) Assume suitable data if **necessary**.
  - 4) Use of non-programmable **calculator** is allowed.
  - 5) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.
  - 6) **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) Which of the following flag register is not available in PSW ?  
A) Carry                      B) Parity                      C) Zero                      D) Sign
- 2) Timer count \_\_\_\_\_ clock pulses while counter count \_\_\_\_\_ clock pules.  
A) External, Internal                      B) Internal, External  
C) TH0, TL0                      D) None
- 3) Which statement is false about WR signal ?  
A) WR signal controls the input buffer  
B) The bar over WR means that this is an active low signal  
C) The bar over WR means that this is an active high signal  
D) If WR is 0 then the input data reaches the latch input
- 4) In 8 bit signed no. operations, OV is set to 1 if  
A) Carry is generated from D7 bit  
B) Carry is generated from D3 bit  
C) Carry is generated from D7 or D3 bit  
D) Carry is generated from D7 or D6 bit

P.T.O.



- 5) PSEN (Program Store Enable) signal is an \_\_\_\_\_ signal for the 8031/51 microcontroller and must be connected to the OE pin of a \_\_\_\_\_ containing the program code.  
A) Output, RAM    B) Input, ROM    C) Output, ROM    D) Input, RAM
- 6) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 9600  
A) FD                      B) FA                      C) F4                      D) E8
- 7) A memory chip contain  $2^x$  location, where x is the number of  
A) Memory chip pins                      B) Control pins  
C) Data pins                                  D) Address pins
- 8) For ADC 0808, the \_\_\_\_\_ analog input channels are multiplexed and selected accordingly using \_\_\_\_\_ address pins.  
A) 16, 4                      B) 8, 4                      C) 4, 2                      D) 8, 3
- 9) RS = 0 for LCD module selects \_\_\_\_\_ register.  
A) Command    B) Data                      C) DPTR                      D) SAR
- 10) \_\_\_\_\_ data communication is widely used for character-oriented transmissions.  
A) Asynchronous serial                      B) Synchronous serial  
C) Asynchronous parallel                      D) All of above
- 11) 8051 contains two 16 bit registers  
A) PC and SP    B) PC and DPTR    C) SP and Flag    D) None of these
- 12) The SFR that contains TI and RI Flag bits for serial communication is  
A) SCON                      B) IE                      C) IP                      D) PIR1
- 13) The status of the CY and AC flag after the addition of 38H and 2FH.  
MOV A, #38H and ADD A, #2FH  
A) 0, 1                      B) 0, 0                      C) 1, 1                      D) 1, 0
- 14) If the crystal frequency is 16 MHz then the time to execute ADD A, R1 one cycle in microseconds instruction is  
A) 0.75                      B) 0.0075                      C) 75000                      D) None of these
-



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**T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
MICROCONTROLLER AND ITS APPLICATIONS**

Day and Date : Saturday, 25-11-2017

Marks : 56

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

- Instructions :**
- 1) *Figures to right indicates full marks.*
  - 2) **All questions are compulsory.**
  - 3) *Assume suitable data if necessary.*
  - 4) *Use of non-programmable calculator is allowed.*

SECTION – I

2. Solve **any three** questions : **(4×3=12)**

- 1) Draw and explain the operation of Port0 pin internal logic circuit.
- 2) Give the operation of each bit in the SFR TCON.
- 3) What is the use of Watch dog timer ?
- 4) What is the difference between ranges for ajmp, sjmp and ljmp instructions ?
- 5) Write a program to perform the following :
  - a) Keep monitoring the P1.2 bit until it becomes high.
  - b) When P1.2 becomes high, write value 45H to port 0.
  - c) Send a high-to-low (H-to-L) pulse to P2.3.

3. Solve **any two** questions : **(8×2=16)**

1) Explain the operation of following instructions with one example.

|   |                  |
|---|------------------|
| A | MOV A, #n        |
| B | XCHD A, @R1      |
| C | SUBB A, add      |
| D | CJNE A, #n, radd |
| E | DIV AB           |

- 2) Assume that XTAL = 11.0592 MHz. What value do we need to load the timer's register if we want to have a time delay of 5 ms (milliseconds) ? Show the program for timer 0 to create a pulse width of 5 ms on P2.3.
- 3) How external memory can be interfaced with 8051 ? Give memory address decoding for 4 KB RAM and 8 KB ROM interfaced with 8051. Draw interfacing diagram.

**Set R**



## SECTION – II

4. Solve **any three** questions : **(4×3=12)**
- 1) Explain SPI protocol for serial communication.
  - 2) Draw and explain interfacing of  $4 \times 4$  matrix keyboard to the microcontroller.
  - 3) Give different features of RTC IC DS1307.
  - 4) How common anode seven segment display can be interfaced with 8051 ?  
What should be done to display digit 8 on it ?
  - 5) Draw and explain serial EEPROM interfacing.
5. Solve **any two** questions : **(8×2=16)**
- 1) Draw SCON register format and explain 9 bit UART mode. How baud rate can be calculated for mode 3 ?
  - 2) Interface DAC 0808 to the microcontroller and write a program to generate triangular wave.
  - 3) Discuss Microcontroller based automatic power factor control system.
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SLR-TJ – 458

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**T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
MICROCONTROLLER AND ITS APPLICATIONS**

Day and Date : Saturday, 25-11-2017  
Time : 10.00 a.m. to 1.00 p.m.

Max. Marks : 70

- Instructions:**
- 1) Figures to **right** indicates **full** marks.
  - 2) **All** questions are **compulsory**.
  - 3) Assume suitable data if **necessary**.
  - 4) Use of non-programmable **calculator** is allowed.
  - 5) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. 3. **Each** question carries **one** mark.
  - 6) **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) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 9600  
A) FD                      B) FA                      C) F4                      D) E8
  - 2) A memory chip contain  $2^x$  location, where x is the number of  
A) Memory chip pins                      B) Control pins  
C) Data pins                      D) Address pins
  - 3) For ADC 0808, the \_\_\_\_\_ analog input channels are multiplexed and selected accordingly using \_\_\_\_\_ address pins.  
A) 16, 4                      B) 8, 4                      C) 4, 2                      D) 8, 3
  - 4) RS = 0 for LCD module selects \_\_\_\_\_ register.  
A) Command                      B) Data                      C) DPTR                      D) SAR
  - 5) \_\_\_\_\_ data communication is widely used for character-oriented transmissions.  
A) Asynchronous serial                      B) Synchronous serial  
C) Asynchronous parallel                      D) All of above

P.T.O.



- 6) 8051 contains two 16 bit registers  
A) PC and SP    B) PC and DPTR    C) SP and Flag    D) None of these
- 7) The SFR that contains TI and RI Flag bits for serial communication is  
A) SCON            B) IE                    C) IP                    D) PIR1
- 8) The status of the CY and AC flag after the addition of 38H and 2FH.  
MOV A, #38H and ADD A, #2FH  
A) 0, 1            B) 0, 0                    C) 1, 1                    D) 1, 0
- 9) If the crystal frequency is 16 MHz then the time to execute ADD A, R1 one cycle in microseconds instruction is  
A) 0.75            B) 0.0075            C) 75000            D) None of these
- 10) Which of the following flag register is not available in PSW ?  
A) Carry            B) Parity            C) Zero            D) Sign
- 11) Timer count \_\_\_\_\_ clock pulses while counter count \_\_\_\_\_ clock pulses.  
A) External, Internal            B) Internal, External  
C) TH0, TL0            D) None
- 12) Which statement is false about WR signal ?  
A) WR signal controls the input buffer  
B) The bar over WR means that this is an active low signal  
C) The bar over WR means that this is an active high signal  
D) If WR is 0 then the input data reaches the latch input
- 13) In 8 bit signed no. operations, OV is set to 1 if  
A) Carry is generated from D7 bit  
B) Carry is generated from D3 bit  
C) Carry is generated from D7 or D3 bit  
D) Carry is generated from D7 or D6 bit
- 14) PSEN (Program Store Enable) signal is an \_\_\_\_\_ signal for the 8031/51 microcontroller and must be connected to the OE pin of a \_\_\_\_\_ containing the program code.  
A) Output, RAM    B) Input, ROM    C) Output, ROM    D) Input, RAM
-



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**T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA)  
Examination, 2017  
MICROCONTROLLER AND ITS APPLICATIONS**

Day and Date : Saturday, 25-11-2017

Marks : 56

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

- Instructions :**
- 1) *Figures to right indicates full marks.*
  - 2) **All questions are compulsory.**
  - 3) *Assume suitable data if necessary.*
  - 4) *Use of non-programmable calculator is allowed.*

SECTION – I

2. Solve **any three** questions : **(4×3=12)**

- 1) Draw and explain the operation of Port0 pin internal logic circuit.
- 2) Give the operation of each bit in the SFR TCON.
- 3) What is the use of Watch dog timer ?
- 4) What is the difference between ranges for ajmp, sjmp and ljmp instructions ?
- 5) Write a program to perform the following :
  - a) Keep monitoring the P1.2 bit until it becomes high.
  - b) When P1.2 becomes high, write value 45H to port 0.
  - c) Send a high-to-low (H-to-L) pulse to P2.3.

3. Solve **any two** questions : **(8×2=16)**

1) Explain the operation of following instructions with one example.

|   |                  |
|---|------------------|
| A | MOV A, #n        |
| B | XCHD A, @R1      |
| C | SUBB A, add      |
| D | CJNE A, #n, radd |
| E | DIV AB           |

- 2) Assume that XTAL = 11.0592 MHz. What value do we need to load the timer's register if we want to have a time delay of 5 ms (milliseconds) ? Show the program for timer 0 to create a pulse width of 5 ms on P2.3.
- 3) How external memory can be interfaced with 8051 ? Give memory address decoding for 4 KB RAM and 8 KB ROM interfaced with 8051. Draw interfacing diagram.

**Set S**



## SECTION – II

4. Solve **any three** questions : **(4×3=12)**
- 1) Explain SPI protocol for serial communication.
  - 2) Draw and explain interfacing of 4 × 4 matrix keyboard to the microcontroller.
  - 3) Give different features of RTC IC DS1307.
  - 4) How common anode seven segment display can be interfaced with 8051 ?  
What should be done to display digit 8 on it ?
  - 5) Draw and explain serial EEPROM interfacing.
5. Solve **any two** questions : **(8×2=16)**
- 1) Draw SCON register format and explain 9 bit UART mode. How baud rate can be calculated for mode 3 ?
  - 2) Interface DAC 0808 to the microcontroller and write a program to generate triangular wave.
  - 3) Discuss Microcontroller based automatic power factor control system.
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SLR-TJ – 459

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**T.E. (Electrical and Electronic Engg.) (Part – II) (CGPA) Examination, 2017  
Self Learning (Technical)  
INDUSTRIAL MANAGEMENT**

Day and Date : Monday, 27-11-2017

Total Marks : 50

Time : 10.00 a.m. to 12.00 noon

- 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) Stress, in and of itself is
    - a) Not necessarily bad
    - b) Healthy in most cases
    - c) Harmful, especially if not managed by exercise
    - d) Beneficial to those who use it
  - 2) Managers need to make sure that employees ability
    - a) Match the job requirement
    - b) Are being maximized
    - c) Are not affected by their stress
    - d) Are not causing them stress
  - 3) Managing change is an integral part of
    - a) Top management job
    - b) Middle level managements job
    - c) The first-line managers job
    - d) Every managers job
  - 4) Global economic pressures force organisations to become more
    - a) Price complitive
    - b) Quality conscious
    - c) Cost efficient
    - d) Conservative with raw materials

P.T.O.



- 5) Falling interest rates are an example of what external force ?
- a) Market place
  - b) Government law and regulation
  - c) Labour markets
  - d) Economic change
- 6) Labour strikes are an example of what change factor that may encourage a change in management thinking and practices ?
- a) Work Force
  - b) Equipment
  - c) Employee attitude
  - d) Strategy
- 7) What category of change involves work process, methods and equipment ?
- a) Technology
  - b) People
  - c) Competitors
  - d) Structure
- 8) Techniques to change the peoples and quality of interpersonal work relationship are termed
- a) Operations
  - b) Organisational development
  - c) Downsizing
  - d) Robotics
- 9) An individual is likely to resist change because of all of the following reasons except
- a) Uncertainty
  - b) Increased productivity
  - c) Concern over personal loss
  - d) Belive that the changes is not in organization's best interest
- 10) \_\_\_\_\_ may be necessary when resistance come from powerful source.
- a) Education and Communication
  - b) Coercion
  - c) Cooptation
  - d) Negotiations
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**T.E. (Electrical and Electronic Engg.) (Part – II) (CGPA) Examination, 2017  
Self Learning (Technical)  
INDUSTRIAL MANAGEMENT**

Day and Date : Monday, 27-11-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

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

Solve **any four** questions from Q. No. 2 to Q. No. 6.

- |                                                                           |          |
|---------------------------------------------------------------------------|----------|
| 2. a) Explain coordinating as function of management.                     | 5        |
| b) Explain industrial relations.                                          | 5        |
| 3. a) Brief the functions of production management.                       | 5        |
| b) Techniques for selection of product mix.                               | 5        |
| 4. a) Explain points to be considered for selection of location of plant. | 5        |
| b) Explain impact of liberalization on Indian economy in 1991.            | 5        |
| 5. a) Brief the function of bank.                                         | 5        |
| b) Explain the points to be considered performance appraisal.             | 5        |
| 6. Write short notes on <b>any two</b> :                                  | (2×5=10) |
| a) Exchange rate determination                                            |          |
| b) Plant layout                                                           |          |
| c) Value analysis.                                                        |          |
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SLR-TJ – 459

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| Set | Q |
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**T.E. (Electrical and Electronic Engg.) (Part – II) (CGPA) Examination, 2017  
Self Learning (Technical)  
INDUSTRIAL MANAGEMENT**

Day and Date : Monday, 27-11-2017  
Time : 10.00 a.m. to 12.00 noon

Total Marks : 50

- 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) An individual is likely to resist change because of all of the following reasons except
    - a) Uncertainty
    - b) Increased productivity
    - c) Concern over personal loss
    - d) Believe that the changes is not in organization's best interest
  - 2) \_\_\_\_\_ may be necessary when resistance come from powerful source.
    - a) Education and Communication
    - b) Coercion
    - c) Cooptation
    - d) Negotiations
  - 3) What category of change involves work process, methods and equipment ?
    - a) Technology
    - b) People
    - c) Competitors
    - d) Structure
  - 4) Techniques to change the peoples and quality of interpersonal work relationship are termed
    - a) Operations
    - b) Organisational development
    - c) Downsizing
    - d) Robotics

P.T.O.



- 5) Stress, in and of itself is
    - a) Not necessarily bad
    - b) Healthy in most cases
    - c) Harmful, especially if not managed by exercise
    - d) Beneficial to those who use it
  - 6) Managers need to make sure that employees ability
    - a) Match the job requirement
    - b) Are being maximized
    - c) Are not affected by their stress
    - d) Are not causing them stress
  - 7) Managing change is an integral part of
    - a) Top management job
    - b) Middle level managements job
    - c) The first-line managers job
    - d) Every managers job
  - 8) Global economic pressures force organisations to become more
    - a) Price complititive
    - b) Quality conscious
    - c) Cost efficient
    - d) Conservative with raw materials
  - 9) Falling interest rates are an example of what external force ?
    - a) Market place
    - b) Government law and regulation
    - c) Labour markets
    - d) Economic change
  - 10) Labour strikes are an example of what change factor that may encourage a change in management thinking and practices ?
    - a) Work Force
    - b) Equipment
    - c) Employee attitude
    - d) Strategy
-



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**T.E. (Electrical and Electronic Engg.) (Part – II) (CGPA) Examination, 2017  
Self Learning (Technical)  
INDUSTRIAL MANAGEMENT**

Day and Date : Monday, 27-11-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

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

Solve **any four** questions from Q. No. **2** to Q. No. **6**.

- |                                                                           |                 |
|---------------------------------------------------------------------------|-----------------|
| 2. a) Explain coordinating as function of management.                     | 5               |
| b) Explain industrial relations.                                          | 5               |
| 3. a) Brief the functions of production management.                       | 5               |
| b) Techniques for selection of product mix.                               | 5               |
| 4. a) Explain points to be considered for selection of location of plant. | 5               |
| b) Explain impact of liberalization on Indian economy in 1991.            | 5               |
| 5. a) Brief the function of bank.                                         | 5               |
| b) Explain the points to be considered performance appraisal.             | 5               |
| 6. Write short notes on <b>any two</b> :                                  | <b>(2×5=10)</b> |
| a) Exchange rate determination                                            |                 |
| b) Plant layout                                                           |                 |
| c) Value analysis.                                                        |                 |
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SLR-TJ – 459

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**T.E. (Electrical and Electronic Engg.) (Part – II) (CGPA) Examination, 2017  
Self Learning (Technical)  
INDUSTRIAL MANAGEMENT**

Day and Date : Monday, 27-11-2017  
Time : 10.00 a.m. to 12.00 noon

Total Marks : 50

- 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) Falling interest rates are an example of what external force ?
    - a) Market place
    - b) Government law and regulation
    - c) Labour markets
    - d) Economic change
  - 2) Labour strikes are an example of what change factor that may encourage a change in management thinking and practices ?
    - a) Work Force
    - b) Equipment
    - c) Employee attitude
    - d) Strategy
  - 3) An individual is likely to resist change because of all of the following reasons except
    - a) Uncertainty
    - b) Increased productivity
    - c) Concern over personal loss
    - d) Believe that the changes is not in organization's best interest
  - 4) \_\_\_\_\_ may be necessary when resistance come from powerful source.
    - a) Education and Communication
    - b) Coercion
    - c) Cooptation
    - d) Negotiations

P.T.O.



- 5) Managing change is an integral part of
    - a) Top management job
    - b) Middle level managements job
    - c) The first-line managers job
    - d) Every managers job
  - 6) Global economic pressures force organisations to become more
    - a) Price complitive
    - b) Quality conscious
    - c) Cost efficient
    - d) Conservative with raw materials
  - 7) Stress, in and of itself is
    - a) Not necessarily bad
    - b) Healthy in most cases
    - c) Harmful, especially if not managed by exercise
    - d) Beneficial to those who use it
  - 8) Managers need to make sure that employees ability
    - a) Match the job requirement
    - b) Are being maximized
    - c) Are not affected by their stress
    - d) Are not causing them stress
  - 9) What category of change involves work process, methods and equipment ?
    - a) Technology
    - b) People
    - c) Competitors
    - d) Structure
  - 10) Techniques to change the peoples and quality of interpersonal work relationship are termed
    - a) Operations
    - b) Organisational development
    - c) Downsizing
    - d) Robotics
-



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**T.E. (Electrical and Electronic Engg.) (Part – II) (CGPA) Examination, 2017  
Self Learning (Technical)  
INDUSTRIAL MANAGEMENT**

Day and Date : Monday, 27-11-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

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

Solve **any four** questions from Q. No. 2 to Q. No. 6.

- |                                                                           |          |
|---------------------------------------------------------------------------|----------|
| 2. a) Explain coordinating as function of management.                     | 5        |
| b) Explain industrial relations.                                          | 5        |
| 3. a) Brief the functions of production management.                       | 5        |
| b) Techniques for selection of product mix.                               | 5        |
| 4. a) Explain points to be considered for selection of location of plant. | 5        |
| b) Explain impact of liberalization on Indian economy in 1991.            | 5        |
| 5. a) Brief the function of bank.                                         | 5        |
| b) Explain the points to be considered performance appraisal.             | 5        |
| 6. Write short notes on <b>any two</b> :                                  | (2×5=10) |
| a) Exchange rate determination                                            |          |
| b) Plant layout                                                           |          |
| c) Value analysis.                                                        |          |
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SLR-TJ – 459

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**T.E. (Electrical and Electronic Engg.) (Part – II) (CGPA) Examination, 2017  
Self Learning (Technical)  
INDUSTRIAL MANAGEMENT**

Day and Date : Monday, 27-11-2017

Total Marks : 50

Time : 10.00 a.m. to 12.00 noon

- 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) Managing change is an integral part of
  - a) Top management job
  - b) Middle level managements job
  - c) The first-line managers job
  - d) Every managers job
- 2) Global economic pressures force organisations to become more
  - a) Price complittive
  - b) Quality conscious
  - c) Cost efficient
  - d) Conservative with raw materials
- 3) Falling interest rates are an example of what external force ?
  - a) Market place
  - b) Government law and regulation
  - c) Labour markets
  - d) Economic change
- 4) Labour strikes are an example of what change factor that may encourage a change in management thinking and practices ?
  - a) Work Force
  - b) Equipment
  - c) Employee attitude
  - d) Strategy

P.T.O.



- 5) What category of change involves work process, methods and equipment ?  
a) Technology      b) People      c) Competitors      d) Structure
- 6) Techniques to change the peoples and quality of interpersonal work relationship are termed  
a) Operations      b) Organisational development  
c) Downsizing      d) Robotics
- 7) An individual is likely to resist change because of all of the following reasons except  
a) Uncertainty  
b) Increased productivity  
c) Concern over personal loss  
d) Believe that the changes is not in organization's best interest
- 8) \_\_\_\_\_ may be necessary when resistance come from powerful source.  
a) Education and Communication      b) Coercion  
c) Cooptation      d) Negotiations
- 9) Stress, in and of itself is  
a) Not necessarily bad  
b) Healthy in most cases  
c) Harmful, especially if not managed by exercise  
d) Beneficial to those who use it
- 10) Managers need to make sure that employees ability  
a) Match the job requirement      b) Are being maximized  
c) Are not affected by their stress      d) Are not causing them stress
-



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**T.E. (Electrical and Electronic Engg.) (Part – II) (CGPA) Examination, 2017  
Self Learning (Technical)  
INDUSTRIAL MANAGEMENT**

Day and Date : Monday, 27-11-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

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

Solve **any four** questions from Q. No. 2 to Q. No. 6.

- |                                                                           |                 |
|---------------------------------------------------------------------------|-----------------|
| 2. a) Explain coordinating as function of management.                     | 5               |
| b) Explain industrial relations.                                          | 5               |
| 3. a) Brief the functions of production management.                       | 5               |
| b) Techniques for selection of product mix.                               | 5               |
| 4. a) Explain points to be considered for selection of location of plant. | 5               |
| b) Explain impact of liberalization on Indian economy in 1991.            | 5               |
| 5. a) Brief the function of bank.                                         | 5               |
| b) Explain the points to be considered performance appraisal.             | 5               |
| 6. Write short notes on <b>any two</b> :                                  | <b>(2×5=10)</b> |
| a) Exchange rate determination                                            |                 |
| b) Plant layout                                                           |                 |
| c) Value analysis.                                                        |                 |
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**B.E. (Part – I) (Old) (Electrical & Electronics Engg.) Examination, 2017**  
**INSTRUMENTATION TECHNIQUES**

Day and Date : Tuesday, 12-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Total 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.**
  - 3) **All** questions are **compulsory**.
  - 4) **Make suitable assumptions if necessary.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Solve the following :

- 1) Thermocouples are
  - a) Passive transducers
  - b) Active transducers
  - c) Both active and passive transducers
  - d) Output transducers
- 2) In an LVDT the two secondary windings are connected in differential to obtain
  - a) Higher output voltage
  - b) An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core tool place from right to left or from left to right
  - c) In order to establish the null or the reference point for the displacement of the core
  - d) Both b) and c)
- 3) The dynamic characteristics of capacitive transducers are similar to those of
  - a) Low pass filter
  - b) High pass filter
  - c) Notch filter
  - d) Band stop filters
- 4) Quartz and Rochelle salt belong to
  - a) Nature group of piezo electric material
  - b) Synthetic group of piezo-electric material
  - c) Can belong to nature or synthetic group of piezo-electric material provided properly polarized
  - d) All of these
- 5) Piezo-electric transducers are
  - a) Passive transducers
  - b) Active transducers
  - c) Inverse transducers
  - d) b) and c)
- 6) The properties of an ideal OPAMP are
  - a) It should have zero input impedance
  - b) It should have an infinite output impedance
  - c) It should have a zero open loop gain
  - d) None of these
- 7) A buffer amplifier has gain of
  - a) infinity
  - b) zero
  - c) unity
  - d) dependent upon the circuit parameters
- 8) The gain of 741 OPAMP falls at low frequency of
  - a) 10 KHz
  - b) 10 Hz
  - c) 100 Hz
  - d) 1000 Hz
- 9) A low pass RC filter acts as a pure differentiator when
  - a)  $\omega \tau = 1$
  - b)  $\omega \tau \ll 1$
  - c)  $\omega \tau \gg 1$
  - d)  $\omega \tau = 0$

When  $\omega$  is applied frequency and  $\tau$  is the time constant of RC circuit.

P.T.O.



- 10) The FM telemetry as compared with AM telemetry requires a channel that is
  - a) Equal to that of AM telemetry
  - b) Smaller than what is required for AM telemetry
  - c) 100 times of that required for AM telemetry
  - d) 10 times of that required for AM telemetry
- 11) Period measurement is done in frequency meters for achieving high accuracy in the case of
  - a) High frequencies
  - b) Medium frequencies
  - c) DC
  - d) Low frequencies
- 12) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A/D converter is
  - a) Successive approximation converter
  - b) Digital ramp converter
  - c) Digital slope converter
  - d) All of these
- 13) X-Y recorders
  - a) Record one quantity with respect to another quantity
  - b) Record one quantity on X axis with respect to time on Y axis
  - c) Record one quantity on Y axis with respect to time on X axis
  - d) None of these
- 14) The advantages of FM magnetic tape recording are
  - a) It can record from dc to several KHz
  - b) It is free from dropout effects
  - c) It is independent of amplitude variations and accurately reproduces the waveform of input signal
  - d) All of these
- 15) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when,
  - a) Static strains are being measured
  - b) Dynamic strains are being measured
  - c) Both static and dynamic strains are being measured
  - d) None of these
- 16) Two strain gauges are used to measure strain in cantilever. One gauge is mounted on top of the cantilever and the other is placed at the bottom. The two strain gauges form two arms of a voltage sensitive Wheatstone's bridge. This bridge configuration is called
  - a) A gaurter bridge
  - b) A half bridge
  - c) A full bridge
  - d) A null bridge
- 17) Dummy strain gauges are used for
  - a) Compensation of temperature changes
  - b) Increasing the sensitivity of bridge in which they are included
  - c) Compensating for different expansion
  - d) Calibration of strain gauges
- 18) Strain gauge rosettes are used
  - a) When the direction of principal stress is known
  - b) When the direction of principal stress is unknown
  - c) When the direction of hoop stress is not known
  - d) When the direction of longitudinal stress is not known
- 19) Piezoelectric accelerometers meter
  - a) Should not be used for high frequencies above 100 Hz
  - b) Should be used for low frequencies
  - c) Should use a monitoring source of low input impedance
  - d) Have a low natural frequency
- 20) A thermocouple
  - a) Has a low time constant when it is bare
  - b) Has a low time constant if it is provided with a sheath
  - c) Has the same time constant whether it is bare or is provided with sheath
  - d) None of these



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**B.E. (Part – I) (Old) (Electrical & Electronics Engg.) Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Tuesday, 12-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 80

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumptions if necessary.**

**SECTION – I**

2. Solve **any four** : **(5×4=20)**

- a) What is the types of transducer ? Classify based on the principle of working.
- b) List the errors occurring in the instrumentation system and discuss the methods to minimise them.
- c) Explain the need of isolation amplifier and its operation.
- d) With neat diagram explain programmable gain amplifier. Also Derive the Expression for Gain.
- e) Write a short note on sample and hold circuit.
- f) How frequency is converted into voltage ? Explain with diagram.

3. Solve **any two** : **(10×2=20)**

- a) Explain instrumentation system with neat block diagram. Give a practical example of it with explanation.
- b) Explain binary weighted resistor type D and A converter.
- c) What is meant by Active filters and Derive the frequency response of 1<sup>st</sup> and 2<sup>nd</sup> order filter.

**SECTION – II**

4. Solve **any four** : **(5×4=20)**

- a) Explain segment displays.
- b) Compare analog verses digital displays.

**Set P**



- c) Write short note on installation of PLC.
- d) What is modulation ? Explain frequency Modulation in detail.
- e) To record one quantity with respect to another which recorder is used ? Explain with neat diagram.
- f) Explain the various elements used for input and output for PLC.

5. Solve **any two** :

**(10×2=20)**

- a) Draw and explain Architecture of PLC. State the types of PLC.
  - b) Explain the working of strip chart recorder and X Y recorder.
  - c) What is telemetry ? Explain landline and position telemetry system.
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**B.E. (Part – I) (Old) (Electrical & Electronics Engg.) Examination, 2017**  
**INSTRUMENTATION TECHNIQUES**

Day and Date : Tuesday, 12-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Total 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.**
  - 3) **All** questions are **compulsory**.
  - 4) **Make suitable assumptions if necessary.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Solve the following :

- 1) Two strain gauges are used to measure strain in cantilever. One gauge is mounted on top of the cantilever and the other is placed at the bottom. The two strain gauges form two arms of a voltage sensitive Wheatstone's bridge. This bridge configuration is called
  - a) A gaurter bridge
  - b) A half bridge
  - c) A full bridge
  - d) A null bridge
- 2) Dummy strain gauges are used for
  - a) Compensation of temperature changes
  - b) Increasing the sensitivity of bridge in which they are included
  - c) Compensating for different expansion
  - d) Calibration of strain gauges
- 3) Strain gauge rosettes are used
  - a) When the direction of principal stress is known
  - b) When the direction of principal stress is unknown
  - c) When the direction of hoop stress is not known
  - d) When the direction of longitudinal stress is not known
- 4) Piezoelectric accelerometers meter
  - a) Should not be used for high frequencies above 100 Hz
  - b) Should be used for low frequencies
  - c) Should use a monitoring source of low input impedance
  - d) Have a low natural frequency
- 5) A thermocouple
  - a) Has a low time constant when it is bare
  - b) Has a low time constant if it is provided with a sheath
  - c) Has the same time constant whether it is bare or is provided with sheath
  - d) None of these
- 6) Thermocouples are
  - a) Passive transducers
  - b) Active transducers
  - c) Both active and passive transducers
  - d) Output transducers
- 7) In an LVDT the two secondary windings are connected in differential to obtain
  - a) Higher output voltage
  - b) An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core tool place from right to left or from left to right
  - c) In order to establish the null or the reference point for the displacement of the core
  - d) Both b) and c)
- 8) The dynamic characteristics of capacitive transducers are similar to those of
  - a) Low pass filter
  - b) High pass filter
  - c) Notch filter
  - d) Band stop filters

P.T.O.



- 9) Quartz and Rochelle salt belong to
- Nature group of piezo electric material
  - Synthetic group of piezo-electric material
  - Can belong to nature or synthetic group of piezo-electric material provided properly polarized
  - All of these
- 10) Piezo-electric transducers are
- Passive transducers
  - Active transducers
  - Inverse transducers
  - b) and c)
- 11) The properties of an ideal OPAMP are
- It should have zero input impedance
  - It should have an infinite output impedance
  - It should have a zero open loop gain
  - None of these
- 12) A buffer amplifier has gain of
- infinity
  - zero
  - unity
  - dependent upon the circuit parameters
- 13) The gain of 741 OPAMP falls at low frequency of
- 10 KHz
  - 10 Hz
  - 100 Hz
  - 1000 Hz
- 14) A low pass RC filter acts as a pure differentiator when
- $\omega \tau = 1$
  - $\omega \tau \ll 1$
  - $\omega \tau \gg 1$
  - $\omega \tau = 0$
- When  $\omega$  is applied frequency and  $\tau$  is the time constant of RC circuit.
- 15) The FM telemetry as compared with AM telemetry requires a channel that is
- Equal to that of AM telemetry
  - Smaller than what is required for AM telemetry
  - 100 times of that required for AM telemetry
  - 10 times of that required for AM telemetry
- 16) Period measurement is done in frequency meters for achieving high accuracy in the case of
- High frequencies
  - Medium frequencies
  - DC
  - Low frequencies
- 17) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A/D converter is
- Successive approximation converter
  - Digital ramp converter
  - Digital slope converter
  - All of these
- 18) X-Y recorders
- Record one quantity with respect to another quantity
  - Record one quantity on X axis with respect to time on Y axis
  - Record one quantity on Y axis with respect to time on X axis
  - None of these
- 19) The advantages of FM magnetic tape recording are
- It can record from dc to several KHz
  - It is free from dropout effects
  - It is independent of amplitude variations and accurately reproduces the waveform of input signal
  - All of these
- 20) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when,
- Static strains are being measured
  - Dynamic strains are being measured
  - Both static and dynamic strains are being measured
  - None of these



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**B.E. (Part – I) (Old) (Electrical & Electronics Engg.) Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Tuesday, 12-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 80

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumptions if necessary.**

**SECTION – I**

2. Solve **any four** : **(5×4=20)**

- a) What is the types of transducer ? Classify based on the principle of working.
- b) List the errors occurring in the instrumentation system and discuss the methods to minimise them.
- c) Explain the need of isolation amplifier and its operation.
- d) With neat diagram explain programmable gain amplifier. Also Derive the Expression for Gain.
- e) Write a short note on sample and hold circuit.
- f) How frequency is converted into voltage ? Explain with diagram.

3. Solve **any two** : **(10×2=20)**

- a) Explain instrumentation system with neat block diagram. Give a practical example of it with explanation.
- b) Explain binary weighted resistor type D and A converter.
- c) What is meant by Active filters and Derive the frequency response of 1<sup>st</sup> and 2<sup>nd</sup> order filter.

**SECTION – II**

4. Solve **any four** : **(5×4=20)**

- a) Explain segment displays.
- b) Compare analog verses digital displays.

**Set Q**



- c) Write short note on installation of PLC.
- d) What is modulation ? Explain frequency Modulation in detail.
- e) To record one quantity with respect to another which recorder is used ? Explain with neat diagram.
- f) Explain the various elements used for input and output for PLC.

5. Solve **any two** :

**(10×2=20)**

- a) Draw and explain Architecture of PLC. State the types of PLC.
  - b) Explain the working of strip chart recorder and X Y recorder.
  - c) What is telemetry ? Explain landline and position telemetry system.
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**B.E. (Part – I) (Old) (Electrical & Electronics Engg.) Examination, 2017**  
**INSTRUMENTATION TECHNIQUES**

Day and Date : Tuesday, 12-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Total 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.**
  - 3) **All** questions are **compulsory**.
  - 4) **Make suitable assumptions if necessary.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Solve the following :

- 1) Period measurement is done in frequency meters for achieving high accuracy in the case of
  - a) High frequencies
  - b) Medium frequencies
  - c) DC
  - d) Low frequencies
- 2) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A/D converter is
  - a) Successive approximation converter
  - b) Digital ramp converter
  - c) Digital slope converter
  - d) All of these
- 3) X-Y recorders
  - a) Record one quantity with respect to another quantity
  - b) Record one quantity on X axis with respect to time on Y axis
  - c) Record one quantity on Y axis with respect to time on X axis
  - d) None of these
- 4) The advantages of FM magnetic tape recording are
  - a) It can record from dc to several KHz
  - b) It is free from dropout effects
  - c) It is independent of amplitude variations and accurately reproduces the waveform of input signal
  - d) All of these
- 5) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when,
  - a) Static strains are being measured
  - b) Dynamic strains are being measured
  - c) Both static and dynamic strains are being measured
  - d) None of these
- 6) Two strain gauges are used to measure strain in cantilever. One gauge is mounted on top of the cantilever and the other is placed at the bottom. The two strain gauges form two arms of a voltage sensitive Wheatstone's bridge. This bridge configuration is called
  - a) A gaurter bridge
  - b) A half bridge
  - c) A full bridge
  - d) A null bridge
- 7) Dummy strain gauges are used for
  - a) Compensation of temperature changes
  - b) Increasing the sensitivity of bridge in which they are included
  - c) Compensating for different expansion
  - d) Calibration of strain gauges

P.T.O.



- 8) Strain gauge rosettes are used
- When the direction of principal stress is known
  - When the direction of principal stress is unknown
  - When the direction of hoop stress is not known
  - When the direction of longitudinal stress is not known
- 9) Piezoelectric accelerometers meter
- Should not be used for high frequencies above 100 Hz
  - Should be used for low frequencies
  - Should use a monitoring source of low input impedance
  - Have a low natural frequency
- 10) A thermocouple
- Has a low time constant when it is bare
  - Has a low time constant if it is provided with a sheath
  - Has the same time constant whether it is bare or is provided with sheath
  - None of these
- 11) Thermocouples are
- Passive transducers
  - Active transducers
  - Both active and passive transducers
  - Output transducers
- 12) In an LVDT the two secondary windings are connected in differential to obtain
- Higher output voltage
  - An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core tool place from right to left or from left to right
  - In order to establish the null or the reference point for the displacement of the core
  - Both b) and c)
- 13) The dynamic characteristics of capacitive transducers are similar to those of
- Low pass filter
  - High pass filter
  - Notch filter
  - Band stop filters
- 14) Quartz and Rochelle salt belong to
- Nature group of piezo electric material
  - Synthetic group of piezo-electric material
  - Can belong to nature or synthetic group of piezo-electric material provided properly polarized
  - All of these
- 15) Piezo-electric transducers are
- Passive transducers
  - Active transducers
  - Inverse transducers
  - b) and c)
- 16) The properties of an ideal OPAMP are
- It should have zero input impedance
  - It should have an infinite output impedance
  - It should have a zero open loop gain
  - None of these
- 17) A buffer amplifier has gain of
- infinity
  - zero
  - unity
  - dependent upon the circuit parameters
- 18) The gain of 741 OPAMP falls at low frequency of
- 10 KHz
  - 10 Hz
  - 100 Hz
  - 1000 Hz
- 19) A low pass RC filter acts as a pure differentiator when
- $\omega \tau = 1$
  - $\omega \tau \ll 1$
  - $\omega \tau \gg 1$
  - $\omega \tau = 0$
- When  $\omega$  is applied frequency and  $\tau$  is the time constant of RC circuit.
- 20) The FM telemetry as compared with AM telemetry requires a channel that is
- Equal to that of AM telemetry
  - Smaller than what is required for AM telemetry
  - 100 times of that required for AM telemetry
  - 10 times of that required for AM telemetry



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**B.E. (Part – I) (Old) (Electrical & Electronics Engg.) Examination, 2017  
INSTRUMENTATION TECHNIQUES**

Day and Date : Tuesday, 12-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 80

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumptions if necessary.**

**SECTION – I**

2. Solve **any four** : **(5×4=20)**

- a) What is the types of transducer ? Classify based on the principle of working.
- b) List the errors occurring in the instrumentation system and discuss the methods to minimise them.
- c) Explain the need of isolation amplifier and its operation.
- d) With neat diagram explain programmable gain amplifier. Also Derive the Expression for Gain.
- e) Write a short note on sample and hold circuit.
- f) How frequency is converted into voltage ? Explain with diagram.

3. Solve **any two** : **(10×2=20)**

- a) Explain instrumentation system with neat block diagram. Give a practical example of it with explanation.
- b) Explain binary weighted resistor type D and A converter.
- c) What is meant by Active filters and Derive the frequency response of 1<sup>st</sup> and 2<sup>nd</sup> order filter.

**SECTION – II**

4. Solve **any four** : **(5×4=20)**

- a) Explain segment displays.
- b) Compare analog verses digital displays.

**Set R**



- c) Write short note on installation of PLC.
- d) What is modulation ? Explain frequency Modulation in detail.
- e) To record one quantity with respect to another which recorder is used ? Explain with neat diagram.
- f) Explain the various elements used for input and output for PLC.

5. Solve **any two** :

**(10×2=20)**

- a) Draw and explain Architecture of PLC. State the types of PLC.
  - b) Explain the working of strip chart recorder and X Y recorder.
  - c) What is telemetry ? Explain landline and position telemetry system.
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**B.E. (Part – I) (Old) (Electrical & Electronics Engg.) Examination, 2017**  
**INSTRUMENTATION TECHNIQUES**

Day and Date : Tuesday, 12-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Total 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.**
  - 3) **All questions are compulsory.**
  - 4) **Make suitable assumptions if necessary.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Solve the following :

- 1) The properties of an ideal OPAMP are
  - a) It should have zero input impedance
  - b) It should have an infinite output impedance
  - c) It should have a zero open loop gain
  - d) None of these
- 2) A buffer amplifier has gain of
  - a) infinity
  - b) zero
  - c) unity
  - d) dependent upon the circuit parameters
- 3) The gain of 741 OPAMP falls at low frequency of
  - a) 10 KHz
  - b) 10 Hz
  - c) 100 Hz
  - d) 1000 Hz
- 4) A low pass RC filter acts as a pure differentiator when
  - a)  $\omega \tau = 1$
  - b)  $\omega \tau \ll 1$
  - c)  $\omega \tau \gg 1$
  - d)  $\omega \tau = 0$

When  $\omega$  is applied frequency and  $\tau$  is the time constant of RC circuit.
- 5) The FM telemetry as compared with AM telemetry requires a channel that is
  - a) Equal to that of AM telemetry
  - b) Smaller than what is required for AM telemetry
  - c) 100 times of that required for AM telemetry
  - d) 10 times of that required for AM telemetry
- 6) Period measurement is done in frequency meters for achieving high accuracy in the case of
  - a) High frequencies
  - b) Medium frequencies
  - c) DC
  - d) Low frequencies
- 7) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A/D converter is
  - a) Successive approximation converter
  - b) Digital ramp converter
  - c) Digital slope converter
  - d) All of these
- 8) X-Y recorders
  - a) Record one quantity with respect to another quantity
  - b) Record one quantity on X axis with respect to time on Y axis
  - c) Record one quantity on Y axis with respect to time on X axis
  - d) None of these



- 9) The advantages of FM magnetic tape recording are
- It can record from dc to several KHz
  - It is free from dropout effects
  - It is independent of amplitude variations and accurately reproduces the waveform of input signal
  - All of these
- 10) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when,
- Static strains are being measured
  - Dynamic strains are being measured
  - Both static and dynamic strains are being measured
  - None of these
- 11) Two strain gauges are used to measure strain in cantilever. One gauge is mounted on top of the cantilever and the other is placed at the bottom. The two strain gauges form two arms of a voltage sensitive Wheatstone's bridge. This bridge configuration is called
- A gaurter bridge
  - A half bridge
  - A full bridge
  - A null bridge
- 12) Dummy strain gauges are used for
- Compensation of temperature changes
  - Increasing the sensitivity of bridge in which they are included
  - Compensating for different expansion
  - Calibration of strain gauges
- 13) Strain gauge rosettes are used
- When the direction of principal stress is known
  - When the direction of principal stress is unknown
  - When the direction of hoop stress is not known
  - When the direction of longitudinal stress is not known
- 14) Piezoelectric accelerometers meter
- Should not be used for high frequencies above 100 Hz
  - Should be used for low frequencies
  - Should use a monitoring source of low input impedance
  - Have a low natural frequency
- 15) A thermocouple
- Has a low time constant when it is bare
  - Has a low time constant if it is provided with a sheath
  - Has the same time constant whether it is bare or is provided with sheath
  - None of these
- 16) Thermocouples are
- Passive transducers
  - Active transducers
  - Both active and passive transducers
  - Output transducers
- 17) In an LVDT the two secondary windings are connected in differential to obtain
- Higher output voltage
  - An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core tool place from right to left or from left to right
  - In order to establish the null or the reference point for the displacement of the core
  - Both b) and c)
- 18) The dynamic characteristics of capacitive transducers are similar to those of
- Low pass filter
  - High pass filter
  - Notch filter
  - Band stop filters
- 19) Quartz and Rochelle salt belong to
- Nature group of piezo electric material
  - Synthetic group of piezo-electric material
  - Can belong to nature or synthetic group of piezo-electric material provided properly polarized
  - All of these
- 20) Piezo-electric transducers are
- Passive transducers
  - Active transducers
  - Inverse transducers
  - b) and c)



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**B.E. (Part – I) (Old) (Electrical & Electronics Engg.) Examination, 2017**  
**INSTRUMENTATION TECHNIQUES**

Day and Date : Tuesday, 12-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 80

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumptions if necessary.**

SECTION – I

2. Solve **any four** : **(5×4=20)**

- a) What is the types of transducer ? Classify based on the principle of working.
- b) List the errors occurring in the instrumentation system and discuss the methods to minimise them.
- c) Explain the need of isolation amplifier and its operation.
- d) With neat diagram explain programmable gain amplifier. Also Derive the Expression for Gain.
- e) Write a short note on sample and hold circuit.
- f) How frequency is converted into voltage ? Explain with diagram.

3. Solve **any two** : **(10×2=20)**

- a) Explain instrumentation system with neat block diagram. Give a practical example of it with explanation.
- b) Explain binary weighted resistor type D and A converter.
- c) What is meant by Active filters and Derive the frequency response of 1<sup>st</sup> and 2<sup>nd</sup> order filter.

SECTION – II

4. Solve **any four** : **(5×4=20)**

- a) Explain segment displays.
- b) Compare analog verses digital displays.

**Set S**



- c) Write short note on installation of PLC.
- d) What is modulation ? Explain frequency Modulation in detail.
- e) To record one quantity with respect to another which recorder is used ? Explain with neat diagram.
- f) Explain the various elements used for input and output for PLC.

5. Solve **any two** :

**(10×2=20)**

- a) Draw and explain Architecture of PLC. State the types of PLC.
- b) Explain the working of strip chart recorder and X Y recorder.
- c) What is telemetry ? Explain landline and position telemetry system.

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**B.E.(Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2017**

**POWER SYSTEM – II**

Day and Date : Thursday, 14-12-2017  
Time : 10.00 a.m. to 1.00. p.m.

Max. Marks : 100

- Instructions:**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on 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) Figure to **right** indicate **full** marks.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

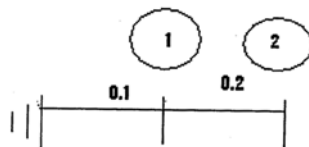
(20×1=20)

- 1) The magnitude of fault current depends upon
  - a) Total impedance up to faults
  - b) Voltage at the fault point
  - c) Load current being supplied before occurrence of fault
  - d) Both a and b
- 2) For a given base voltage and base volt-ampere, the per-unit impedance value of an element is x. What will be the per-unit impedance value of this element when the voltage and volt-ampere bases are both doubled ?
  - a) 0.5 x
  - b) 2x
  - c) 4x
  - d) x
- 3) An isolated synchronous generator with transient reactance equal to 0.1 pu on a 100 MVA base is connected to the high voltages bus through a step-up transformer of reactance 0.1 pu on a 100 MVA base. The faults level at the bus is
  - a) 1,000 MVA
  - b) 500 MVA
  - c) 50 MVA
  - d) 10 MVA
- 4) The value of the expression  $1 + \alpha + \alpha^2$  is
  - a) 0
  - b) 1
  - c) -1
  - d) 2
- 5) A balanced 3-phase system consist of
  - a) Zero-sequence currents only
  - b) Positive-sequence currents only
  - c) Negative and zero sequence currents
  - d) Zero negative and positive sequence currents
- 6) In case of an unbalanced star – connected load supplied from an unbalanced 3-phase, 3-wire system, load currents will consists of
  - a) Positive-seqence components
  - b) Negative-sequence component
  - c) Zero-sequence components
  - d) Only a and b
- 7) Negative – sequence reactance of transformer is
  - a) Equal to the positive-sequence reactance
  - b) Larger than the positive-sequence reactance
  - c) Smaller than the positive-sequence reactance
  - d) None of the above
- 8) The zero-sequence fault current are absent when the fault is
  - a) Single line to ground
  - b) Line to line
  - c) Double line to ground
  - d) None of the above
- 9) A star-connected 3-phase 11 kv, 25 MVA alternator with its neutral grounded through a 0.033 pu reactance (based on the alternator rating) has positive, – negative and zero sequence reactance of 0.2 pu, 0.1 pu and 0.1 pu respectively. A single line to ground fault on one of its terminals would result in a fault MVA of
  - a) 150 MVA
  - b) 125 MVA
  - c) 100 MVA
  - d) 50 MVA

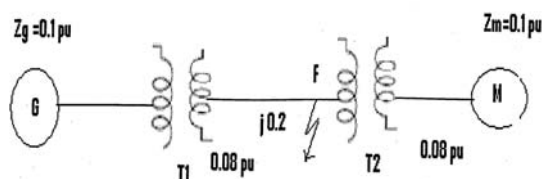
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- 10) The stability of the power system is not affected
- Generator reactance
  - Line reactance
  - Line losses
  - Excitation of generators
- 11) If a generator of 250 MVA rating has an inertia constant of 6 MJ/MVA, its inertia constant on a 100MVA base is
- 15 MJ/MVA
  - 10.5 MJ/MVA
  - 6 MJ/MVA
  - 2.4 MJ/MVA
- 12) Equal area criterion gives the information regarding
- Stability region
  - Absolute stability
  - Relative stability
  - Swing curve
- 13) For a load-flow solution the quantities normally specified at a voltages controlled bus are
- P and Q
  - P and V
  - Q and V
  - P and  $\delta$
- 14) In power system, the maximum numbers of buses are
- Generator buses
  - Load buses
  - Slack buses
  - P-V buses
- 15) The bus admittance matrix of the network shown in the given figure, for which the marked parameters are per unit impedance, is



- $\begin{bmatrix} 0.3 & 0.2 \\ -0.2 & 0.2 \end{bmatrix}$
  - $\begin{bmatrix} 0.3 & 0.2 \\ 0.2 & 0.2 \end{bmatrix}$
  - $\begin{bmatrix} 0.3 & -0.2 \\ -0.2 & 0.2 \end{bmatrix}$
  - $\begin{bmatrix} 15 & -5 \\ -5 & 5 \end{bmatrix}$
- 16) For accurate load-flow calculation on large power systems \_\_\_\_\_ Method is best one.
- G-S
  - N R
  - De-coupled
  - None
- 17) In a load-flow study a PV bus is treated as PQ bus when
- Voltages limit is violated
  - Active power limit is violated
  - Phase angle is high
  - Reactive power limit is violated
- 18) Compared to gauss-Seidal method, newton-Raphon method takes
- Less number of iterations and more time per iteration
  - Less number of iteration and less time per iteration
  - More number of iteration and more time per iteration
  - More number of iteration and less time per iteration
- 19) The following figure shows the single line diagram of a power system with all reactance marked inper unit (pu) on the same base



- The system is on no load when a 3-phase fault occur at F on the high voltage side of the transformer T2. The fault current will be
- $-j 0.8187$  pu
  - $+j 0.8187$  pu
  - $-j 8.1871$  pu
  - $+j 8.1871$  pu
- 20) Zero sequences currents flow in a transmission line when there is
- Double line to ground faults
  - An overvoltage in the line caused by charged loads
  - A line to line fault
  - A faults across all the three line



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**B.E.(Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2017  
POWER SYSTEM – II**

Day and Date : Thursday, 14-12-2017  
Time : 10.00 a.m. to 1.00. p.m.

Marks : 80

- Instructions :**
- i) **All questions are compulsory.**
  - ii) **Figure to right indicate full marks.**
  - iii) **Assume suitable data if necessary.**

SECTION – I

2. Solve **any four** : **(5×4=20)**

- a) Derive an expression on per unit of single phase and three phase supply system with proper definition.
- b) Write short note on time behavior of synchronous machine at the short circuit.
- c) Starting from the first principle develop the equations for real and reactive bus powers.
- d) From the Y Bus for the G-bus system if the line series impedances are as under :

| bus   | impedance (pu) |
|-------|----------------|
| 1 – 2 | 0.5 + j0.16    |
| 1 – 3 | 0.6 + j0.15    |
| 1 – 4 | 0.15 + j0.6    |
| 2 – 3 | 0.05 + j0.03   |
| 3 – 4 | 0.04 + j0.02   |

- e) Classify the different buses in power flow analysis in briefly.
- f) Derive and Explain the formation of Y bus by using singular transformation method.

3. Solve **any two** : **(10×2=20)**

- a) Two generators rated at 10 MVA, 13.2 kV and 15 MVA, 13.2 kV resp. are connected in parallel to a bus. The bus feeds two motors rated at 8 MVA and 12 MVA resp. The rated voltage of motor is 12.5 kV. The reactance of each generator is 15% and that of motor is 20% each. Assume 50 MVA, 13.8 kV base and draw reactance diagram.
- b) A 200 MVA, 11 KV, 50 Hz, 6 pole turbo generator has an inertia constant of MJ/MVA. Find the stored energy in rotor at synchronous speed. If the machine is operating at a load of 120 MW when the load suddenly increases to 160 MW. Find the rotor retardation.
- c) Explain the G – S method for solution of non-linear algebraic equations.



## SECTION – II

4. Solve **any four** : **(5×4=20)**
- a) A 60 MVA, 11 KV generator has  $z_1 = z_2 = j0.3$ ,  $z_0 = j0.06$  per unit. A line to line fault occurs on the generator terminals. Find the fault current.
  - b) Define and Explain the symmetrical components.
  - c) The line currents in a three phase system are  $1_a = 7 \angle 60^\circ$  A,  $1_b = 6 \angle 60^\circ$  A, and  $1_c = 0$ . Find the symmetrical components.
  - d) Derive the expression for zero phase sequence impedance of transmission line which is to be considered 2.5 times of positive or negative phase sequence impedance.
  - e) Explain the different reasons symmetrical fault with proper explanation.
  - f) Explain the selection criteria for circuit breaker.
5. Solve **any two** : **(10×2=20)**
- a) Explain the stability of power system. Derive the swing equation.
  - b) Explain the different security constraints in power system in detail.
  - c) Explain steady state stability and transient stability in the power system.
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**B.E.(Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2017****POWER SYSTEM – II**

Day and Date : Thursday, 14-12-2017  
Time : 10.00 a.m. to 1.00. p.m.

Max. Marks : 100

- Instructions :**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on 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) Figure to **right** indicate **full** marks.

**MCQ/Objective Type Questions**

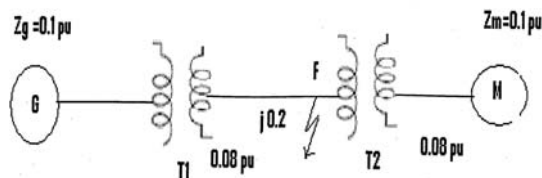
Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) For accurate load-flow calculation on large power systems \_\_\_\_\_ Method is best one.  
a) G-S                                      b) N R                                      c) De-coupled                                      d) None
- 2) In a load-flow study a PV bus is treated as PQ bus when  
a) Voltages limit is violated                                      b) Active power limit is violated  
c) Phase angle is high                                      d) Reactive power limit is violated
- 3) Compared to gauss-Seidal method, newton-Raphon method takes  
a) Less number of iterations and more time per iteration  
b) Less number of iteration and less time per iteration  
c) More number of iteration and more time per iteration  
d) More number of iteration and less time per iteration
- 4) The following figure shows the single line diagram of a power system with all reactance marked inper unit (pu) on the same base

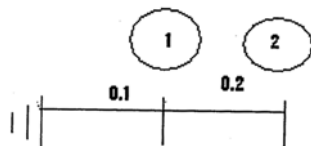


- The system is on no load when a 3-phase fault occur at F on the high voltage side of the transformer T2. The fault current will be
- a)  $-j 0.8187$  pu                                      b)  $+j 0.8187$  pu                                      c)  $-j 8.1871$  pu                                      d)  $+j 8.1871$  pu
- 5) Zero sequences currents flow in a transmission line when there is  
a) Double line to ground faults  
b) An overvoltage in the line caused by charged loads  
c) A line to line fault  
d) A faults across all the three line
  - 6) The magnitude of fault current depends upon  
a) Total impedance up to faults  
b) Voltage at the fault point  
c) Load current being supplied before occurrence of fault  
d) Both a and b
  - 7) For a given base voltage and base volt-ampere, the per-unit impedance value of an element is x. What will be the per-unit impedance value of this element when the voltage and volt-ampere bases are both doubled ?  
a)  $0.5 x$                                       b)  $2x$                                       c)  $4x$                                       d)  $x$

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- 8) An isolated synchronous generator with transient reactance equal to 0.1 pu on a 100 MVA base is connected to the high voltages bus through a step-up transformer of reactance 0.1 pu on a 100 MVA base. The faults level at the bus is  
 a) 1,000 MVA                      b) 500 MVA                      c) 50 MVA                      d) 10 MVA
- 9) The value of the expression  $1 + \alpha + \alpha^2$  is  
 a) 0                      b) 1                      c) -1                      d) 2
- 10) A balanced 3-phase system consist of  
 a) Zero-sequence currents only                      b) Positive-sequence currents only  
 c) Negative and zero sequence currents                      d) Zero negative and positive sequence currents
- 11) In case of an unbalanced star – connected load supplied from an unbalanced 3-phase, 3-wire system, load currents will consists of  
 a) Positive-seqence components                      b) Negative-sequence component  
 c) Zero-sequence components                      d) Only a and b
- 12) Negative – sequence reactance of transformer is  
 a) Equal to the positive-sequence reactance  
 b) Larger than the positive-sequence reactance  
 c) Smaller than the positive-sequence reactance  
 d) None of the above
- 13) The zero-sequence fault current are absent when the fault is  
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 c) Double line to ground                      d) None of the above
- 14) A star-connected 3-phase 11 kv, 25 MVA alternator with its neutral grounded through a 0.033 pu reactance (based on the alternator rating) has positive, – negative and zero sequence reactance of 0.2 pu, 0.1 pu and 0.1 pu respectively. A single line to ground fault on one of its terminals would result in a fault MVA of  
 a) 150 MVA                      b) 125 MVA                      c) 100 MVA                      d) 50 MVA
- 15) The stability of the power system is not affected  
 a) Generator reactance                      b) Line reactance  
 c) Line losses                      d) Excitation of generators
- 16) If a generator of 250 MVA rating has an inertia constant of 6 MJ/MVA, its inertia constant on a 100MVA base is  
 a) 15 MJ/MVA                      b) 10.5 MJ/MVA                      c) 6 MJ/MVA                      d) 2.4 MJ/MVA
- 17) Equal area criterion gives the information regarding  
 a) Stability region                      b) Absolute stability                      c) Relative stability                      d) Swing curve
- 18) For a load-flow solution the quantities normally specified at a voltages controlled bus are  
 a) P and Q                      b) P and V                      c) Q and V                      d) P and  $\delta$
- 19) In power system, the maximum numbers of buses are  
 a) Generator buses                      b) Load buses                      c) Slack buses                      d) P-V buses
- 20) The bus admittance matrix of the network shown in the given figure, for which the marked parameters are per unit impedance, is



- a)  $\begin{bmatrix} 0.3 & 0.2 \\ -0.2 & 0.2 \end{bmatrix}$                       b)  $\begin{bmatrix} 0.3 & 0.2 \\ 0.2 & 0.2 \end{bmatrix}$                       c)  $\begin{bmatrix} 0.3 & -0.2 \\ -0.2 & 0.2 \end{bmatrix}$                       d)  $\begin{bmatrix} 15 & -5 \\ -5 & 5 \end{bmatrix}$



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**B.E.(Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2017  
POWER SYSTEM – II**

Day and Date : Thursday, 14-12-2017  
Time : 10.00 a.m. to 1.00. p.m.

Marks : 80

- Instructions :**
- i) **All questions are compulsory.**
  - ii) **Figure to right indicate full marks.**
  - iii) **Assume suitable data if necessary.**

SECTION – I

2. Solve **any four** : **(5×4=20)**

- a) Derive an expression on per unit of single phase and three phase supply system with proper definition.
- b) Write short note on time behavior of synchronous machine at the short circuit.
- c) Starting from the first principle develop the equations for real and reactive bus powers.
- d) From the Y Bus for the G-bus system if the line series impedances are as under :

| bus   | impedance (pu) |
|-------|----------------|
| 1 – 2 | 0.5 + j0.16    |
| 1 – 3 | 0.6 + j0.15    |
| 1 – 4 | 0.15 + j0.6    |
| 2 – 3 | 0.05 + j0.03   |
| 3 – 4 | 0.04 + j0.02   |

- e) Classify the different buses in power flow analysis in briefly.
- f) Derive and Explain the formation of Y bus by using singular transformation method.

3. Solve **any two** : **(10×2=20)**

- a) Two generators rated at 10 MVA, 13.2 kV and 15 MVA, 13.2 kV resp. are connected in parallel to a bus. The bus feeds two motors rated at 8 MVA and 12 MVA resp. The rated voltage of motor is 12.5 kV. The reactance of each generator is 15% and that of motor is 20% each. Assume 50 MVA, 13.8 kV base and draw reactance diagram.
- b) A 200 MVA, 11 KV, 50 Hz, 6 pole turbo generator has an inertia constant of MJ/MVA. Find the stored energy in rotor at synchronous speed. If the machine is operating at a load of 120 MW when the load suddenly increases to 160 MW. Find the rotor retardation.
- c) Explain the G – S method for solution of non-linear algebraic equations.



## SECTION – II

4. Solve **any four** : **(5×4=20)**
- a) A 60 MVA, 11 KV generator has  $z_1 = z_2 = j0.3$ ,  $z_0 = j0.06$  per unit. A line to line fault occurs on the generator terminals. Find the fault current.
  - b) Define and Explain the symmetrical components.
  - c) The line currents in a three phase system are  $1_a = 7 \angle 60^\circ$  A,  $1_b = 6 \angle 60^\circ$  A, and  $1_c = 0$ . Find the symmetrical components.
  - d) Derive the expression for zero phase sequence impedance of transmission line which is to be considered 2.5 times of positive or negative phase sequence impedance.
  - e) Explain the different reasons symmetrical fault with proper explanation.
  - f) Explain the selection criteria for circuit breaker.
5. Solve **any two** : **(10×2=20)**
- a) Explain the stability of power system. Derive the swing equation.
  - b) Explain the different security constraints in power system in detail.
  - c) Explain steady state stability and transient stability in the power system.
-





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**B.E.(Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2017**  
**POWER SYSTEM – II**

Day and Date : Thursday, 14-12-2017  
Time : 10.00 a.m. to 1.00. p.m.

Max. Marks : 100

- Instructions:**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on 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) Figure to **right** indicate **full** marks.

**MCQ/Objective Type Questions**

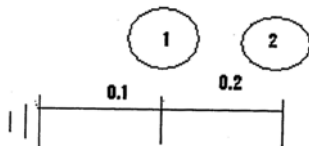
Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

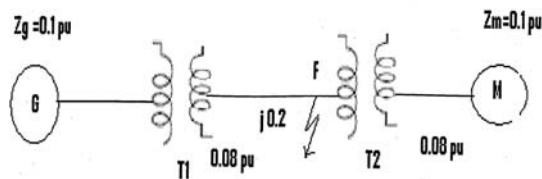
- 1) If a generator of 250 MVA rating has an inertia constant of 6 MJ/MVA, its inertia constant on a 100MVA base is
  - a) 15 MJ/MVA
  - b) 10.5 MJ/MVA
  - c) 6 MJ/MVA
  - d) 2.4 MJ/MVA
- 2) Equal area criterion gives the information regarding
  - a) Stability region
  - b) Absolute stability
  - c) Relative stability
  - d) Swing curve
- 3) For a load-flow solution the quantities normally specified at a voltages controlled bus are
  - a) P and Q
  - b) P and V
  - c) Q and V
  - d) P and  $\delta$
- 4) In power system, the maximum numbers of buses are
  - a) Generator buses
  - b) Load buses
  - c) Slack buses
  - d) P-V buses
- 5) The bus admittance matrix of the network shown in the given figure, for which the marked parameters are per unit impedance, is



- a)  $\begin{bmatrix} 0.3 & 0.2 \\ -0.2 & 0.2 \end{bmatrix}$
  - b)  $\begin{bmatrix} 0.3 & 0.2 \\ 0.2 & 0.2 \end{bmatrix}$
  - c)  $\begin{bmatrix} 0.3 & -0.2 \\ -0.2 & 0.2 \end{bmatrix}$
  - d)  $\begin{bmatrix} 15 & -5 \\ -5 & 5 \end{bmatrix}$
- 6) For accurate load-flow calculation on large power systems \_\_\_\_\_ Method is best one.
    - a) G-S
    - b) N R
    - c) De-coupled
    - d) None
  - 7) In a load-flow study a PV bus is treated as PQ bus when
    - a) Voltages limit is violated
    - b) Active power limit is violated
    - c) Phase angle is high
    - d) Reactive power limit is violated
  - 8) Compared to gauss-Seidal method, newton-Raphon method takes
    - a) Less number of iterations and more time per iteration
    - b) Less number of iteration and less time per iteration
    - c) More number of iteration and more time per iteration
    - d) More number of iteration and less time per iteration



- 9) The following figure shows the single line diagram of a power system with all reactance marked in per unit (pu) on the same base



- The system is on no load when a 3-phase fault occur at F on the high voltage side of the transformer T2. The fault current will be
- a)  $-j 0.8187$  pu      b)  $+j 0.8187$  pu      c)  $-j 8.1871$  pu      d)  $+j 8.1871$  pu
- 10) Zero sequence currents flow in a transmission line when there is
- a) Double line to ground faults  
b) An overvoltage in the line caused by charged loads  
c) A line to line fault  
d) A fault across all the three line
- 11) The magnitude of fault current depends upon
- a) Total impedance up to fault  
b) Voltage at the fault point  
c) Load current being supplied before occurrence of fault  
d) Both a and b
- 12) For a given base voltage and base volt-ampere, the per-unit impedance value of an element is  $x$ . What will be the per-unit impedance value of this element when the voltage and volt-ampere bases are both doubled ?
- a)  $0.5x$       b)  $2x$       c)  $4x$       d)  $x$
- 13) An isolated synchronous generator with transient reactance equal to  $0.1$  pu on a  $100$  MVA base is connected to the high voltage bus through a step-up transformer of reactance  $0.1$  pu on a  $100$  MVA base. The fault level at the bus is
- a)  $1,000$  MVA      b)  $500$  MVA      c)  $50$  MVA      d)  $10$  MVA
- 14) The value of the expression  $1 + \alpha + \alpha^2$  is
- a)  $0$       b)  $1$       c)  $-1$       d)  $2$
- 15) A balanced 3-phase system consists of
- a) Zero-sequence currents only      b) Positive-sequence currents only  
c) Negative and zero sequence currents      d) Zero negative and positive sequence currents
- 16) In case of an unbalanced star-connected load supplied from an unbalanced 3-phase, 3-wire system, load currents will consist of
- a) Positive-sequence components      b) Negative-sequence component  
c) Zero-sequence components      d) Only a and b
- 17) Negative – sequence reactance of transformer is
- a) Equal to the positive-sequence reactance      b) Larger than the positive-sequence reactance  
c) Smaller than the positive-sequence reactance      d) None of the above
- 18) The zero-sequence fault current are absent when the fault is
- a) Single line to ground      b) Line to line  
c) Double line to ground      d) None of the above
- 19) A star-connected 3-phase  $11$  kv,  $25$  MVA alternator with its neutral grounded through a  $0.033$  pu reactance (based on the alternator rating) has positive, – negative and zero sequence reactance of  $0.2$  pu,  $0.1$  pu and  $0.1$  pu respectively. A single line to ground fault on one of its terminals would result in a fault MVA of
- a)  $150$  MVA      b)  $125$  MVA      c)  $100$  MVA      d)  $50$  MVA
- 20) The stability of the power system is not affected
- a) Generator reactance      b) Line reactance  
c) Line losses      d) Excitation of generators



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**B.E.(Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2017  
POWER SYSTEM – II**

Day and Date : Thursday, 14-12-2017  
Time : 10.00 a.m. to 1.00. p.m.

Marks : 80

- Instructions :**
- i) **All questions are compulsory.**
  - ii) **Figure to right indicate full marks.**
  - iii) **Assume suitable data if necessary.**

SECTION – I

2. Solve **any four** : **(5×4=20)**

- a) Derive an expression on per unit of single phase and three phase supply system with proper definition.
- b) Write short note on time behavior of synchronous machine at the short circuit.
- c) Starting from the first principle develop the equations for real and reactive bus powers.
- d) From the Y Bus for the G-bus system if the line series impedances are as under :

| bus   | impedance (pu) |
|-------|----------------|
| 1 – 2 | 0.5 + j0.16    |
| 1 – 3 | 0.6 + j0.15    |
| 1 – 4 | 0.15 + j0.6    |
| 2 – 3 | 0.05 + j0.03   |
| 3 – 4 | 0.04 + j0.02   |

- e) Classify the different buses in power flow analysis in briefly.
- f) Derive and Explain the formation of Y bus by using singular transformation method.

3. Solve **any two** : **(10×2=20)**

- a) Two generators rated at 10 MVA, 13.2 kV and 15 MVA, 13.2 kV resp. are connected in parallel to a bus. The bus feeds two motors rated at 8 MVA and 12 MVA resp. The rated voltage of motor is 12.5 kV. The reactance of each generator is 15% and that of motor is 20% each. Assume 50 MVA, 13.8 kV base and draw reactance diagram.
- b) A 200 MVA, 11 KV, 50 Hz, 6 pole turbo generator has an inertia constant of MJ/MVA. Find the stored energy in rotor at synchronous speed. If the machine is operating at a load of 120 MW when the load suddenly increases to 160 MW. Find the rotor retardation.
- c) Explain the G – S method for solution of non-linear algebraic equations.



## SECTION – II

4. Solve **any four** : **(5×4=20)**
- a) A 60 MVA, 11 KV generator has  $z_1 = z_2 = j0.3$ ,  $z_0 = j0.06$  per unit. A line to line fault occurs on the generator terminals. Find the fault current.
  - b) Define and Explain the symmetrical components.
  - c) The line currents in a three phase system are  $1a = 7 \angle 60^\circ$  A,  $1b = 6 \angle 60^\circ$  A, and  $1c = 0$ . Find the symmetrical components.
  - d) Derive the expression for zero phase sequence impedance of transmission line which is to be considered 2.5 times of positive or negative phase sequence impedance.
  - e) Explain the different reasons symmetrical fault with proper explanation.
  - f) Explain the selection criteria for circuit breaker.
5. Solve **any two** : **(10×2=20)**
- a) Explain the stability of power system. Derive the swing equation.
  - b) Explain the different security constraints in power system in detail.
  - c) Explain steady state stability and transient stability in the power system.
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SLR-TJ – 464

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**B.E.(Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2017**  
**POWER SYSTEM – II**

Day and Date : Thursday, 14-12-2017  
Time : 10.00 a.m. to 1.00. p.m.

Max. Marks : 100

- Instructions:**
- 1) Q. No. 1 is **compulsory**. It should be solved in **first 30 minutes** in Answer Book on 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) Figure to **right** indicate **full** marks.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

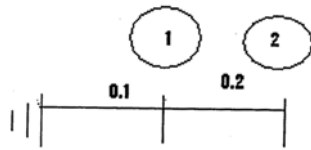
Marks : 20

1. Choose the correct answer : **(20×1=20)**
- 1) In case of an unbalanced star – connected load supplied from an unbalanced 3-phase, 3-wire system, load currents will consists of
    - a) Positive-sequence components
    - b) Negative-sequence component
    - c) Zero-sequence components
    - d) Only a and b
  - 2) Negative – sequence reactance of transformer is
    - a) Equal to the positive-sequence reactance
    - b) Larger than the positive-sequence reactance
    - c) Smaller than the positive-sequence reactance
    - d) None of the above
  - 3) The zero-sequence fault current are absent when the fault is
    - a) Single line to ground
    - b) Line to line
    - c) Double line to ground
    - d) None of the above
  - 4) A star-connected 3-phase 11 kv, 25 MVA alternator with its neutral grounded through a 0.033 pu reactance (based on the alternator rating) has positive, – negative and zero sequence reactance of 0.2 pu, 0.1 pu and 0.1 pu respectively. A single line to ground fault on one of its terminals would result in a fault MVA of
    - a) 150 MVA
    - b) 125 MVA
    - c) 100 MVA
    - d) 50 MVA
  - 5) The stability of the power system is not affected
    - a) Generator reactance
    - b) Line reactance
    - c) Line losses
    - d) Excitation of generators
  - 6) If a generator of 250 MVA rating has an inertia constant of 6 MJ/MVA, its inertia constant on a 100MVA base is
    - a) 15 MJ/MVA
    - b) 10.5 MJ/MVA
    - c) 6 MJ/MVA
    - d) 2.4 MJ/MVA
  - 7) Equal area criterion gives the information regarding
    - a) Stability region
    - b) Absolute stability
    - c) Relative stability
    - d) Swing curve
  - 8) For a load-flow solution the quantities normally specified at a voltages controlled bus are
    - a) P and Q
    - b) P and V
    - c) Q and V
    - d) P and  $\delta$
  - 9) In power system, the maximum numbers of buses are
    - a) Generator buses
    - b) Load buses
    - c) Slack buses
    - d) P-V buses

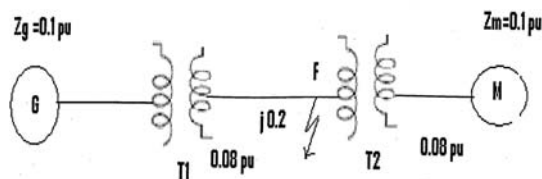
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- 10) The bus admittance matrix of the network shown in the given figure, for which the marked parameters are per unit impedance, is



- a)  $\begin{bmatrix} 0.3 & 0.2 \\ -0.2 & 0.2 \end{bmatrix}$       b)  $\begin{bmatrix} 0.3 & 0.2 \\ 0.2 & 0.2 \end{bmatrix}$       c)  $\begin{bmatrix} 0.3 & -0.2 \\ -0.2 & 0.2 \end{bmatrix}$       d)  $\begin{bmatrix} 15 & -5 \\ -5 & 5 \end{bmatrix}$
- 11) For accurate load-flow calculation on large power systems \_\_\_\_\_ Method is best one.  
 a) G-S                                      b) N R                                      c) De-coupled                                      d) None
- 12) In a load-flow study a PV bus is treated as PQ bus when  
 a) Voltages limit is violated                                      b) Active power limit is violated  
 c) Phase angle is high                                      d) Reactive power limit is violated
- 13) Compared to gauss-Seidal method, newton-Raphon method takes  
 a) Less number of iterations and more time per iteration  
 b) Less number of iteration and less time per iteration  
 c) More number of iteration and more time per iteration  
 d) More number of iteration and less time per iteration
- 14) The following figure shows the single line diagram of a power system with all reactance marked inper unit (pu) on the same base



- The system is on no load when a 3-phase fault occur at F on the high voltage side of the transformer T2. The fault current will be  
 a)  $-j 0.8187$  pu                                      b)  $+j 0.8187$  pu                                      c)  $-j 8.1871$  pu                                      d)  $+j 8.1871$  pu
- 15) Zero sequences currents flow in a transmission line when there is  
 a) Double line to ground faults  
 b) An overvoltage in the line caused by charged loads  
 c) A line to line fault  
 d) A faults across all the three line
- 16) The magnitude of fault current depends upon  
 a) Total impedance up to faults  
 b) Voltage at the fault point  
 c) Load current being supplied before occurrence of fault  
 d) Both a and b
- 17) For a given base voltage and base volt-ampere, the per-unit impedance value of an element is x. What will be the per-unit impedance value of this element when the voltage and volt-ampere bases are both doubled ?  
 a)  $0.5x$                                       b)  $2x$                                       c)  $4x$                                       d)  $x$
- 18) An isolated synchronous generator with transient reactance equal to 0.1 pu on a 100 MVA base is connected to the high voltages bus through a step-up transformer of reactance 0.1 pu on a 100 MVA base. The faults level at the bus is  
 a) 1,000 MVA                                      b) 500 MVA                                      c) 50 MVA                                      d) 10 MVA
- 19) The value of the expression  $1 + \alpha + \alpha^2$  is  
 a) 0                                      b) 1                                      c)  $-1$                                       d) 2
- 20) A balanced 3-phase system consist of  
 a) Zero-sequence currents only                                      b) Positive-sequence currents only  
 c) Negative and zero sequence currents                                      d) Zero negative and positive sequence currents



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**B.E.(Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2017  
POWER SYSTEM – II**

Day and Date : Thursday, 14-12-2017  
Time : 10.00 a.m. to 1.00. p.m.

Marks : 80

- Instructions :**
- i) **All questions are compulsory.**
  - ii) **Figure to right indicate full marks.**
  - iii) **Assume suitable data if necessary.**

SECTION – I

2. Solve **any four** : **(5×4=20)**

- a) Derive an expression on per unit of single phase and three phase supply system with proper definition.
- b) Write short note on time behavior of synchronous machine at the short circuit.
- c) Starting from the first principle develop the equations for real and reactive bus powers.
- d) From the Y Bus for the G-bus system if the line series impedances are as under :

| bus   | impedance (pu) |
|-------|----------------|
| 1 – 2 | 0.5 + j0.16    |
| 1 – 3 | 0.6 + j0.15    |
| 1 – 4 | 0.15 + j0.6    |
| 2 – 3 | 0.05 + j0.03   |
| 3 – 4 | 0.04 + j0.02   |

- e) Classify the different buses in power flow analysis in briefly.
- f) Derive and Explain the formation of Y bus by using singular transformation method.

3. Solve **any two** : **(10×2=20)**

- a) Two generators rated at 10 MVA, 13.2 kV and 15 MVA, 13.2 kV resp. are connected in parallel to a bus. The bus feeds two motors rated at 8 MVA and 12 MVA resp. The rated voltage of motor is 12.5 kV. The reactance of each generator is 15% and that of motor is 20% each. Assume 50 MVA, 13.8 kV base and draw reactance diagram.
- b) A 200 MVA, 11 KV, 50 Hz, 6 pole turbo generator has an inertia constant of MJ/MVA. Find the stored energy in rotor at synchronous speed. If the machine is operating at a load of 120 MW when the load suddenly increases to 160 MW. Find the rotor retardation.
- c) Explain the G – S method for solution of non-linear algebraic equations.



## SECTION – II

4. Solve **any four** : **(5×4=20)**
- a) A 60 MVA, 11 KV generator has  $z_1 = z_2 = j0.3$ ,  $z_0 = j0.06$  per unit. A line to line fault occurs on the generator terminals. Find the fault current.
  - b) Define and Explain the symmetrical components.
  - c) The line currents in a three phase system are  $1a = 7 \angle 60^\circ$  A,  $1b = 6 \angle 60^\circ$  A, and  $1c = 0$ . Find the symmetrical components.
  - d) Derive the expression for zero phase sequence impedance of transmission line which is to be considered 2.5 times of positive or negative phase sequence impedance.
  - e) Explain the different reasons symmetrical fault with proper explanation.
  - f) Explain the selection criteria for circuit breaker.
5. Solve **any two** : **(10×2=20)**
- a) Explain the stability of power system. Derive the swing equation.
  - b) Explain the different security constraints in power system in detail.
  - c) Explain steady state stability and transient stability in the power system.
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SLR-TJ – 465

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**B.E. (Electrical and Electronics Engineering) (Part – I) (New-CGPA)  
Examination, 2017  
INDUSTRIAL DRIVES AND CONTROL**

Day and Date : Tuesday, 28-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- 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 **wherever** necessary.  
4) Non-programmable calculators are **permitted**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : 14
- 1) A pole changing type squirrel cage motor used in derricks has four, eight and twenty four poles. In this, the lowest speed is used for
    - a) Landing the load
    - b) Hoisting
    - c) Lowering
    - d) None of the above
  - 2) The \_\_\_\_\_ motor, because of their inherent characteristics, are best suited for rolling mills.
    - a) dc motor
    - b) slip ring IM
    - c) squirrel cage IM
    - d) single phase motor
  - 3) Which of the following motor is preferred for blowers ?
    - a) wound rotor IM
    - b) squirrel cage IM
    - c) dc shunt motor
    - d) dc series motor
  - 4) Pole changing method of speed control is used in
    - a) slip ring IM
    - b) dc shunt motor
    - c) dc series motor
    - d) squirrel cage IM

P.T.O.



- 5) Consideration involved in the selection of drive for particular application depends on
  - a) Speed control range and its nature
  - b) Starting torque
  - c) Environmental conditions
  - d) All of above
- 6) The motor normally used for crane travel is
  - a) AC slip ring motor
  - b) Ward Leonard controlled dc motors
  - c) Synchronous motor
  - d) DC differentially compound motor
- 7) The travelling speed of crane varies from
  - a) 1 to 2.5 m/s
  - b) 5 to 15 m/s
  - c) 20 to 22.5 m/s
  - d) 25 to 40 m/s
- 8) The advantage of a synchronous motor in addition to its constant speed is
  - a) High power factor
  - b) Better efficiency
  - c) Lower cost
  - d) All of above
- 9) The number of set used in pole changing type squirrel cage motors for derricks and winches is
  - a) 2
  - b) 3
  - c) 4
  - d) 6
- 10) In which of the following application ac drives are used
  - a) fans
  - b) blowers
  - c) mill run out tables
  - d) all of above
- 11) When smooth and precise speed control over the wide range is desired, the motor preferred is
  - a) Synchronous motor
  - b) Squirrel cage IM
  - c) Wound rotor IM
  - d) DC motor
- 12) The selection of control gear for a particular application is based on the consideration of
  - a) Duty
  - b) Starting torque
  - c) Limitations on starting current
  - d) All of above
- 13) The efficiency by using rotor resistance control in IM is
  - a) High
  - b) Low
  - c) Very high
  - d) Very low
- 14) For high frequency chopper the device that is preferred is
  - a) Thyristors
  - b) TRIAC
  - c) Transistor
  - d) GTO



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**B.E. (Electrical and Electronics Engineering) (Part – I) (New-CGPA)  
Examination, 2017  
INDUSTRIAL DRIVES AND CONTROL**

Day and Date : Tuesday, 28-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**Instructions :** 1) Assume suitable data *wherever* necessary.  
2) Non-programmable calculators are **permitted**.

SECTION – I

2. Solve **any three** : **(3×4=12)**
- a) Explain advantages and applications of electrical drives.
  - b) Draw the block diagram of electrical drive and explain each block.
  - c) Derive the fundamental torque equation of electrical drive.
  - d) Explain braking methods of D.C. motor drives.
  - e) Describe multi-quadrant operation of separately excited D.C. motor.
3. Solve **any two** : **(2×8=16)**
- a) Explain different parts of electrical drives in detail with necessary diagram.
  - b) Explain different modes of operation of electrical drives with speed transition path.
  - c) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of  $0.06 \Omega$ . It is fed from  $1 \phi$  fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction, calculate :
    - 1) Firing angle for rated motor torque and 750 rpm.
    - 2) Firing angle for rated motor torque and 600 rpm.



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- Explain stator voltage control of 3 phase I.M. with necessary diagrams.
  - Explain rotor resistance control and conventional methods.
  - Explain static Scherbius drive. Draw the necessary diagram.
  - Calculate motor breakdown torque for inverter fed IM drive for a frequency of 70 Hz as ratio of 50 Hz. Given – 400 V, 50Hz, 4 pole, 1370 rpm,  $R_s = 2\ \Omega$  ,  $R_r' = 3\ \Omega$  ,  $X_s = X_r' = 3.5\ \Omega$  .
  - Give comparison in between VSI and CSI.
5. Solve **any two** : **(2×8=16)**
- Explain V/F control method of induction motor and also draw all necessary diagram.
  - A star connected squirrel cage induction motor has following ratings and parameters – 400 V, 50 Hz, 4 pole, 1370 rpm,  $R_s = 2\ \Omega$  ,  $R_r' = 3\ \Omega$  ,  $X_s = X_r' = 3.5\ \Omega$  .  
For regenerative braking operation of inverter fed induction motor drives.  
Determined approximate value of
    - Speed for frequency of 30 Hz and 80% of full load torque.
    - Frequency for a speed of 1000 rpm and full load torque.
  - Explain brushless motor drives with applications, advantages, waveforms and diagrams.
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SLR-TJ – 465

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**B.E. (Electrical and Electronics Engineering) (Part – I) (New-CGPA)  
Examination, 2017  
INDUSTRIAL DRIVES AND CONTROL**

Day and Date : Tuesday, 28-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- 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 **wherever** necessary.  
4) Non-programmable calculators are **permitted**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : **14**
- 1) The advantage of a synchronous motor in addition to its constant speed is
    - a) High power factor
    - b) Better efficiency
    - c) Lower cost
    - d) All of above
  - 2) The number of set used in pole changing type squirrel cage motors for derricks and winches is
    - a) 2
    - b) 3
    - c) 4
    - d) 6
  - 3) In which of the following application ac drives are used
    - a) fans
    - b) blowers
    - c) mill run out tables
    - d) all of above
  - 4) When smooth and precise speed control over the wide range is desired, the motor preferred is
    - a) Synchronous motor
    - b) Squirrel cage IM
    - c) Wound rotor IM
    - d) DC motor
  - 5) The selection of control gear for a particular application is based on the consideration of
    - a) Duty
    - b) Starting torque
    - c) Limitations on starting current
    - d) All of above

P.T.O.



- 6) The efficiency by using rotor resistance control in IM is  
a) High                      b) Low                      c) Very high                      d) Very low
- 7) For high frequency chopper the device that is preferred is  
a) Thyristors                      b) TRIAC                      c) Transistor                      d) GTO
- 8) A pole changing type squirrel cage motor used in derricks has four, eight and twenty four poles. In this, the lowest speed is used for  
a) Landing the load                      b) Hoisting  
c) Lowering                      d) None of the above
- 9) The \_\_\_\_\_ motor, because of their inherent characteristics, are best suited for rolling mills.  
a) dc motor                      b) slip ring IM  
c) squirrel cage IM                      d) single phase motor
- 10) Which of the following motor is preferred for blowers ?  
a) wound rotor IM                      b) squirrel cage IM  
c) dc shunt motor                      d) dc series motor
- 11) Pole changing method of speed control is used in  
a) slip ring IM  
b) dc shunt motor  
c) dc series motor  
d) squirrel cage IM
- 12) Consideration involved in the selection of drive for particular application depends on  
a) Speed control range and its nature  
b) Starting torque  
c) Environmental conditions  
d) All of above
- 13) The motor normally used for crane travel is  
a) AC slip ring motor  
b) Ward Leonard controlled dc motors  
c) Synchronous motor  
d) DC differentially compound motor
- 14) The travelling speed of crane varies from  
a) 1 to 2.5 m/s                      b) 5 to 15 m/s                      c) 20 to 22.5 m/s                      d) 25 to 40 m/s



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**B.E. (Electrical and Electronics Engineering) (Part – I) (New-CGPA)  
Examination, 2017  
INDUSTRIAL DRIVES AND CONTROL**

Day and Date : Tuesday, 28-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**Instructions :** 1) Assume suitable data *wherever* necessary.  
2) Non-programmable calculators are **permitted**.

SECTION – I

2. Solve **any three** : **(3×4=12)**
- a) Explain advantages and applications of electrical drives.
  - b) Draw the block diagram of electrical drive and explain each block.
  - c) Derive the fundamental torque equation of electrical drive.
  - d) Explain braking methods of D.C. motor drives.
  - e) Describe multiquadrant operation of separately excited D.C. motor.
3. Solve **any two** : **(2×8=16)**
- a) Explain different parts of electrical drives in detail with necessary diagram.
  - b) Explain different modes of operation of electrical drives with speed transition path.
  - c) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of  $0.06 \Omega$ . It is fed from  $1 \phi$  fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction, calculate :
    - 1) Firing angle for rated motor torque and 750 rpm.
    - 2) Firing angle for rated motor torque and 600 rpm.



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- Explain stator voltage control of 3 phase I.M. with necessary diagrams.
  - Explain rotor resistance control and conventional methods.
  - Explain static Scherbius drive. Draw the necessary diagram.
  - Calculate motor breakdown torque for inverter fed IM drive for a frequency of 70 Hz as ratio of 50 Hz. Given – 400 V, 50Hz, 4 pole, 1370 rpm,  $R_s = 2\ \Omega$  ,  $R_r' = 3\ \Omega$  ,  $X_s = X_r' = 3.5\ \Omega$  .
  - Give comparison in between VSI and CSI.
5. Solve **any two** : **(2×8=16)**
- Explain V/F control method of induction motor and also draw all necessary diagram.
  - A star connected squirrel cage induction motor has following ratings and parameters – 400 V, 50 Hz, 4 pole, 1370 rpm,  $R_s = 2\ \Omega$  ,  $R_r' = 3\ \Omega$  ,  $X_s = X_r' = 3.5\ \Omega$  .  
For regenerative braking operation of inverter fed induction motor drives.  
Determined approximate value of
    - Speed for frequency of 30 Hz and 80% of full load torque.
    - Frequency for a speed of 1000 rpm and full load torque.
  - Explain brushless motor drives with applications, advantages, waveforms and diagrams.
-





SLR-TJ – 465

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**B.E. (Electrical and Electronics Engineering) (Part – I) (New-CGPA)  
Examination, 2017  
INDUSTRIAL DRIVES AND CONTROL**

Day and Date : Tuesday, 28-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- 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 **wherever** necessary.  
4) Non-programmable calculators are **permitted**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : 14
- 1) Consideration involved in the selection of drive for particular application depends on
    - a) Speed control range and its nature
    - b) Starting torque
    - c) Environmental conditions
    - d) All of above
  - 2) The motor normally used for crane travel is
    - a) AC slip ring motor
    - b) Ward Leonard controlled dc motors
    - c) Synchronous motor
    - d) DC differentially compound motor
  - 3) The travelling speed of crane varies from
    - a) 1 to 2.5 m/s
    - b) 5 to 15 m/s
    - c) 20 to 22.5 m/s
    - d) 25 to 40 m/s
  - 4) The advantage of a synchronous motor in addition to its constant speed is
    - a) High power factor
    - b) Better efficiency
    - c) Lower cost
    - d) All of above

P.T.O.



- 5) The number of set used in pole changing type squirrel cage motors for derricks and winches is  
a) 2                                      b) 3                                      c) 4                                      d) 6
- 6) In which of the following application ac drives are used  
a) fans                                      b) blowers  
c) mill run out tables                      d) all of above
- 7) When smooth and precise speed control over the wide range is desired, the motor preferred is  
a) Synchronous motor                      b) Squirrel cage IM  
c) Wound rotor IM                              d) DC motor
- 8) The selection of control gear for a particular application is based on the consideration of  
a) Duty                                      b) Starting torque  
c) Limitations on starting current              d) All of above
- 9) The efficiency by using rotor resistance control in IM is  
a) High                                      b) Low                                      c) Very high                              d) Very low
- 10) For high frequency chopper the device that is preferred is  
a) Thyristors                              b) TRIAC                                      c) Transistor                              d) GTO
- 11) A pole changing type squirrel cage motor used in derricks has four, eight and twenty four poles. In this, the lowest speed is used for  
a) Landing the load                              b) Hoisting  
c) Lowering                                      d) None of the above
- 12) The \_\_\_\_\_ motor, because of their inherent characteristics, are best suited for rolling mills.  
a) dc motor                                      b) slip ring IM  
c) squirrel cage IM                              d) single phase motor
- 13) Which of the following motor is preferred for blowers ?  
a) wound rotor IM                              b) squirrel cage IM  
c) dc shunt motor                              d) dc series motor
- 14) Pole changing method of speed control is used in  
a) slip ring IM  
b) dc shunt motor  
c) dc series motor  
d) squirrel cage IM



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**B.E. (Electrical and Electronics Engineering) (Part – I) (New-CGPA)  
Examination, 2017  
INDUSTRIAL DRIVES AND CONTROL**

Day and Date : Tuesday, 28-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**Instructions :** 1) Assume suitable data *wherever* necessary.  
2) Non-programmable calculators are **permitted**.

SECTION – I

2. Solve **any three** : **(3×4=12)**
- a) Explain advantages and applications of electrical drives.
  - b) Draw the block diagram of electrical drive and explain each block.
  - c) Derive the fundamental torque equation of electrical drive.
  - d) Explain braking methods of D.C. motor drives.
  - e) Describe multi-quadrant operation of separately excited D.C. motor.
3. Solve **any two** : **(2×8=16)**
- a) Explain different parts of electrical drives in detail with necessary diagram.
  - b) Explain different modes of operation of electrical drives with speed transition path.
  - c) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of  $0.06 \Omega$ . It is fed from  $1 \phi$  fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction, calculate :
    - 1) Firing angle for rated motor torque and 750 rpm.
    - 2) Firing angle for rated motor torque and 600 rpm.



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- Explain stator voltage control of 3 phase I.M. with necessary diagrams.
  - Explain rotor resistance control and conventional methods.
  - Explain static Scherbius drive. Draw the necessary diagram.
  - Calculate motor breakdown torque for inverter fed IM drive for a frequency of 70 Hz as ratio of 50 Hz. Given – 400 V, 50Hz, 4 pole, 1370 rpm,  $R_s = 2\Omega$ ,  $R_r' = 3\Omega$ ,  $X_s = X_r' = 3.5\Omega$ .
  - Give comparison in between VSI and CSI.
5. Solve **any two** : **(2×8=16)**
- Explain V/F control method of induction motor and also draw all necessary diagram.
  - A star connected squirrel cage induction motor has following ratings and parameters – 400 V, 50 Hz, 4 pole, 1370 rpm,  $R_s = 2\Omega$ ,  $R_r' = 3\Omega$ ,  $X_s = X_r' = 3.5\Omega$ .  
For regenerative braking operation of inverter fed induction motor drives.  
Determined approximate value of
    - Speed for frequency of 30 Hz and 80% of full load torque.
    - Frequency for a speed of 1000 rpm and full load torque.
  - Explain brushless motor drives with applications, advantages, waveforms and diagrams.
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**B.E. (Electrical and Electronics Engineering) (Part – I) (New-CGPA)  
Examination, 2017  
INDUSTRIAL DRIVES AND CONTROL**

Day and Date : Tuesday, 28-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- 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 **wherever** necessary.  
4) Non-programmable calculators are **permitted**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct answer : 14
- 1) In which of the following application ac drives are used
    - a) fans
    - b) blowers
    - c) mill run out tables
    - d) all of above
  - 2) When smooth and precise speed control over the wide range is desired, the motor preferred is
    - a) Synchronous motor
    - b) Squirrel cage IM
    - c) Wound rotor IM
    - d) DC motor
  - 3) The selection of control gear for a particular application is based on the consideration of
    - a) Duty
    - b) Starting torque
    - c) Limitations on starting current
    - d) All of above
  - 4) The efficiency by using rotor resistance control in IM is
    - a) High
    - b) Low
    - c) Very high
    - d) Very low
  - 5) For high frequency chopper the device that is preferred is
    - a) Thyristors
    - b) TRIAC
    - c) Transistor
    - d) GTO

P.T.O.



- 6) A pole changing type squirrel cage motor used in derricks has four, eight and twenty four poles. In this, the lowest speed is used for
- a) Landing the load
  - b) Hoisting
  - c) Lowering
  - d) None of the above
- 7) The \_\_\_\_\_ motor, because of their inherent characteristics, are best suited for rolling mills.
- a) dc motor
  - b) slip ring IM
  - c) squirrel cage IM
  - d) single phase motor
- 8) Which of the following motor is preferred for blowers ?
- a) wound rotor IM
  - b) squirrel cage IM
  - c) dc shunt motor
  - d) dc series motor
- 9) Pole changing method of speed control is used in
- a) slip ring IM
  - b) dc shunt motor
  - c) dc series motor
  - d) squirrel cage IM
- 10) Consideration involved in the selection of drive for particular application depends on
- a) Speed control range and its nature
  - b) Starting torque
  - c) Environmental conditions
  - d) All of above
- 11) The motor normally used for crane travel is
- a) AC slip ring motor
  - b) Ward Leonard controlled dc motors
  - c) Synchronous motor
  - d) DC differentially compound motor
- 12) The travelling speed of crane varies from
- a) 1 to 2.5 m/s
  - b) 5 to 15 m/s
  - c) 20 to 22.5 m/s
  - d) 25 to 40 m/s
- 13) The advantage of a synchronous motor in addition to its constant speed is
- a) High power factor
  - b) Better efficiency
  - c) Lower cost
  - d) All of above
- 14) The number of set used in pole changing type squirrel cage motors for derricks and winches is
- a) 2
  - b) 3
  - c) 4
  - d) 6



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**B.E. (Electrical and Electronics Engineering) (Part – I) (New-CGPA)  
Examination, 2017  
INDUSTRIAL DRIVES AND CONTROL**

Day and Date : Tuesday, 28-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**Instructions :** 1) Assume suitable data *wherever* necessary.  
2) Non-programmable calculators are **permitted**.

SECTION – I

2. Solve **any three** : **(3×4=12)**
- a) Explain advantages and applications of electrical drives.
  - b) Draw the block diagram of electrical drive and explain each block.
  - c) Derive the fundamental torque equation of electrical drive.
  - d) Explain braking methods of D.C. motor drives.
  - e) Describe multi-quadrant operation of separately excited D.C. motor.
3. Solve **any two** : **(2×8=16)**
- a) Explain different parts of electrical drives in detail with necessary diagram.
  - b) Explain different modes of operation of electrical drives with speed transition path.
  - c) A 200 V, 875 rpm, 150 A separately excited dc motor has an armature resistance of  $0.06 \Omega$ . It is fed from  $1 \phi$  fully controlled rectifier with an ac source voltage of 220 V, 50 Hz. Assuming continuous conduction, calculate :
    - 1) Firing angle for rated motor torque and 750 rpm.
    - 2) Firing angle for rated motor torque and 600 rpm.



## SECTION – II

4. Solve **any three** : **(3×4=12)**
- a) Explain stator voltage control of 3 phase I.M. with necessary diagrams.
  - b) Explain rotor resistance control and conventional methods.
  - c) Explain static Scherbius drive. Draw the necessary diagram.
  - d) Calculate motor breakdown torque for inverter fed IM drive for a frequency of 70 Hz as ratio of 50 Hz. Given – 400 V, 50Hz, 4 pole, 1370 rpm,  $R_s = 2\Omega$ ,  $R_r' = 3\Omega$ ,  $X_s = X_r' = 3.5\Omega$ .
  - e) Give comparison in between VSI and CSI.
5. Solve **any two** : **(2×8=16)**
- a) Explain V/F control method of induction motor and also draw all necessary diagram.
  - b) A star connected squirrel cage induction motor has following ratings and parameters – 400 V, 50 Hz, 4 pole, 1370 rpm,  $R_s = 2\Omega$ ,  $R_r' = 3\Omega$ ,  $X_s = X_r' = 3.5\Omega$ .  
For regenerative braking operation of inverter fed induction motor drives.  
Determined approximate value of
    - 1) Speed for frequency of 30 Hz and 80% of full load torque.
    - 2) Frequency for a speed of 1000 rpm and full load torque.
  - c) Explain brushless motor drives with applications, advantages, waveforms and diagrams.
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**B.E. (Part – I) (Electrical and Electronics Engg.) (New CGPA) Examination, 2017  
ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date : Thursday, 30-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- 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 assumption if **necessary**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct option.

**14**

- 1) Total flux or lumens required in any lighting scheme depends inversely on
  - a) Utilization factor
  - b) Reduction factor
  - c) Reflection factor
  - d) None of the above
- 2) The condition of refrigerant after passing through the condenser in a vapour compression system is
  - a) Saturated liquid
  - b) Wet vapour
  - c) Dry saturated vapour
  - d) Superheated vapour
- 3) Induction heating takes place in
  - a) Conducting but non magnetic materials
  - b) Conducting materials may be magnetic or nonmagnetic materials
  - c) Insulating materials
  - d) Conducting and magnetic material
- 4) Subcooling is a process of cooling the refrigerant in vapour compression refrigeration system before
  - a) Evaporation
  - b) Throttling
  - c) Condensation
  - d) Compression
- 5) The heat required by the weld is produced due to the contact resistance between the two pieces and is
  - a) Directly proportional to the current
  - b) Directly proportional to the square of the current
  - c) Inversely proportional to the square of the current
  - d) Inversely proportional to the current
- 6) Radiant efficiency of the luminous source depends on
  - a) Shape of the source
  - b) Temperature of the source
  - c) Wavelength of light rays
  - d) All of the above

**P.T.O.**



- 7) The unit of luminous flux is  
a) steradian                      b) candela                      c) lumen                      d) lux
- 8) The efficiency of diesel locomotives is nearly  
a) 20 – 25 percent                      b) 35 – 40 percent  
c) 50 – 55 percent                      d) 70 – 75 percent
- 9) For running at half of the maximum speed, the batteries of battery electric drive are connected in  
a) Parallel                      b) Series  
c) Series – parallel                      d) Drive cannot run at this speed
- 10) The advantage of electric traction over other methods is  
a) No pollution problems                      b) Faster acceleration  
c) Better braking action                      d) All of the above
- 11) What are the constituents in speed time curve of train ?  
a) Coasting                      b) Initial acceleration  
c) Constant speed                      d) All of these
- 12) Which motor is used in tramways ?  
a) AC single phase capacitor start motor  
b) AC three phase motor  
c) DC series motor  
d) DC shunt motor
- 13) When the speed of the train is estimated taking into account the time of stop at a station in addition to the actual running time between stops, is known as  
a) Average speed                      b) Schedule speed  
c) Notching speed                      d) Free running speed
- 14) The specific energy consumption for suburban services is usually  
a) 18 to 25 watt-hours per tonne km  
b) 50 to 75 watt-hours per tonne km  
c) 125 to 150 watt-hours per tonne km  
d) 155 to 200 watt-hours per tonne km
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**B.E. (Part – I) (Electrical and Electronics Engg.) (New CGPA) Examination, 2017  
ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date : Thursday, 30-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumption if necessary.**

**SECTION – I**

2. Solve **any three** : **(3×4=12)**
- 1) State and explain laws of illumination.
  - 2) Differentiate between sodium vapour lamp and mercury vapour lamp.
  - 3) With a neat diagram, explain the construction and working of induction furnace.
  - 4) Write a short note on room air conditioner.
  - 5) What are the various methods of welding ?
3. Solve **any two** : **(8×2=16)**
- 1) Define the terms : luminous flux, luminous intensity, illumination, MHCP, polar curve, luminance, utilization factor and light.
  - 2) Find the illumination due to 20 bulbs of 200 W in a room of 15 m × 8 m assuming the following data : Coefficient of utilization 0.6, depreciation factor 1.2, MSCP of 200 W lamp is 250.
  - 3) What are the advantages of electric heating ? Give brief classification of electric heating methods.

**SECTION – II**

4. Solve **any three** : **(3×4=12)**
- 1) What do you understand by speed time curve ? What is its use in practice ?
  - 2) Describe diesel electric traction.
  - 3) Define the following terms :
    - i) Dead weight
    - ii) Accelerating weight
    - iii) Adhesive weight.
  - 4) Explain the characteristics of traction motor required for traction system.
  - 5) Write a comparison between Electric Vehicle (EV) and Hybrid Electric Vehicle (HEV).

**Set P**



5. Solve **any two** :

**(8×2=16)**

- 1) The speed time curve of a train consists of :
  - i) Uniform acceleration of 6 km/h/s for 25s
  - ii) Free running for 10 minutes
  - iii) Uniform deceleration of 6 km/h/s to stop the train
  - iv) A stop of 5 minutes.

Find the distance between the stations, the average and schedule speed.

- 2) What do you mean by hybrid vehicles ? What are motors to be selected for interconnection with hybrid vehicles ?
  - 3) What are the requirements that a current collector gear of electric vehicle should fulfill ? Describe with a neat diagram the pantograph collector.
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**B.E. (Part – I) (Electrical and Electronics Engg.) (New CGPA) Examination, 2017  
ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date : Thursday, 30-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- 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 assumption if **necessary**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct option.

14

- 1) The efficiency of diesel locomotives is nearly
  - a) 20 – 25 percent
  - b) 35 – 40 percent
  - c) 50 – 55 percent
  - d) 70 – 75 percent
- 2) For running at half of the maximum speed, the batteries of battery electric drive are connected in
  - a) Parallel
  - b) Series
  - c) Series – parallel
  - d) Drive cannot run at this speed
- 3) The advantage of electric traction over other methods is
  - a) No pollution problems
  - b) Faster acceleration
  - c) Better braking action
  - d) All of the above
- 4) What are the constituents in speed time curve of train ?
  - a) Coasting
  - b) Initial acceleration
  - c) Constant speed
  - d) All of these
- 5) Which motor is used in tramways ?
  - a) AC single phase capacitor start motor
  - b) AC three phase motor
  - c) DC series motor
  - d) DC shunt motor
- 6) When the speed of the train is estimated taking into account the time of stop at a station in addition to the actual running time between stops, is known as
  - a) Average speed
  - b) Schedule speed
  - c) Notching speed
  - d) Free running speed

P.T.O.



- 7) The specific energy consumption for suburban services is usually
- a) 18 to 25 watt-hours per tonne km
  - b) 50 to 75 watt-hours per tonne km
  - c) 125 to 150 watt-hours per tonne km
  - d) 155 to 200 watt-hours per tonne km
- 8) Total flux or lumens required in any lighting scheme depends inversely on
- a) Utilization factor
  - b) Reduction factor
  - c) Reflection factor
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- 9) The condition of refrigerant after passing through the condenser in a vapour compression system is
- a) Saturated liquid
  - b) Wet vapour
  - c) Dry saturated vapour
  - d) Superheated vapour
- 10) Induction heating takes place in
- a) Conducting but non magnetic materials
  - b) Conducting materials may be magnetic or nonmagnetic materials
  - c) Insulating materials
  - d) Conducting and magnetic material
- 11) Subcooling is a process of cooling the refrigerant in vapour compression refrigeration system before
- a) Evaporation
  - b) Throttling
  - c) Condensation
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- 12) The heat required by the weld is produced due to the contact resistance between the two pieces and is
- a) Directly proportional to the current
  - b) Directly proportional to the square of the current
  - c) Inversely proportional to the square of the current
  - d) Inversely proportional to the current
- 13) Radiant efficiency of the luminous source depends on
- a) Shape of the source
  - b) Temperature of the source
  - c) Wavelength of light rays
  - d) All of the above
- 14) The unit of luminous flux is
- a) steradian
  - b) candela
  - c) lumen
  - d) lux
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**B.E. (Part – I) (Electrical and Electronics Engg.) (New CGPA) Examination, 2017  
ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date : Thursday, 30-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumption if necessary.**

**SECTION – I**

2. Solve **any three** : **(3×4=12)**

- 1) State and explain laws of illumination.
- 2) Differentiate between sodium vapour lamp and mercury vapour lamp.
- 3) With a neat diagram, explain the construction and working of induction furnace.
- 4) Write a short note on room air conditioner.
- 5) What are the various methods of welding ?

3. Solve **any two** : **(8×2=16)**

- 1) Define the terms : luminous flux, luminous intensity, illumination, MHCP, polar curve, luminance, utilization factor and light.
- 2) Find the illumination due to 20 bulbs of 200 W in a room of 15 m × 8 m assuming the following data : Coefficient of utilization 0.6, depreciation factor 1.2, MSCP of 200 W lamp is 250.
- 3) What are the advantages of electric heating ? Give brief classification of electric heating methods.

**SECTION – II**

4. Solve **any three** : **(3×4=12)**

- 1) What do you understand by speed time curve ? What is its use in practice ?
- 2) Describe diesel electric traction.
- 3) Define the following terms :
  - i) Dead weight
  - ii) Accelerating weight
  - iii) Adhesive weight.
- 4) Explain the characteristics of traction motor required for traction system.
- 5) Write a comparison between Electric Vehicle (EV) and Hybrid Electric Vehicle (HEV).

**Set Q**



5. Solve **any two** :

**(8×2=16)**

- 1) The speed time curve of a train consists of :
  - i) Uniform acceleration of 6 km/h/s for 25s
  - ii) Free running for 10 minutes
  - iii) Uniform deceleration of 6 km/h/s to stop the train
  - iv) A stop of 5 minutes.

Find the distance between the stations, the average and schedule speed.

- 2) What do you mean by hybrid vehicles ? What are motors to be selected for interconnection with hybrid vehicles ?
  - 3) What are the requirements that a current collector gear of electric vehicle should fulfill ? Describe with a neat diagram the pantograph collector.
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**B.E. (Part – I) (Electrical and Electronics Engg.) (New CGPA) Examination, 2017  
ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date : Thursday, 30-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- 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 assumption if **necessary**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct option.

14

- 1) The heat required by the weld is produced due to the contact resistance between the two pieces and is
  - a) Directly proportional to the current
  - b) Directly proportional to the square of the current
  - c) Inversely proportional to the square of the current
  - d) Inversely proportional to the current
- 2) Radiant efficiency of the luminous source depends on
  - a) Shape of the source
  - b) Temperature of the source
  - c) Wavelength of light rays
  - d) All of the above
- 3) The unit of luminous flux is
  - a) steradian
  - b) candela
  - c) lumen
  - d) lux
- 4) The efficiency of diesel locomotives is nearly
  - a) 20 – 25 percent
  - b) 35 – 40 percent
  - c) 50 – 55 percent
  - d) 70 – 75 percent
- 5) For running at half of the maximum speed, the batteries of battery electric drive are connected in
  - a) Parallel
  - b) Series
  - c) Series – parallel
  - d) Drive cannot run at this speed
- 6) The advantage of electric traction over other methods is
  - a) No pollution problems
  - b) Faster acceleration
  - c) Better braking action
  - d) All of the above

P.T.O.



- 7) What are the constituents in speed time curve of train ?
- a) Coasting
  - b) Initial acceleration
  - c) Constant speed
  - d) All of these
- 8) Which motor is used in tramways ?
- a) AC single phase capacitor start motor
  - b) AC three phase motor
  - c) DC series motor
  - d) DC shunt motor
- 9) 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
- 10) The specific energy consumption for suburban services is usually
- a) 18 to 25 watt-hours per tonne km
  - b) 50 to 75 watt-hours per tonne km
  - c) 125 to 150 watt-hours per tonne km
  - d) 155 to 200 watt-hours per tonne km
- 11) Total flux or lumens required in any lighting scheme depends inversely on
- a) Utilization factor
  - b) Reduction factor
  - c) Reflection factor
  - d) None of the above
- 12) The condition of refrigerant after passing through the condenser in a vapour compression system is
- a) Saturated liquid
  - b) Wet vapour
  - c) Dry saturated vapour
  - d) Superheated vapour
- 13) Induction heating takes place in
- a) Conducting but non magnetic materials
  - b) Conducting materials may be magnetic or nonmagnetic materials
  - c) Insulating materials
  - d) Conducting and magnetic material
- 14) Subcooling is a process of cooling the refrigerant in vapour compression refrigeration system before
- a) Evaporation
  - b) Throttling
  - c) Condensation
  - d) Compression
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**B.E. (Part – I) (Electrical and Electronics Engg.) (New CGPA) Examination, 2017  
ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date : Thursday, 30-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumption if necessary.**

**SECTION – I**

2. Solve **any three** : **(3×4=12)**

- 1) State and explain laws of illumination.
- 2) Differentiate between sodium vapour lamp and mercury vapour lamp.
- 3) With a neat diagram, explain the construction and working of induction furnace.
- 4) Write a short note on room air conditioner.
- 5) What are the various methods of welding ?

3. Solve **any two** : **(8×2=16)**

- 1) Define the terms : luminous flux, luminous intensity, illumination, MHCP, polar curve, luminance, utilization factor and light.
- 2) Find the illumination due to 20 bulbs of 200 W in a room of 15 m × 8 m assuming the following data : Coefficient of utilization 0.6, depreciation factor 1.2, MSCP of 200 W lamp is 250.
- 3) What are the advantages of electric heating ? Give brief classification of electric heating methods.

**SECTION – II**

4. Solve **any three** : **(3×4=12)**

- 1) What do you understand by speed time curve ? What is its use in practice ?
- 2) Describe diesel electric traction.
- 3) Define the following terms :
  - i) Dead weight
  - ii) Accelerating weight
  - iii) Adhesive weight.
- 4) Explain the characteristics of traction motor required for traction system.
- 5) Write a comparison between Electric Vehicle (EV) and Hybrid Electric Vehicle (HEV).

**Set R**



5. Solve **any two** :

**(8×2=16)**

- 1) The speed time curve of a train consists of :
  - i) Uniform acceleration of 6 km/h/s for 25s
  - ii) Free running for 10 minutes
  - iii) Uniform deceleration of 6 km/h/s to stop the train
  - iv) A stop of 5 minutes.

Find the distance between the stations, the average and schedule speed.

- 2) What do you mean by hybrid vehicles ? What are motors to be selected for interconnection with hybrid vehicles ?
  - 3) What are the requirements that a current collector gear of electric vehicle should fulfill ? Describe with a neat diagram the pantograph collector.
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**B.E. (Part – I) (Electrical and Electronics Engg.) (New CGPA) Examination, 2017  
ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date : Thursday, 30-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- 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 assumption if **necessary**.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 14

1. Choose the correct option.

14

- 1) The advantage of electric traction over other methods is
  - a) No pollution problems
  - b) Faster acceleration
  - c) Better braking action
  - d) All of the above
- 2) What are the constituents in speed time curve of train ?
  - a) Coasting
  - b) Initial acceleration
  - c) Constant speed
  - d) All of these
- 3) Which motor is used in tramways ?
  - a) AC single phase capacitor start motor
  - b) AC three phase motor
  - c) DC series motor
  - d) DC shunt motor
- 4) 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
- 5) The specific energy consumption for suburban services is usually
  - a) 18 to 25 watt-hours per tonne km
  - b) 50 to 75 watt-hours per tonne km
  - c) 125 to 150 watt-hours per tonne km
  - d) 155 to 200 watt-hours per tonne km

P.T.O.



- 6) Total flux or lumens required in any lighting scheme depends inversely on
- a) Utilization factor
  - b) Reduction factor
  - c) Reflection factor
  - d) None of the above
- 7) The condition of refrigerant after passing through the condenser in a vapour compression system is
- a) Saturated liquid
  - b) Wet vapour
  - c) Dry saturated vapour
  - d) Superheated vapour
- 8) Induction heating takes place in
- a) Conducting but non magnetic materials
  - b) Conducting materials may be magnetic or nonmagnetic materials
  - c) Insulating materials
  - d) Conducting and magnetic material
- 9) Subcooling is a process of cooling the refrigerant in vapour compression refrigeration system before
- a) Evaporation
  - b) Throttling
  - c) Condensation
  - d) Compression
- 10) The heat required by the weld is produced due to the contact resistance between the two pieces and is
- a) Directly proportional to the current
  - b) Directly proportional to the square of the current
  - c) Inversely proportional to the square of the current
  - d) Inversely proportional to the current
- 11) Radiant efficiency of the luminous source depends on
- a) Shape of the source
  - b) Temperature of the source
  - c) Wavelength of light rays
  - d) All of the above
- 12) The unit of luminous flux is
- a) steradian
  - b) candela
  - c) lumen
  - d) lux
- 13) The efficiency of diesel locomotives is nearly
- a) 20 – 25 percent
  - b) 35 – 40 percent
  - c) 50 – 55 percent
  - d) 70 – 75 percent
- 14) For running at half of the maximum speed, the batteries of battery electric drive are connected in
- a) Parallel
  - b) Series
  - c) Series – parallel
  - d) Drive cannot run at this speed
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**B.E. (Part – I) (Electrical and Electronics Engg.) (New CGPA) Examination, 2017  
ELECTRICAL ENERGY UTILIZATION AND TRACTION**

Day and Date : Thursday, 30-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

- Instructions :** 1) **All questions are compulsory.**  
2) **Make suitable assumption if necessary.**

**SECTION – I**

2. Solve **any three** : **(3×4=12)**

- 1) State and explain laws of illumination.
- 2) Differentiate between sodium vapour lamp and mercury vapour lamp.
- 3) With a neat diagram, explain the construction and working of induction furnace.
- 4) Write a short note on room air conditioner.
- 5) What are the various methods of welding ?

3. Solve **any two** : **(8×2=16)**

- 1) Define the terms : luminous flux, luminous intensity, illumination, MHCP, polar curve, luminance, utilization factor and light.
- 2) Find the illumination due to 20 bulbs of 200 W in a room of 15 m × 8 m assuming the following data : Coefficient of utilization 0.6, depreciation factor 1.2, MSCP of 200 W lamp is 250.
- 3) What are the advantages of electric heating ? Give brief classification of electric heating methods.

**SECTION – II**

4. Solve **any three** : **(3×4=12)**

- 1) What do you understand by speed time curve ? What is its use in practice ?
- 2) Describe diesel electric traction.
- 3) Define the following terms :
  - i) Dead weight
  - ii) Accelerating weight
  - iii) Adhesive weight.
- 4) Explain the characteristics of traction motor required for traction system.
- 5) Write a comparison between Electric Vehicle (EV) and Hybrid Electric Vehicle (HEV).

**Set S**



5. Solve **any two** :

**(8×2=16)**

- 1) The speed time curve of a train consists of :
  - i) Uniform acceleration of 6 km/h/s for 25s
  - ii) Free running for 10 minutes
  - iii) Uniform deceleration of 6 km/h/s to stop the train
  - iv) A stop of 5 minutes.

Find the distance between the stations, the average and schedule speed.

- 2) What do you mean by hybrid vehicles ? What are motors to be selected for interconnection with hybrid vehicles ?
  - 3) What are the requirements that a current collector gear of electric vehicle should fulfill ? Describe with a neat diagram the pantograph collector.
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SLR-TJ – 467

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**B.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA)  
Examination, 2017  
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date : Monday, 4-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- 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) Severity of electric shock is mainly depends on  
a) Voltage                      b) Current                      c) Type of supply      d) All of these
- 2) In fire extinguisher we use  
a) CO<sub>2</sub>                          b) SO<sub>2</sub>                          c) O<sub>2</sub>                          d) H<sub>2</sub>O
- 3) The most common method of artificial respiration is  
a) Schafer's method                      b) Silvester's method  
c) Neilson's method                      d) Mouth to mouth method
- 4) Copper losses in a rotating machine is  
a) Variable losses                      b) Constant losses  
c) Either (a) or (b)                      d) None of these
- 5) Stray losses are the losses which vary with the load but their relationship with load current cannot be identified. Stay losses is maximum in  
a) Synchronous machines  
b) D.C. Machines  
c) Induction machines  
d) Equal in all types of machines
- 6) Electrical power output in a d.c. generator is equal to  
a) Electrical power developed in armature – copper losses  
b) Mechanical power input – iron and friction losses  
c) Electrical power developed in armature – iron and copper losses  
d) Mechanical power input – iron and friction losses – copper losses

P.T.O.





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**B.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA)  
Examination, 2017  
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date : Monday, 4-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**SECTION – I**

2. Solve **any four** : **(4×4=16)**

- 1) Explain the various causes of troubles and failure of power transformer.
- 2) Explain the impulse voltage test of transformer.
- 3) Explain routine and breakdown maintenance of transformer.
- 4) What precautions should be taken to avoid the electric accidents ?
- 5) Explain the term polarizing index.
- 6) What are the objectives of testing of transformers ?

3. Solve **any two** : **(2×6=12)**

- 1) Explain the procedure for rescuing the person who has got the electric shock.
- 2) Explain the back to back test on transformer.
- 3) Explain the voltage ratio test, polarity test for transformer.

**SECTION – II**

4. Solve **any four** : **(4×4=16)**

- 1) List all type of test performed on induction motor.
- 2) Explain the various tests of transformer oil.
- 3) What are the effects of mis-alignment in the installation of synchronous machine ?



- 4) Explain the slip test of synchronous machine.
- 5) Explain the commissioning test for induction motor.
- 6) Explain the maintenance schedule of CT and PT.

5. Solve **any two** :

**(2×6=12)**

- 1) What are the requirements of foundations for installing induction motors.
  - 2) Explain the commissioning tests of synchronous machine.
  - 3) Explain the measurement of sequence impedances of synchronous machines.
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**B.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA)  
Examination, 2017  
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date : Monday, 4-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

- 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) Which of the following factors affects on life of insulating material ?
  - a) Temperature
  - b) Deposition of dust
  - c) Impurities
  - d) All of these
- 2) The rotational losses in d.c. machines is equal to the
  - a) Kinetic energy of armature
  - b) Half of the kinetic energy of armature
  - c) Square of the kinetic energy of armature
  - d) Rate of change of kinetic energy
- 3) Which of the following fire extinguisher are toxic
  - a) Carbon tetrachloride
  - b) Sulphur hexachloride
  - c) Carbon hexachloride
  - d) Sulphur tetrachloride
- 4) Buchholz relay is
  - a) Located in the conservator tank
  - b) Located in the transformer tank itself
  - c) Connected in the pipe connecting main tank of transformer and conservator
  - d) Installed in the circuit breaker
- 5) The arc voltage in C.B. is
  - a) In the phase of arc current
  - b) Lagging the arc current by  $90^\circ$
  - c) Leading the arc current by  $90^\circ$
  - d) Legging the arc current by  $180^\circ$

P.T.O.



- 6) Which of the following method used for measuring temperature of insulation ?  
a) Embedded detector method                      b) Voltmeter method  
c) Megger                                                      d) None of these
- 7) For good transformer oil, as per IS density should be equal to  
a)  $0.5 \text{ gm/cm}^3$                                               b)  $0.65 \text{ gm/cm}^3$   
c)  $0.89 \text{ gm/cm}^3$                                               d)  $1.15 \text{ gm/cm}^3$
- 8) Severity of electric shock is mainly depends on  
a) Voltage                      b) Current                      c) Type of supply      d) All of these
- 9) In fire extinguisher we use  
a)  $\text{CO}_2$                       b)  $\text{SO}_2$                       c)  $\text{O}_2$                       d)  $\text{H}_2\text{O}$
- 10) The most common method of artificial respiration is  
a) Schafer's method                                      b) Silvester's method  
c) Neilson's method                                      d) Mouth to mouth method
- 11) Copper losses in a rotating machine is  
a) Variable losses                                      b) Constant losses  
c) Either (a) or (b)                                      d) None of these
- 12) Stray losses are the losses which vary with the load but their relationship with load current cannot be identified. Stray losses is maximum in  
a) Synchronous machines  
b) D.C. Machines  
c) Induction machines  
d) Equal in all types of machines
- 13) Electrical power output in a d.c. generator is equal to  
a) Electrical power developed in armature – copper losses  
b) Mechanical power input – iron and friction losses  
c) Electrical power developed in armature – iron and copper losses  
d) Mechanical power input – iron and friction losses – copper losses
- 14) The speed in d.c. machine can be measured by using  
a) Anemometer                                              b) Tachometer  
c) Voltmeter                                                      d) Ammeter
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**B.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA)  
Examination, 2017  
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date : Monday, 4-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**SECTION – I**

2. Solve **any four** : **(4×4=16)**

- 1) Explain the various causes of troubles and failure of power transformer.
- 2) Explain the impulse voltage test of transformer.
- 3) Explain routine and breakdown maintenance of transformer.
- 4) What precautions should be taken to avoid the electric accidents ?
- 5) Explain the term polarizing index.
- 6) What are the objectives of testing of transformers ?

3. Solve **any two** : **(2×6=12)**

- 1) Explain the procedure for rescuing the person who has got the electric shock.
- 2) Explain the back to back test on transformer.
- 3) Explain the voltage ratio test, polarity test for transformer.

**SECTION – II**

4. Solve **any four** : **(4×4=16)**

- 1) List all type of test performed on induction motor.
- 2) Explain the various tests of transformer oil.
- 3) What are the effects of mis-alignment in the installation of synchronous machine ?



- 4) Explain the slip test of synchronous machine.
- 5) Explain the commissioning test for induction motor.
- 6) Explain the maintenance schedule of CT and PT.

5. Solve **any two** :

**(2×6=12)**

- 1) What are the requirements of foundations for installing induction motors.
  - 2) Explain the commissioning tests of synchronous machine.
  - 3) Explain the measurement of sequence impedances of synchronous machines.
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SLR-TJ – 467

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**B.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA)  
Examination, 2017  
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date : Monday, 4-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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) Stray losses are the losses which vary with the load but their relationship with load current cannot be identified. Stray losses is maximum in
  - a) Synchronous machines
  - b) D.C. Machines
  - c) Induction machines
  - d) Equal in all types of machines
- 2) Electrical power output in a d.c. generator is equal to
  - a) Electrical power developed in armature – copper losses
  - b) Mechanical power input – iron and friction losses
  - c) Electrical power developed in armature – iron and copper losses
  - d) Mechanical power input – iron and friction losses – copper losses
- 3) The speed in d.c. machine can be measured by using
  - a) Anemometer
  - b) Tachometer
  - c) Voltmeter
  - d) Ammeter
- 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) The rotational losses in d.c. machines is equal to the
  - a) Kinetic energy of armature
  - b) Half of the kinetic energy of armature
  - c) Square of the kinetic energy of armature
  - d) Rate of change of kinetic energy

P.T.O.



- 6) Which of the following fire extinguisher are toxic
- a) Carbon tetrachloride
  - b) Sulphur hexachloride
  - c) Carbon hexachloride
  - d) Sulphur tetrachloride
- 7) Buchholz relay is
- a) Located in the conservator tank
  - b) Located in the transformer tank itself
  - c) Connected in the pipe connecting main tank of transformer and conservator
  - d) Installed in the circuit breaker
- 8) The arc voltage in C.B. is
- a) In the phase of arc current
  - b) Lagging the arc current by  $90^\circ$
  - c) Leading the arc current by  $90^\circ$
  - d) Lagging the arc current by  $180^\circ$
- 9) Which of the following method used for measuring temperature of insulation ?
- a) Embedded detector method
  - b) Voltmeter method
  - c) Megger
  - d) None of these
- 10) For good transformer oil, as per IS density should be equal to
- a)  $0.5 \text{ gm/cm}^3$
  - b)  $0.65 \text{ gm/cm}^3$
  - c)  $0.89 \text{ gm/cm}^3$
  - d)  $1.15 \text{ gm/cm}^3$
- 11) Severity of electric shock is mainly depends on
- a) Voltage
  - b) Current
  - c) Type of supply
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- 13) The most common method of artificial respiration is
- a) Schafer's method
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  - c) Neilson's method
  - d) Mouth to mouth method
- 14) Copper losses in a rotating machine is
- a) Variable losses
  - b) Constant losses
  - c) Either (a) or (b)
  - d) None of these
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**B.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA)  
Examination, 2017  
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date : Monday, 4-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**SECTION – I**

2. Solve **any four** : **(4×4=16)**

- 1) Explain the various causes of troubles and failure of power transformer.
- 2) Explain the impulse voltage test of transformer.
- 3) Explain routine and breakdown maintenance of transformer.
- 4) What precautions should be taken to avoid the electric accidents ?
- 5) Explain the term polarizing index.
- 6) What are the objectives of testing of transformers ?

3. Solve **any two** : **(2×6=12)**

- 1) Explain the procedure for rescuing the person who has got the electric shock.
- 2) Explain the back to back test on transformer.
- 3) Explain the voltage ratio test, polarity test for transformer.

**SECTION – II**

4. Solve **any four** : **(4×4=16)**

- 1) List all type of test performed on induction motor.
- 2) Explain the various tests of transformer oil.
- 3) What are the effects of mis-alignment in the installation of synchronous machine ?



- 4) Explain the slip test of synchronous machine.
- 5) Explain the commissioning test for induction motor.
- 6) Explain the maintenance schedule of CT and PT.

5. Solve **any two** :

**(2×6=12)**

- 1) What are the requirements of foundations for installing induction motors.
  - 2) Explain the commissioning tests of synchronous machine.
  - 3) Explain the measurement of sequence impedances of synchronous machines.
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SLR-TJ – 467

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**B.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA)  
Examination, 2017  
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date : Monday, 4-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 70

**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) Which of the following fire extinguisher are toxic
  - a) Carbon tetrachloride
  - b) Sulphur hexachloride
  - c) Carbon hexachloride
  - d) Sulphur tetrachloride
- 2) Buchholz relay is
  - a) Located in the conservator tank
  - b) Located in the transformer tank itself
  - c) Connected in the pipe connecting main tank of transformer and conservator
  - d) Installed in the circuit breaker
- 3) The arc voltage in C.B. is
  - a) In the phase of arc current
  - b) Lagging the arc current by 90°
  - c) Leading the arc current by 90°
  - d) Legging the arc current by 180°
- 4) Which of the following method used for measuring temperature of insulation ?
  - a) Embedded detector method
  - b) Voltmeter method
  - c) Megger
  - d) None of these
- 5) For good transformer oil, as per IS density should be equal to
  - a) 0.5 gm/cm<sup>3</sup>
  - b) 0.65 gm/cm<sup>3</sup>
  - c) 0.89 gm/cm<sup>3</sup>
  - d) 1.15 gm/cm<sup>3</sup>

P.T.O.



- 6) Severity of electric shock is mainly depends on  
a) Voltage                      b) Current                      c) Type of supply      d) All of these
- 7) In fire extinguisher we use  
a) CO<sub>2</sub>                      b) SO<sub>2</sub>                      c) O<sub>2</sub>                      d) H<sub>2</sub>O
- 8) The most common method of artificial respiration is  
a) Schafer's method                      b) Silvester's method  
c) Neilson's method                      d) Mouth to mouth method
- 9) Copper losses in a rotating machine is  
a) Variable losses                      b) Constant losses  
c) Either (a) or (b)                      d) None of these
- 10) Stray losses are the losses which vary with the load but their relationship with load current cannot be identified. Stray losses is maximum in  
a) Synchronous machines  
b) D.C. Machines  
c) Induction machines  
d) Equal in all types of machines
- 11) Electrical power output in a d.c. generator is equal to  
a) Electrical power developed in armature – copper losses  
b) Mechanical power input – iron and friction losses  
c) Electrical power developed in armature – iron and copper losses  
d) Mechanical power input – iron and friction losses – copper losses
- 12) The speed in d.c. machine can be measured by using  
a) Anemometer                      b) Tachometer  
c) Voltmeter                      d) Ammeter
- 13) Which of the following factors affects on life of insulating material ?  
a) Temperature                      b) Deposition of dust  
c) Impurities                      d) All of these
- 14) The rotational losses in d.c. machines is equal to the  
a) Kinetic energy of armature  
b) Half of the kinetic energy of armature  
c) Square of the kinetic energy of armature  
d) Rate of change of kinetic energy
-



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**B.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA)  
Examination, 2017  
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE**

Day and Date : Monday, 4-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**SECTION – I**

2. Solve **any four** : **(4×4=16)**

- 1) Explain the various causes of troubles and failure of power transformer.
- 2) Explain the impulse voltage test of transformer.
- 3) Explain routine and breakdown maintenance of transformer.
- 4) What precautions should be taken to avoid the electric accidents ?
- 5) Explain the term polarizing index.
- 6) What are the objectives of testing of transformers ?

3. Solve **any two** : **(2×6=12)**

- 1) Explain the procedure for rescuing the person who has got the electric shock.
- 2) Explain the back to back test on transformer.
- 3) Explain the voltage ratio test, polarity test for transformer.

**SECTION – II**

4. Solve **any four** : **(4×4=16)**

- 1) List all type of test performed on induction motor.
- 2) Explain the various tests of transformer oil.
- 3) What are the effects of mis-alignment in the installation of synchronous machine ?



- 4) Explain the slip test of synchronous machine.
- 5) Explain the commissioning test for induction motor.
- 6) Explain the maintenance schedule of CT and PT.

5. Solve **any two** :

**(2×6=12)**

- 1) What are the requirements of foundations for installing induction motors.
  - 2) Explain the commissioning tests of synchronous machine.
  - 3) Explain the measurement of sequence impedances of synchronous machines.
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SLR-TJ – 468

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**B.E. (Electrical and Electronics) (Part – I) (New – CGPA)  
Examination, 2017  
SWITCHGEAR AND PROTECTION**

Day and Date : Wednesday, 6-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :** 1) **All questions are compulsory.**  
2) Assume **suitable** data **whenever** 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 : **(1×14=14)**
- 1) The operating time of protection relay is usually  
a) One cycle      b) Two cycles      c) Four cycles      d) Three cycles
  - 2) The difference in the time setting of two adjacent relays is usually  
a) 0.2s      b) 1s      c) 0.5s      d) 1.5s
  - 3) The normal current in a power line in is 100 A, suddenly their line current becomes 150 A, on can expect  
a) Open circuit fault      b) Short circuit fault  
c) Overload condition      d) None of above
  - 4) For a round wire of diameter d the fusing current I is given by  
a)  $I \propto d$       b)  $I \propto d^{3/2}$       c)  $I \propto d^2$       d)  $I \propto \sqrt{d}$
  - 5) A circuit breaker is a  
a) Current controlling device      b) Current interrupting  
c) Current limiting device      d) None of above
  - 6) An isolator is designed to open a circuit under  
a) Full load      b) Normal condition  
c) No load      d) None of above
  - 7) The device that detects the fault in a power system is  
a) Circuit breaker      b) Isolator  
c) Relay      d) None of above

P.T.O.



- 8) If the length of the arc in a circuit breaker increases, its resistance  
a) Decreases      b) Increases      c) Remains same      d) None of above
- 9) The current chopping mainly occurs in  
a) Air blast circuit breaker      b) Oil circuit breaker  
c) SF6 circuit breaker      d) Vacuum circuit breaker
- 10) In low oil circuit breaker, the oil performs the function of  
a) Only insulation      b) Arc extinction only  
c) Both insulation and arc extinction      d) None of above
- 11) A differential relay measures the vector difference between  
a) Two currents  
b) Two voltages  
c) Two or more similar electrical quantities  
d) None of the above
- 12) A transmission line is protected by  
a) Inrush protection  
b) Distance protection  
c) Time graded and current graded over current protection  
d) Both b) and c)
- 13) Large internal faults are protected by  
a) Merz-price percentage differential protection  
b) Mho and over current relay  
c) Horn gaps and temperature relays  
d) Earth fault and positive sequence relays
- 14) The voltage appearing across the contacts after opening of the circuit breaker is called \_\_\_\_\_ voltage.  
a) Recovery      b) Surge  
c) Operating      d) Arc
-



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**B.E. (Electrical and Electronics) (Part – I) (New – CGPA)  
Examination, 2017  
SWITCHGEAR AND PROTECTION**

Day and Date : Wednesday, 6-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**Instructions :** 1) *All questions are compulsory.*  
2) *Assume suitable data whenever necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
- 1) Explain the physics of arc phenomenon and state the factor on which it depends.
  - 2) Describe the types of air blast circuit breaker.
  - 3) Explain the role played by arc runners and arc splitters in an air-break circuit breaker.
  - 4) What are the advantages of HRC fuses ?
3. Solve **any two** : **(8×2=16)**
- 1) Compare oil circuit breaker and air blast circuit breaker with diagram.
  - 2) Describe advantages of SF6 circuit breaker.
  - 3) Explain criteria for selection of fuses.

SECTION – II

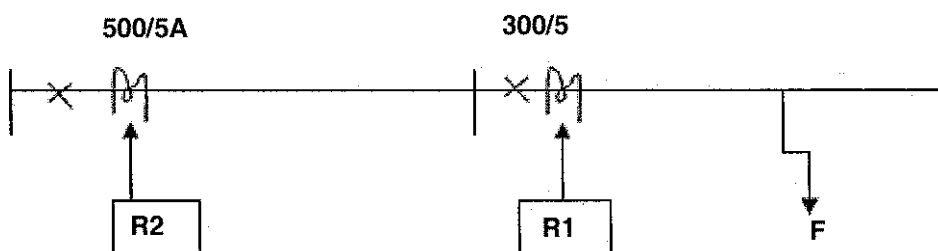
4. Solve **any three** : **(4×3=12)**
- 1) Draw and explain the circuit connections of three MHO units for three zones of protection.
  - 2) Write short note on :  
Inverse time over current relay and IDMT relay.
  - 3) What are the measures taken for lightning over voltages ?
  - 4) What are the types of back up protection ?



5. Solve any two :

(8×2=16)

- 1) Describe the impedance relay using microprocessor.
- 2) Describe the inverse time static over current relay with block diagram.
- 3) Two relays R1 and R2 connected in two sections as shown in figure  
 RELAY R1 C.T. Ratio 300/5 plug setting = 50% TMS = 0.3  
 RELAY R2 C.T. Ratio 500/5 plug setting = 75% fault at F results in fault current 3000 A. Find TMS of R2 to give time gradation margin of 0.5 sec between the relays.



|                         |    |   |   |   |     |     |
|-------------------------|----|---|---|---|-----|-----|
| PSM                     | 2  | 4 | 5 | 8 | 10  | 20  |
| Opening time in seconds | 10 | 5 | 4 | 3 | 2.8 | 2.4 |



SLR-TJ – 468

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**B.E. (Electrical and Electronics) (Part – I) (New – CGPA)  
Examination, 2017  
SWITCHGEAR AND PROTECTION**

Day and Date : Wednesday, 6-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :** 1) **All questions are compulsory.**  
2) Assume **suitable** data **whenever** 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 : **(1×14=14)**
- 1) If the length of the arc in a circuit breaker increases, its resistance
    - a) Decreases
    - b) Increases
    - c) Remains same
    - d) None of above
  - 2) The current chopping mainly occurs in
    - a) Air blast circuit breaker
    - b) Oil circuit breaker
    - c) SF6 circuit breaker
    - d) Vacuum circuit breaker
  - 3) In low oil circuit breaker, the oil performs the function of
    - a) Only insulation
    - b) Arc extinction only
    - c) Both insulation and arc extinction
    - d) None of above
  - 4) A differential relay measures the vector difference between
    - a) Two currents
    - b) Two voltages
    - c) Two or more similar electrical quantities
    - d) None of the above
  - 5) A transmission line is protected by
    - a) Inrush protection
    - b) Distance protection
    - c) Time graded and current graded over current protection
    - d) Both b) and c)

P.T.O.



- 6) Large internal faults are protected by
- Merz-price percentage differential protection
  - Mho and over current relay
  - Horn gaps and temperature relays
  - Earth fault and positive sequence relays
- 7) The voltage appearing across the contacts after opening of the circuit breaker is called \_\_\_\_\_ voltage.
- Recovery
  - Surge
  - Operating
  - Arc
- 8) The operating time of protection relay is usually
- One cycle
  - Two cycles
  - Four cycles
  - Three cycles
- 9) The difference in the time setting of two adjacent relays is usually
- 0.2s
  - 1s
  - 0.5s
  - 1.5s
- 10) The normal current in a power line is 100 A, suddenly their line current becomes 150 A, one can expect
- Open circuit fault
  - Short circuit fault
  - Overload condition
  - None of above
- 11) For a round wire of diameter  $d$  the fusing current  $I$  is given by
- $I \propto d$
  - $I \propto d^{3/2}$
  - $I \propto d^2$
  - $I \propto \sqrt{d}$
- 12) A circuit breaker is a
- Current controlling device
  - Current interrupting
  - Current limiting device
  - None of above
- 13) An isolator is designed to open a circuit under
- Full load
  - Normal condition
  - No load
  - None of above
- 14) The device that detects the fault in a power system is
- Circuit breaker
  - Isolator
  - Relay
  - None of above
-



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**B.E. (Electrical and Electronics) (Part – I) (New – CGPA)  
Examination, 2017  
SWITCHGEAR AND PROTECTION**

Day and Date : Wednesday, 6-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**Instructions :** 1) *All questions are compulsory.*  
2) *Assume suitable data whenever necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
- 1) Explain the physics of arc phenomenon and state the factor on which it depends.
  - 2) Describe the types of air blast circuit breaker.
  - 3) Explain the role played by arc runners and arc splitters in an air-break circuit breaker.
  - 4) What are the advantages of HRC fuses ?
3. Solve **any two** : **(8×2=16)**
- 1) Compare oil circuit breaker and air blast circuit breaker with diagram.
  - 2) Describe advantages of SF6 circuit breaker.
  - 3) Explain criteria for selection of fuses.

SECTION – II

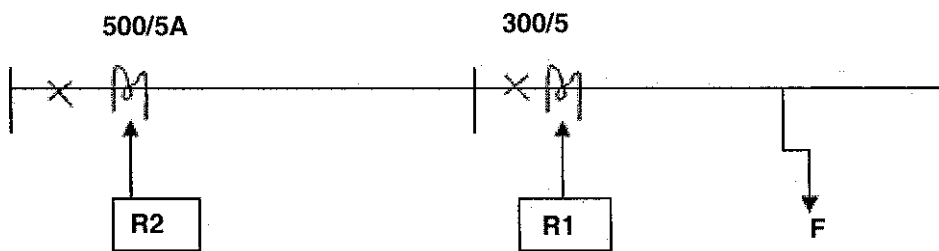
4. Solve **any three** : **(4×3=12)**
- 1) Draw and explain the circuit connections of three MHO units for three zones of protection.
  - 2) Write short note on :  
Inverse time over current relay and IDMT relay.
  - 3) What are the measures taken for lightning over voltages ?
  - 4) What are the types of back up protection ?



5. Solve **any two** :

**(8×2=16)**

- 1) Describe the impedance relay using microprocessor.
- 2) Describe the inverse time static over current relay with block diagram.
- 3) Two relays R1 and R2 connected in two sections as shown in figure  
 RELAY R1 C.T. Ratio 300/5 plug setting = 50% TMS = 0.3  
 RELAY R2 C.T. Ratio 500/5 plug setting = 75% fault at F results in fault current 3000 A. Find TMS of R2 to give time gradation margin of 0.5 sec between the relays.



|                                |    |   |   |   |     |     |
|--------------------------------|----|---|---|---|-----|-----|
| <b>PSM</b>                     | 2  | 4 | 5 | 8 | 10  | 20  |
| <b>Opening time in seconds</b> | 10 | 5 | 4 | 3 | 2.8 | 2.4 |





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**B.E. (Electrical and Electronics) (Part – I) (New – CGPA)  
Examination, 2017  
SWITCHGEAR AND PROTECTION**

Day and Date : Wednesday, 6-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :** 1) **All questions are compulsory.**  
2) Assume **suitable** data **whenever** 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 :

**(1×14=14)**

- 1) A circuit breaker is a
  - a) Current controlling device
  - b) Current interrupting
  - c) Current limiting device
  - d) None of above
- 2) An isolator is designed to open a circuit under
  - a) Full load
  - b) Normal condition
  - c) No load
  - d) None of above
- 3) The device that detects the fault in a power system is
  - a) Circuit breaker
  - b) Isolator
  - c) Relay
  - d) None of above
- 4) If the length of the arc in a circuit breaker increases, its resistance
  - a) Decreases
  - b) Increases
  - c) Remains same
  - d) None of above
- 5) The current chopping mainly occurs in
  - a) Air blast circuit breaker
  - b) Oil circuit breaker
  - c) SF6 circuit breaker
  - d) Vacuum circuit breaker
- 6) In low oil circuit breaker, the oil performs the function of
  - a) Only insulation
  - b) Arc extinction only
  - c) Both insulation and arc extinction
  - d) None of above

P.T.O.



- 7) A differential relay measures the vector difference between
- Two currents
  - Two voltages
  - Two or more similar electrical quantities
  - None of the above
- 8) A transmission line is protected by
- Inrush protection
  - Distance protection
  - Time graded and current graded over current protection
  - Both b) and c)
- 9) Large internal faults are protected by
- Merz-price percentage differential protection
  - Mho and over current relay
  - Horn gaps and temperature relays
  - Earth fault and positive sequence relays
- 10) The voltage appearing across the contacts after opening of the circuit breaker is called \_\_\_\_\_ voltage.
- Recovery
  - Surge
  - Operating
  - Arc
- 11) The operating time of protection relay is usually
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- 0.2s
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- 14) For a round wire of diameter  $d$  the fusing current  $I$  is given by
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  - $I \propto d^{3/2}$
  - $I \propto d^2$
  - $I \propto \sqrt{d}$
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**B.E. (Electrical and Electronics) (Part – I) (New – CGPA)  
Examination, 2017  
SWITCHGEAR AND PROTECTION**

Day and Date : Wednesday, 6-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**Instructions :** 1) *All questions are compulsory.*  
2) *Assume suitable data whenever necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
- 1) Explain the physics of arc phenomenon and state the factor on which it depends.
  - 2) Describe the types of air blast circuit breaker.
  - 3) Explain the role played by arc runners and arc splitters in an air-break circuit breaker.
  - 4) What are the advantages of HRC fuses ?
3. Solve **any two** : **(8×2=16)**
- 1) Compare oil circuit breaker and air blast circuit breaker with diagram.
  - 2) Describe advantages of SF6 circuit breaker.
  - 3) Explain criteria for selection of fuses.

SECTION – II

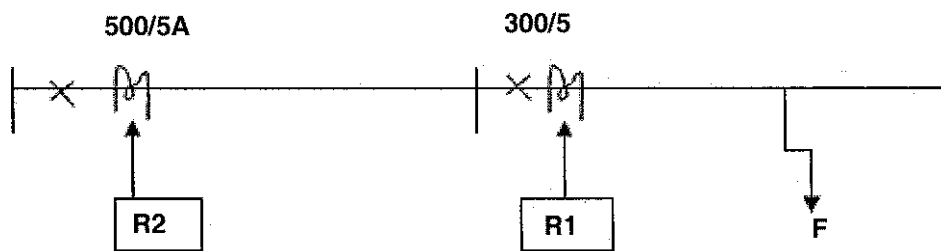
4. Solve **any three** : **(4×3=12)**
- 1) Draw and explain the circuit connections of three MHO units for three zones of protection.
  - 2) Write short note on :  
Inverse time over current relay and IDMT relay.
  - 3) What are the measures taken for lightning over voltages ?
  - 4) What are the types of back up protection ?



5. Solve **any two** :

**(8×2=16)**

- 1) Describe the impedance relay using microprocessor.
- 2) Describe the inverse time static over current relay with block diagram.
- 3) Two relays R1 and R2 connected in two sections as shown in figure  
 RELAY R1 C.T. Ratio 300/5 plug setting = 50% TMS = 0.3  
 RELAY R2 C.T. Ratio 500/5 plug setting = 75% fault at F results in fault current 3000 A. Find TMS of R2 to give time gradation margin of 0.5 sec between the relays.



|                                |    |   |   |   |     |     |
|--------------------------------|----|---|---|---|-----|-----|
| <b>PSM</b>                     | 2  | 4 | 5 | 8 | 10  | 20  |
| <b>Opening time in seconds</b> | 10 | 5 | 4 | 3 | 2.8 | 2.4 |



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**B.E. (Electrical and Electronics) (Part – I) (New – CGPA)  
Examination, 2017  
SWITCHGEAR AND PROTECTION**

Day and Date : Wednesday, 6-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions :** 1) **All questions are compulsory.**  
2) Assume **suitable** data **whenever** 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 :

**(1×14=14)**

- 1) In low oil circuit breaker, the oil performs the function of
  - a) Only insulation
  - b) Arc extinction only
  - c) Both insulation and arc extinction
  - d) None of above
- 2) A differential relay measures the vector difference between
  - a) Two currents
  - b) Two voltages
  - c) Two or more similar electrical quantities
  - d) None of the above
- 3) A transmission line is protected by
  - a) Inrush protection
  - b) Distance protection
  - c) Time graded and current graded over current protection
  - d) Both b) and c)
- 4) Large internal faults are protected by
  - a) Merz-price percentage differential protection
  - b) Mho and over current relay
  - c) Horn gaps and temperature relays
  - d) Earth fault and positive sequence relays

P.T.O.





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**B.E. (Electrical and Electronics) (Part – I) (New – CGPA)  
Examination, 2017  
SWITCHGEAR AND PROTECTION**

Day and Date : Wednesday, 6-12-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 56

**Instructions :** 1) *All questions are compulsory.*  
2) *Assume suitable data whenever necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
- 1) Explain the physics of arc phenomenon and state the factor on which it depends.
  - 2) Describe the types of air blast circuit breaker.
  - 3) Explain the role played by arc runners and arc splitters in an air-break circuit breaker.
  - 4) What are the advantages of HRC fuses ?
3. Solve **any two** : **(8×2=16)**
- 1) Compare oil circuit breaker and air blast circuit breaker with diagram.
  - 2) Describe advantages of SF6 circuit breaker.
  - 3) Explain criteria for selection of fuses.

SECTION – II

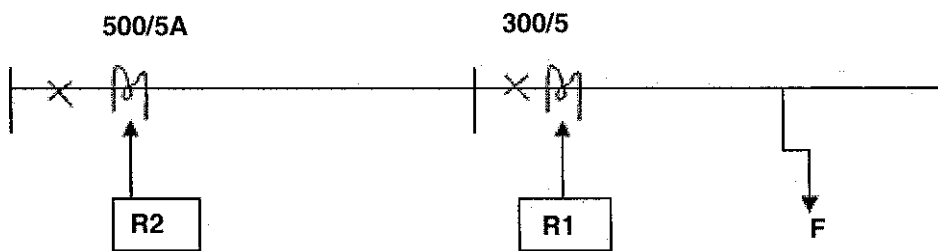
4. Solve **any three** : **(4×3=12)**
- 1) Draw and explain the circuit connections of three MHO units for three zones of protection.
  - 2) Write short note on :  
Inverse time over current relay and IDMT relay.
  - 3) What are the measures taken for lightning over voltages ?
  - 4) What are the types of back up protection ?



5. Solve **any two** :

**(8×2=16)**

- 1) Describe the impedance relay using microprocessor.
- 2) Describe the inverse time static over current relay with block diagram.
- 3) Two relays R1 and R2 connected in two sections as shown in figure  
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 RELAY R2 C.T. Ratio 500/5 plug setting = 75% fault at F results in fault current 3000 A. Find TMS of R2 to give time gradation margin of 0.5 sec between the relays.



|                                |    |   |   |   |     |     |
|--------------------------------|----|---|---|---|-----|-----|
| <b>PSM</b>                     | 2  | 4 | 5 | 8 | 10  | 20  |
| <b>Opening time in seconds</b> | 10 | 5 | 4 | 3 | 2.8 | 2.4 |





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**B.E. (E&E) (Part – I) (New CGPA) Examination, 2017  
RENEWABLE ENERGY SOURCES (Elective – I)**

Day and Date : Friday, 8-12-2017

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) Ocean and sea waves are indirectly produced due to
  - a) Pressure gradients
  - b) Solar energy
  - c) Geothermal energy
  - d) None of the above
- 2) In petrothermal systems energy obtained in the absence of underground water by
  - a) circulating compressed air
  - b) pumping water
  - c) creating water wells
  - d) none of the above
- 3) Biomass can be converted into
  - a) Liquid fuel
  - b) Hydrogen
  - c) Producer gas
  - d) All of the above
- 4) The main source of energy for satellite is
  - a) battery
  - b) solar cell
  - c) cryogenic storage
  - d) any of the above
- 5) Which of the following solar cookers is the most efficient and has the shortest cooking time ?
  - a) Box cooker
  - b) Parabolic cooker
  - c) Panel cooker
  - d) Cardboard type cooker
- 6) The electrical output of a solar cell depends on the
  - a) Intensity of solar radiation
  - b) Heat component of solar radiation
  - c) Ultraviolet radiation
  - d) Infrared radiation
- 7) Solar energy travels through space by
  - a) Conduction
  - b) Convection
  - c) Radiation
  - d) Transportation

P.T.O.



- 8) Which of the following sources emit fewer pollutants ?
- a) Coal
  - b) Petroleum
  - c) Charcoal
  - d) Wind energy
- 9) If the velocity of wind is doubled, then the power output will be
- a) 10 times
  - b) 8 times
  - c) 2 times
  - d) 6 times
- 10) A windmill is also called as
- a) Wind farm
  - b) Propeller
  - c) Wind station
  - d) Wind turbine
- 11) Lower speed wind turbines are mainly driven by
- a) Drag forces
  - b) Lift forces
  - c) Push forces
  - d) None of the above
- 12) In hydrothermal source of geothermal energy
- a) hot water or steam is available
  - b) hot gases are available
  - c) molten lava is available
  - d) none of the above
- 13) Gasification of biomass is a
- a) Biochemical conversion process
  - b) Chemical conversion process
  - c) Thermochemical conversion process
  - d) Biological conversion process
- 14) Which of the following energy originate from the ocean ?
- a) Tidal energy
  - b) Sea energy
  - c) Wind energy
  - d) Hydropower
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**B.E. (E&E) (Part – I) (New CGPA) Examination, 2017  
RENEWABLE ENERGY SOURCES (Elective – I)**

Day and Date : Friday, 8-12-2017

Marks : 56

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

SECTION – I

2. Attempt **any 4** questions : **(4 Marks each)**

- 1) Explain Indian scenario regarding non-conventional energy resources.
- 2) Explain with neat sketch solar air heaters.
- 3) Draw and explain VI characteristics of PV cell.
- 4) Define :
  - 1) Pitch control
  - 2) Cut in speed
  - 3) Yaw control
  - 4) Swept area
- 5) Write a short note on :
  - 1) Solar water heater
  - 2) Solar cooker.
- 6) Give details on Semiconductor materials used for solar cells.

3. Attempt **any 2** questions : **(6 Marks each)**

- 1) Write a short note on :
  - i) Efficiency of solar cells
  - ii) Principle of wind energy conversion.
- 2) Describe with neat sketches various types of concentrating collectors.
- 3) Explain with neat sketch.
  - 1) Horizontal wind mills
  - 2) Vertical wind mills.



## SECTION – II

4. Attempt **any 4** questions : **(4 Marks each)**
- 1) Explain various types of geothermal resources.
  - 2) What are the limitations associated with storage and transportation of hydrogen gas ?
  - 3) Explain how hydrogen is used as alternative fuel for vehicles.
  - 4) State the various factors to be considered while designing the biogas plant.
  - 5) What are the types of batteries ? Explain with neat sketch different types of battery arrangements.
  - 6) Explain with neat sketch steam reforming for production of hydrogen.
5. Attempt **any 2** questions : **(6 Marks each)**
- 1) Explain with neat sketch
    - 1) floating drum digester
    - 2) Fixed dome digester.
  - 2) Explain following Ocean Thermal Electric Conversion systems
    - 1) open cycle
    - 2) closed cycle
    - 3) hybrid cycle.
  - 3) Explain with neat sketch various part of geothermal energy system.
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SLR-TJ – 470

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Q

**B.E. (E&E) (Part – I) (New CGPA) Examination, 2017  
RENEWABLE ENERGY SOURCES (Elective – I)**

Day and Date : Friday, 8-12-2017

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) Which of the following sources emit fewer pollutants ?
  - a) Coal
  - b) Petroleum
  - c) Charcoal
  - d) Wind energy
- 2) If the velocity of wind is doubled, then the power output will be
  - a) 10 times
  - b) 8 times
  - c) 2 times
  - d) 6 times
- 3) A windmill is also called as
  - a) Wind farm
  - b) Propeller
  - c) Wind station
  - d) Wind turbine
- 4) Lower speed wind turbines are mainly driven by
  - a) Drag forces
  - b) Lift forces
  - c) Push forces
  - d) None of the above
- 5) In hydrothermal source of geothermal energy
  - a) hot water or steam is available
  - b) hot gases are available
  - c) molten lava is available
  - d) none of the above
- 6) Gasification of biomass is a
  - a) Biochemical conversion process
  - b) Chemical conversion process
  - c) Thermochemical conversion process
  - d) Biological conversion process

P.T.O.



- 7) Which of the following energy originate from the ocean ?
- a) Tidal energy
  - b) Sea energy
  - c) Wind energy
  - d) Hydropower
- 8) Ocean and sea waves are indirectly produced due to
- a) Pressure gradients
  - b) Solar energy
  - c) Geothermal energy
  - d) None of the above
- 9) In petrothermal systems energy obtained in the absence of underground water by
- a) circulating compressed air
  - b) pumping water
  - c) creating water wells
  - d) none of the above
- 10) Biomass can be converted into
- a) Liquid fuel
  - b) Hydrogen
  - c) Producer gas
  - d) All of the above
- 11) The main source of energy for satellite is
- a) battery
  - b) solar cell
  - c) cryogenic storage
  - d) any of the above
- 12) Which of the following solar cookers is the most efficient and has the shortest cooking time ?
- a) Box cooker
  - b) Parabolic cooker
  - c) Panel cooker
  - d) Cardboard type cooker
- 13) The electrical output of a solar cell depends on the
- a) Intensity of solar radiation
  - b) Heat component of solar radiation
  - c) Ultraviolet radiation
  - d) Infrared radiation
- 14) Solar energy travels through space by
- a) Conduction
  - b) Convection
  - c) Radiation
  - d) Transportation
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**B.E. (E&E) (Part – I) (New CGPA) Examination, 2017  
RENEWABLE ENERGY SOURCES (Elective – I)**

Day and Date : Friday, 8-12-2017

Marks : 56

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

SECTION – I

2. Attempt **any 4** questions : **(4 Marks each)**

- 1) Explain Indian scenario regarding non-conventional energy resources.
- 2) Explain with neat sketch solar air heaters.
- 3) Draw and explain VI characteristics of PV cell.
- 4) Define :
  - 1) Pitch control
  - 2) Cut in speed
  - 3) Yaw control
  - 4) Swept area
- 5) Write a short note on :
  - 1) Solar water heater
  - 2) Solar cooker.
- 6) Give details on Semiconductor materials used for solar cells.

3. Attempt **any 2** questions : **(6 Marks each)**

- 1) Write a short note on :
  - i) Efficiency of solar cells
  - ii) Principle of wind energy conversion.
- 2) Describe with neat sketches various types of concentrating collectors.
- 3) Explain with neat sketch.
  - 1) Horizontal wind mills
  - 2) Vertical wind mills.



SECTION – II

4. Attempt **any 4** questions : **(4 Marks each)**
- 1) Explain various types of geothermal resources.
  - 2) What are the limitations associated with storage and transportation of hydrogen gas ?
  - 3) Explain how hydrogen is used as alternative fuel for vehicles.
  - 4) State the various factors to be considered while designing the biogas plant.
  - 5) What are the types of batteries ? Explain with neat sketch different types of battery arrangements.
  - 6) Explain with neat sketch steam reforming for production of hydrogen.
5. Attempt **any 2** questions : **(6 Marks each)**
- 1) Explain with neat sketch
    - 1) floating drum digester
    - 2) Fixed dome digester.
  - 2) Explain following Ocean Thermal Electric Conversion systems
    - 1) open cycle
    - 2) closed cycle
    - 3) hybrid cycle.
  - 3) Explain with neat sketch various part of geothermal energy system.
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SLR-TJ – 470

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R

**B.E. (E&E) (Part – I) (New CGPA) Examination, 2017  
RENEWABLE ENERGY SOURCES (Elective – I)**

Day and Date : Friday, 8-12-2017

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) Which of the following solar cookers is the most efficient and has the shortest cooking time ?
  - a) Box cooker
  - b) Parabolic cooker
  - c) Panel cooker
  - d) Cardboard type cooker
- 2) The electrical output of a solar cell depends on the
  - a) Intensity of solar radiation
  - b) Heat component of solar radiation
  - c) Ultraviolet radiation
  - d) Infrared radiation
- 3) Solar energy travels through space by
  - a) Conduction
  - b) Convection
  - c) Radiation
  - d) Transportation
- 4) Which of the following sources emit fewer pollutants ?
  - a) Coal
  - b) Petroleum
  - c) Charcoal
  - d) Wind energy
- 5) If the velocity of wind is doubled, then the power output will be
  - a) 10 times
  - b) 8 times
  - c) 2 times
  - d) 6 times
- 6) A windmill is also called as
  - a) Wind farm
  - b) Propeller
  - c) Wind station
  - d) Wind turbine
- 7) Lower speed wind turbines are mainly driven by
  - a) Drag forces
  - b) Life forces
  - c) Push forces
  - d) None of the above

P.T.O.



- 8) In hydrothermal source of geothermal energy
- a) hot water or steam is available
  - b) hot gases are available
  - c) molten lava is available
  - d) none of the above
- 9) Gasification of biomass is a
- a) Biochemical conversion process
  - b) Chemical conversion process
  - c) Thermochemical conversion process
  - d) Biological conversion process
- 10) Which of the following energy originate from the ocean ?
- a) Tidal energy
  - b) Sea energy
  - c) Wind energy
  - d) Hydropower
- 11) Ocean and sea waves are indirectly produced due to
- a) Pressure gradients
  - b) Solar energy
  - c) Geothermal energy
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- 12) In petrothermal systems energy obtained in the absence of underground water by
- a) circulating compressed air
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  - c) creating water wells
  - d) none of the above
- 13) Biomass can be converted into
- a) Liquid fuel
  - b) Hydrogen
  - c) Producer gas
  - d) All of the above
- 14) The main source of energy for satellite is
- a) battery
  - b) solar cell
  - c) cryogenic storage
  - d) any of the above
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**B.E. (E&E) (Part – I) (New CGPA) Examination, 2017  
RENEWABLE ENERGY SOURCES (Elective – I)**

Day and Date : Friday, 8-12-2017

Marks : 56

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

SECTION – I

2. Attempt **any 4** questions : **(4 Marks each)**

- 1) Explain Indian scenario regarding non-conventional energy resources.
- 2) Explain with neat sketch solar air heaters.
- 3) Draw and explain VI characteristics of PV cell.
- 4) Define :
  - 1) Pitch control
  - 2) Cut in speed
  - 3) Yaw control
  - 4) Swept area
- 5) Write a short note on :
  - 1) Solar water heater
  - 2) Solar cooker.
- 6) Give details on Semiconductor materials used for solar cells.

3. Attempt **any 2** questions : **(6 Marks each)**

- 1) Write a short note on :
  - i) Efficiency of solar cells
  - ii) Principle of wind energy conversion.
- 2) Describe with neat sketches various types of concentrating collectors.
- 3) Explain with neat sketch.
  - 1) Horizontal wind mills
  - 2) Vertical wind mills.

Set R



## SECTION – II

4. Attempt **any 4** questions : **(4 Marks each)**
- 1) Explain various types of geothermal resources.
  - 2) What are the limitations associated with storage and transportation of hydrogen gas ?
  - 3) Explain how hydrogen is used as alternative fuel for vehicles.
  - 4) State the various factors to be considered while designing the biogas plant.
  - 5) What are the types of batteries ? Explain with neat sketch different types of battery arrangements.
  - 6) Explain with neat sketch steam reforming for production of hydrogen.
5. Attempt **any 2** questions : **(6 Marks each)**
- 1) Explain with neat sketch
    - 1) floating drum digester
    - 2) Fixed dome digester.
  - 2) Explain following Ocean Thermal Electric Conversion systems
    - 1) open cycle
    - 2) closed cycle
    - 3) hybrid cycle.
  - 3) Explain with neat sketch various part of geothermal energy system.
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SLR-TJ – 470

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S

**B.E. (E&E) (Part – I) (New CGPA) Examination, 2017  
RENEWABLE ENERGY SOURCES (Elective – I)**

Day and Date : Friday, 8-12-2017

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) A windmill is also called as
  - a) Wind farm
  - b) Propeller
  - c) Wind station
  - d) Wind turbine
- 2) Lower speed wind turbines are mainly driven by
  - a) Drag forces
  - b) Life forces
  - c) Push forces
  - d) None of the above
- 3) In hydrothermal source of geothermal energy
  - a) hot water or steam is available
  - b) hot gases are available
  - c) molten lava is available
  - d) none of the above
- 4) Gasification of biomass is a
  - a) Biochemical conversion process
  - b) Chemical conversion process
  - c) Thermochemical conversion process
  - d) Biological conversion process
- 5) Which of the following energy originate from the ocean ?
  - a) Tidal energy
  - b) Sea energy
  - c) Wind energy
  - d) Hydropower
- 6) Ocean and sea waves are indirectly produced due to
  - a) Pressure gradients
  - b) Solar energy
  - c) Geothermal energy
  - d) None of the above

P.T.O.



- 7) In petrothermal systems energy obtained in the absence of underground water by
- a) circulating compressed air
  - b) pumping water
  - c) creating water wells
  - d) none of the above
- 8) Biomass can be converted into
- a) Liquid fuel
  - b) Hydrogen
  - c) Producer gas
  - d) All of the above
- 9) The main source of energy for satellite is
- a) battery
  - b) solar cell
  - c) cryogenic storage
  - d) any of the above
- 10) Which of the following solar cookers is the most efficient and has the shortest cooking time ?
- a) Box cooker
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  - c) Panel cooker
  - d) Cardboard type cooker
- 11) The electrical output of a solar cell depends on the
- a) Intensity of solar radiation
  - b) Heat component of solar radiation
  - c) Ultraviolet radiation
  - d) Infrared radiation
- 12) Solar energy travels through space by
- a) Conduction
  - b) Convection
  - c) Radiation
  - d) Transportation
- 13) Which of the following sources emit fewer pollutants ?
- a) Coal
  - b) Petroleum
  - c) Charcoal
  - d) Wind energy
- 14) If the velocity of wind is doubled, then the power output will be
- a) 10 times
  - b) 8 times
  - c) 2 times
  - d) 6 times
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**B.E. (E&E) (Part – I) (New CGPA) Examination, 2017  
RENEWABLE ENERGY SOURCES (Elective – I)**

Day and Date : Friday, 8-12-2017

Marks : 56

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

SECTION – I

2. Attempt **any 4** questions : **(4 Marks each)**

- 1) Explain Indian scenario regarding non-conventional energy resources.
- 2) Explain with neat sketch solar air heaters.
- 3) Draw and explain VI characteristics of PV cell.
- 4) Define :
  - 1) Pitch control
  - 2) Cut in speed
  - 3) Yaw control
  - 4) Swept area
- 5) Write a short note on :
  - 1) Solar water heater
  - 2) Solar cooker.
- 6) Give details on Semiconductor materials used for solar cells.

3. Attempt **any 2** questions : **(6 Marks each)**

- 1) Write a short note on :
  - i) Efficiency of solar cells
  - ii) Principle of wind energy conversion.
- 2) Describe with neat sketches various types of concentrating collectors.
- 3) Explain with neat sketch.
  - 1) Horizontal wind mills
  - 2) Vertical wind mills.



## SECTION – II

4. Attempt **any 4** questions : **(4 Marks each)**
- 1) Explain various types of geothermal resources.
  - 2) What are the limitations associated with storage and transportation of hydrogen gas ?
  - 3) Explain how hydrogen is used as alternative fuel for vehicles.
  - 4) State the various factors to be considered while designing the biogas plant.
  - 5) What are the types of batteries ? Explain with neat sketch different types of battery arrangements.
  - 6) Explain with neat sketch steam reforming for production of hydrogen.
5. Attempt **any 2** questions : **(6 Marks each)**
- 1) Explain with neat sketch
    - 1) floating drum digester
    - 2) Fixed dome digester.
  - 2) Explain following Ocean Thermal Electric Conversion systems
    - 1) open cycle
    - 2) closed cycle
    - 3) hybrid cycle.
  - 3) Explain with neat sketch various part of geothermal energy system.
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SLR-TJ – 475

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**B.E. (Electrical and Electronics) (Part – II) Examination, 2017  
HVDC AND FACTS**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) **Marks are indicated to the right of question.**
  - 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.**
  - 5) **Assume suitable data wherever necessary.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct alternatives

(1×20=20)

- 1) Modern HVDC systems are all
  - a) 3 pulse converter
  - b) 6 pulse converter
  - c) 24 pulse converter
  - d) 12 pulse converter
- 2) Thyristor valve conducts when ?
  - a) Anode is positive
  - b) Anode is negative
  - c) Anode is positive with positive gate pulse
  - d) Anode is positive with negative gate pulse
- 3) The break even distance is the distance beyond which
  - a) d.c. transmission is economical
  - b) a.c. transmission is economical
  - c) cost of both systems are same
  - d) both a) and c)
- 4) In bipolar system
  - a) Both conductors are positive
  - b) Both conductors are negative
  - c) One conductor is positive and other negative
  - d) One conductor is positive or negative and other is at ground potential
- 5) Harmonics suppressed by
  - a) Active filters
  - b) Spark gap
  - c) Lightning arrester
  - d) None of above
- 6) UPFC is a combination of
  - a) STATCOM and SSSC
  - b) TC-PAR and TCR
  - c) Series and series
  - d) None of the above

P.T.O.



- 7) HVDC systems are mainly used with large power rating for
- Interconnection of two systems with different frequencies
  - Bulk power transmission over large distance
  - Submarine cable transmission
  - To connect non conventional power sources
- 8)  $k$  is \_\_\_\_\_
- $X/X_c$
  - $1/X_c$
  - $X$
  - $X_c/X$
- 9) Effect of HVDC transmission in power system
- Improves voltage stability
  - Causes voltage collapse
  - Has no effect
  - None of the above
- 10) In GTO, the gate current pulse required for turn on may be
- 1 – 2%
  - 2 – 5%
  - 3 – 5%
  - None of the above
- 11) The power flow increases with increase in \_\_\_\_\_
- $\alpha$
  - $X$
  - $\delta$
  - All of above
- 12) FACTS provides \_\_\_\_\_
- Power transfer capability and controllability
  - Phase sequence and comparability
  - a) and b)
  - None
- 13) PWM converter for FACT technology is high power, high voltage and \_\_\_\_\_
- High frequency
  - Low frequency
  - Medium frequency
  - Modest switching frequencies
- 14) In TCR the reactance is controlled by
- Switching of thyristor valve
  - Fully conduction control
  - Partial conduction control
  - None
- 15) For desirable operation of a DC link without ground return, \_\_\_\_\_ link are most commonly used.
- Monopolar
  - Bipolar
  - Homopolar
  - All of the above
- 16) When the rotationally oscillating generator accelerates and  $\delta$  ?
- Decreases
  - Increases
  - Unity
  - None of above
- 17) In SVC the  $I_{sm}$  and  $I_{mr}$
- Same
  - Different
  - Unity
  - None of above
- 18) The by passing of the bridge can be done with the help of \_\_\_\_\_
- Replacing a single valve in the arm
  - Replacing both valve in same arm
  - Activating a bypass pair in the bridge
  - Deactivating same arm from converter set
- 19) In tap changing transformers, the tapping are provided on \_\_\_\_\_
- Secondary winding
  - Primary winding
  - Tertiary winding
  - High voltage winding
- 20) \_\_\_\_\_ is a non-self clearing fault.
- Commutation failure
  - Arc-through
  - Arc-back
  - Misfire



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**B.E. (Electrical and Electronics) (Part – II) Examination, 2017**  
**HVDC AND FACTS**

Day and Date : Tuesday, 21-11-2017

Marks : 80

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

- Instructions :** 1) **All questions are compulsory.**  
2) Assume suitable data **wherever** necessary.

SECTION – I

2. Solve **any four** : **(5×4=20)**
- 1) Explain the benefits of FACTS technology.
  - 2) Write short note on FC-TCR.
  - 3) Explain STATCOM.
  - 4) Compare TCVR and TCPAR.
  - 5) Explain power oscillation damping by shunt compensation.
3. Solve **any two** : **(10×2=20)**
- 1) Explain the operational and performance characteristics of STATCOM and SVC.
  - 2) Give brief explanation along with necessary diagram of the FACTS controller.
  - 3) Explain concept of series capacitive compensation with neat diagram.



SECTION – II

4. Solve **any four** : **(5×4=20)**
- 1) Draw and explain different types of DC links.
  - 2) Explain LCC bridge characteristic for rectifier.
  - 3) Explain the parameters under choice of voltage level.
  - 4) Explain characteristic of twelve pulse converter.
  - 5) What is CC CONVERTER ?
5. Solve **any two** : **(10×2=20)**
- 1) What are the benefits of HVDC over EHV AC system ?
  - 2) Describe with neat sketch typical HVDC converter station.
  - 3) Explain the analysis of two and three valve conduction mode in LCC.
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**B.E. (Electrical and Electronics) (Part – II) Examination, 2017  
HVDC AND FACTS**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) **Marks are indicated to the right of question.**
  - 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.**
  - 5) **Assume suitable data wherever necessary.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct alternatives (1×20=20)
- 1) When the rotationally oscillating generator accelerates and  $\delta$  ?  
a) Decreases      b) Increases      c) Unity      d) None of above
  - 2) In SVC the  $I_{sm}$  and  $I_{mr}$   
a) Same      b) Different      c) Unity      d) None of above
  - 3) The by passing of the bridge can be done with the help of \_\_\_\_\_  
a) Replacing a single valve in the arm  
b) Replacing both valve in same arm  
c) Activating a bypass pair in the bridge  
d) Deactivating same arm from converter set
  - 4) In tap changing transformers, the tapping are provided on \_\_\_\_\_  
a) Secondary winding      b) Primary winding  
c) Tertiary winding      d) High voltage winding
  - 5) \_\_\_\_\_ is a non-self clearing fault.  
a) Commutation failure      b) Arc-through  
c) Arc-back      d) Misfire
  - 6) Modern HVDC systems are all  
a) 3 pulse converter      b) 6 pulse converter  
c) 24 pulse converter      d) 12 pulse converter
  - 7) Thyristor valve conducts when ?  
a) Anode is positive  
b) Anode is negative  
c) Anode is positive with positive gate pulse  
d) Anode is positive with negative gate pulse

P.T.O.



- 8) The break even distance is the distance beyond which
- a) d.c. transmission is economical
  - b) a.c. transmission is economical
  - c) cost of both systems are same
  - d) both a) and c)
- 9) In bipolar system
- a) Both conductors are positive
  - b) Both conductors are negative
  - c) One conductor is positive and other negative
  - d) One conductor is positive or negative and other is at ground potential
- 10) Harmonics suppressed by
- a) Active filters
  - b) Spark gap
  - c) Lightning arrester
  - d) None of above
- 11) UPFC is a combination of
- a) STATCOM and SSSC
  - b) TC-PAR and TCR
  - c) Series and series
  - d) None of the above
- 12) HVDC systems are mainly used with large power rating for
- a) Interconnection of two systems with different frequencies
  - b) Bulk power transmission over large distance
  - c) Submarine cable transmission
  - d) To connect non conventional power sources
- 13)  $k$  is \_\_\_\_\_
- a)  $X/X_c$
  - b)  $1/X_c$
  - c)  $X$
  - d)  $X_c/X$
- 14) Effect of HVDC transmission in power system
- a) Improves voltage stability
  - b) Causes voltage collapse
  - c) Has no effect
  - d) None of the above
- 15) In GTO, the gate current pulse required for turn on may be
- a) 1 – 2%
  - b) 2 – 5%
  - c) 3 – 5%
  - d) None of the above
- 16) The power flow increases with increase in \_\_\_\_\_
- a)  $\alpha$
  - b)  $X$
  - c)  $\delta$
  - d) All of above
- 17) FACTS provides \_\_\_\_\_
- a) Power transfer capability and controllability
  - b) Phase sequence and comparability
  - c) a) and b)
  - d) None
- 18) PWM converter for FACT technology is high power, high voltage and \_\_\_\_\_
- a) High frequency
  - b) Low frequency
  - c) Medium frequency
  - d) Modest switching frequencies
- 19) In TCR the reactance is controlled by
- a) Switching of thyristor valve
  - b) Fully conduction control
  - c) Partial conduction control
  - d) None
- 20) For desirable operation of a DC link without ground return, \_\_\_\_\_ link are most commonly used.
- a) Monopolar
  - b) Bipolar
  - c) Homopolar
  - d) All of the above



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**B.E. (Electrical and Electronics) (Part – II) Examination, 2017**  
**HVDC AND FACTS**

Day and Date : Tuesday, 21-11-2017

Marks : 80

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

- Instructions :** 1) **All questions are compulsory.**  
2) Assume suitable data **wherever** necessary.

SECTION – I

2. Solve **any four** : **(5×4=20)**
- 1) Explain the benefits of FACTS technology.
  - 2) Write short note on FC-TCR.
  - 3) Explain STATCOM.
  - 4) Compare TCVR and TCPAR.
  - 5) Explain power oscillation damping by shunt compensation.
3. Solve **any two** : **(10×2=20)**
- 1) Explain the operational and performance characteristics of STATCOM and SVC.
  - 2) Give brief explanation along with necessary diagram of the FACTS controller.
  - 3) Explain concept of series capacitive compensation with neat diagram.



## SECTION – II

4. Solve **any four** : **(5×4=20)**
- 1) Draw and explain different types of DC links.
  - 2) Explain LCC bridge characteristic for rectifier.
  - 3) Explain the parameters under choice of voltage level.
  - 4) Explain characteristic of twelve pulse converter.
  - 5) What is CC CONVERTER ?
5. Solve **any two** : **(10×2=20)**
- 1) What are the benefits of HVDC over EHV AC system ?
  - 2) Describe with neat sketch typical HVDC converter station.
  - 3) Explain the analysis of two and three valve conduction mode in LCC.
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**B.E. (Electrical and Electronics) (Part – II) Examination, 2017  
HVDC AND FACTS**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) **Marks** are indicated to the **right** of question.
  - 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.**
  - 5) Assume suitable data **wherever** necessary.

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct alternatives (1×20=20)
- 1) The power flow increases with increase in \_\_\_\_\_  
a)  $\alpha$                       b) X                      c)  $\delta$                       d) All of above
  - 2) FACTS provides \_\_\_\_\_  
a) Power transfer capability and controllability  
b) Phase sequence and comparability  
c) a) and b)  
d) None
  - 3) PWM converter for FACT technology is high power, high voltage and \_\_\_\_\_  
a) High frequency                      b) Low frequency  
c) Medium frequency                      d) Modest switching frequencies
  - 4) In TCR the reactance is controlled by  
a) Switching of thyristor valve                      b) Fully conduction control  
c) Partial conduction control                      d) None
  - 5) For desirable operation of a DC link without ground return, \_\_\_\_\_ link are most commonly used.  
a) Monopolar                      b) Bipolar                      c) Homopolar                      d) All of the above
  - 6) When the rotationally oscillating generator accelerates and  $\delta$  ?  
a) Decreases                      b) Increases                      c) Unity                      d) None of above
  - 7) In SVC the  $I_{sm}$  and  $I_{mr}$   
a) Same                      b) Different                      c) Unity                      d) None of above
  - 8) The by passing of the bridge can be done with the help of \_\_\_\_\_  
a) Replacing a single valve in the arm  
b) Replacing both valve in same arm  
c) Activating a bypass pair in the bridge  
d) Deactivating same arm from converter set

P.T.O.





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**B.E. (Electrical and Electronics) (Part – II) Examination, 2017**  
**HVDC AND FACTS**

Day and Date : Tuesday, 21-11-2017

Marks : 80

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

- Instructions :** 1) **All questions are compulsory.**  
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SECTION – I

2. Solve **any four** : **(5×4=20)**
- 1) Explain the benefits of FACTS technology.
  - 2) Write short note on FC-TCR.
  - 3) Explain STATCOM.
  - 4) Compare TCVR and TCPAR.
  - 5) Explain power oscillation damping by shunt compensation.
3. Solve **any two** : **(10×2=20)**
- 1) Explain the operational and performance characteristics of STATCOM and SVC.
  - 2) Give brief explanation along with necessary diagram of the FACTS controller.
  - 3) Explain concept of series capacitive compensation with neat diagram.



## SECTION – II

4. Solve **any four** : **(5×4=20)**
- 1) Draw and explain different types of DC links.
  - 2) Explain LCC bridge characteristic for rectifier.
  - 3) Explain the parameters under choice of voltage level.
  - 4) Explain characteristic of twelve pulse converter.
  - 5) What is CC CONVERTER ?
5. Solve **any two** : **(10×2=20)**
- 1) What are the benefits of HVDC over EHV AC system ?
  - 2) Describe with neat sketch typical HVDC converter station.
  - 3) Explain the analysis of two and three valve conduction mode in LCC.
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SLR-TJ – 475

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**B.E. (Electrical and Electronics) (Part – II) Examination, 2017  
HVDC AND FACTS**

Day and Date : Tuesday, 21-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- Instructions :**
- 1) **All questions are compulsory.**
  - 2) **Marks are indicated to the right of question.**
  - 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.**
  - 5) **Assume suitable data wherever necessary.**

**MCQ/Objective Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct alternatives

(1×20=20)

- 1) UPFC is a combination of
  - a) STATCOM and SSSC
  - b) TC-PAR and TCR
  - c) Series and series
  - d) None of the above
- 2) HVDC systems are mainly used with large power rating for
  - a) Interconnection of two systems with different frequencies
  - b) Bulk power transmission over large distance
  - c) Submarine cable transmission
  - d) To connect non conventional power sources
- 3)  $k$  is \_\_\_\_\_
  - a)  $X/X_c$
  - b)  $1/X_c$
  - c)  $X$
  - d)  $X_c/X$
- 4) Effect of HVDC transmission in power system
  - a) Improves voltage stability
  - b) Causes voltage collapse
  - c) Has no effect
  - d) None of the above
- 5) In GTO, the gate current pulse required for turn on may be
  - a) 1 – 2%
  - b) 2 – 5%
  - c) 3 – 5%
  - d) None of the above
- 6) The power flow increases with increase in \_\_\_\_\_
  - a)  $\alpha$
  - b)  $X$
  - c)  $\delta$
  - d) All of above
- 7) FACTS provides \_\_\_\_\_
  - a) Power transfer capability and controllability
  - b) Phase sequence and comparability
  - c) a) and b)
  - d) None

P.T.O.



- 8) PWM converter for FACT technology is high power, high voltage and \_\_\_\_\_
- a) High frequency
  - b) Low frequency
  - c) Medium frequency
  - d) Modest switching frequencies
- 9) In TCR the reactance is controlled by
- a) Switching of thyristor valve
  - b) Fully conduction control
  - c) Partial conduction control
  - d) None
- 10) For desirable operation of a DC link without ground return, \_\_\_\_\_ link are most commonly used.
- a) Monopolar
  - b) Bipolar
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  - d) All of the above
- 11) When the rotationally oscillating generator accelerates and  $\delta$  ?
- a) Decreases
  - b) Increases
  - c) Unity
  - d) None of above
- 12) In SVC the  $I_{sm}$  and  $I_{mr}$
- a) Same
  - b) Different
  - c) Unity
  - d) None of above
- 13) The by passing of the bridge can be done with the help of \_\_\_\_\_
- a) Replacing a single valve in the arm
  - b) Replacing both valve in same arm
  - c) Activating a bypass pair in the bridge
  - d) Deactivating same arm from converter set
- 14) In tap changing transformers, the tapping are provided on \_\_\_\_\_
- a) Secondary winding
  - b) Primary winding
  - c) Tertiary winding
  - d) High voltage winding
- 15) \_\_\_\_\_ is a non-self clearing fault.
- a) Commutation failure
  - b) Arc-through
  - c) Arc-back
  - d) Misfire
- 16) Modern HVDC systems are all
- a) 3 pulse converter
  - b) 6 pulse converter
  - c) 24 pulse converter
  - d) 12 pulse converter
- 17) Thyristor valve conducts when ?
- a) Anode is positive
  - b) Anode is negative
  - c) Anode is positive with positive gate pulse
  - d) Anode is positive with negative gate pulse
- 18) The break even distance is the distance beyond which
- a) d.c. transmission is economical
  - b) a.c. transmission is economical
  - c) cost of both systems are same
  - d) both a) and c)
- 19) In bipolar system
- a) Both conductors are positive
  - b) Both conductors are negative
  - c) One conductor is positive and other negative
  - d) One conductor is positive or negative and other is at ground potential
- 20) Harmonics suppressed by
- a) Active filters
  - b) Spark gap
  - c) Lightning arrester
  - d) None of above



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**B.E. (Electrical and Electronics) (Part – II) Examination, 2017**  
**HVDC AND FACTS**

Day and Date : Tuesday, 21-11-2017

Marks : 80

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

- Instructions :** 1) **All questions are compulsory.**  
2) Assume suitable data **wherever** necessary.

SECTION – I

2. Solve **any four** : **(5×4=20)**
- 1) Explain the benefits of FACTS technology.
  - 2) Write short note on FC-TCR.
  - 3) Explain STATCOM.
  - 4) Compare TCVR and TCPAR.
  - 5) Explain power oscillation damping by shunt compensation.
3. Solve **any two** : **(10×2=20)**
- 1) Explain the operational and performance characteristics of STATCOM and SVC.
  - 2) Give brief explanation along with necessary diagram of the FACTS controller.
  - 3) Explain concept of series capacitive compensation with neat diagram.



## SECTION – II

4. Solve **any four** : **(5×4=20)**
- 1) Draw and explain different types of DC links.
  - 2) Explain LCC bridge characteristic for rectifier.
  - 3) Explain the parameters under choice of voltage level.
  - 4) Explain characteristic of twelve pulse converter.
  - 5) What is CC CONVERTER ?
5. Solve **any two** : **(10×2=20)**
- 1) What are the benefits of HVDC over EHV AC system ?
  - 2) Describe with neat sketch typical HVDC converter station.
  - 3) Explain the analysis of two and three valve conduction mode in LCC.
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SLR-TJ – 476

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**B.E. (E&E) (Part – II) Examination, 2017  
ELECTRICAL MACHINE DESIGN**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

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 Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) High current density increases  
A) Copper cost    B) Copper loss    C) Efficiency    D) None of the above
- 2) The rotor slots in 3 phase induction motor are kept inclined. This Phenomenon is known as  
A) Skewing    B) Crawling    C) Cogging    D) None of the above
- 3) Transformer-core laminations are made of  
A) Cast iron    B) Silicon steel    C) Wrought iron    D) Cast steel
- 4) Line joining tangent and torque line in a circle diagram gives  
A) Copper loss    B) Stator loss  
C) Maximum output    D) Maximum torque
- 5) The effect of harmonics in rotating machines can be minimized by  
A) Use of longer air gap    B) Skewing the poles  
C) Use of distributed winding    D) All of the above
- 6) Current density in rotor bars of an induction motor is  
A) 3 – 4 A/mm<sup>2</sup>    B) 4 – 7 A/mm<sup>2</sup>    C) 3 – 10 A/mm<sup>2</sup>    D) 10 – 15 A/mm<sup>2</sup>
- 7) In a transformer with cruciform core the net iron area is  
A) 0.45 d<sup>2</sup>    B) 0.6 d<sup>2</sup>    C) 0.62 d<sup>2</sup>    D) 0.56 d<sup>2</sup>
- 8) The core and winding of a transformer dissipate heat to surrounding by  
A) Convection    B) Conduction    C) Radiation    D) All of these
- 9) A single phase shell type distribution transformer has sandwich type winding because to  
A) save copper    B) improve voltage regulation  
C) reduce leakage reactance    D) both B) and C)

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**B.E. (E&E) (Part – II) Examination, 2017  
ELECTRICAL MACHINE DESIGN**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** questions : **(4×5=20)**
- a) Explain the design of cooling tubes for the transformer.
  - b) Derive the output equation of three phase transformer. State assumptions made.
  - c) Explain the choice of flux density and choice of current density for transformer.
  - d) A single phase 400 V, 50 Hz transformer is built from stampings having a relative permeability of 1000. The length of the flux path is 2.5 m, the area of cross section of the core is  $2.5 \times 10^{-3} \text{ m}^2$  and the primary winding has 800 turns. Estimate the maximum flux and no load current of the transformer.
  - e) Discuss the factors which governs the choice (selection) of specific loadings for a 3 phase induction motor.
  - f) Find the current in the bars and end rings of a cage rotor of a 6 pole 3 phase squirrel cage induction motor having 72 stator slots with 15 conductors in each slot, if the stator current per phase is 24.1 and rotor slots are 55. The coil span is 11 slots and the phase spread is  $60^\circ$ . The power factor is 0.83.
3. Answer **any two** questions : **(2×10=20)**
- a) Derive the expression for leakage reactance for transformer. State assumptions made.
  - b) Calculate the equivalent resistance per phase of the rotor referred to the stator of a squirrel cage induction motor given the following data :  
Stator : Voltage/phase = 400 V, No. of phases = 3, No. of poles = 4, Frequency = 50 Hz, slots = 48, Conductors/slot = 30, Kw = 0.958.  
Rotor : slots = 53, conductors/slot = 1, Area of bar =  $60 \text{ mm}^2$ , length of Bar = 12 cm, end ring cross-section =  $150 \text{ mm}^2$ , mean diameter of end Ring = 18 cm, Resistivity of copper =  $0.021 \text{ mm}^2/\text{m}$ . Assume that stator mmf = rotor mmf.
  - c) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 5 KVA, 11 KV/400 V, 50 Hz, single phase distribution transformer. The net copper area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for core, a flux density of 1 web/sq.m., current density of 1.4 A/Sq. mm, window space factor of 0.2 and ratio of window height to width is 3.

Set P



## SECTION – II

4. Answer **any four** questions : **(4×5=20)**

- Define the terms specific magnetic loading and specific electric load and derive the output equation of a single phase induction motor.
- Draw a neat circuit diagram for shaded pole single phase induction motor, explain in brief its working principle and construction.
- Explain the rotor design of single phase induction motor.
- What are different types of pole constructions used for salient pole alternator ?
- Calculate the main dimensions of a 370 W, single phase induction motor in mm at 1430 rpm. The available supply is 230 V at 50 Hz 4-pole, its efficiency is 0.65 and power factor is 0.62.
- Find the main dimensions of a 3000 KVA, 6.6 KV, 50 Hz, 187.5 rpm, 3-phase water wheel generator. The average gap density is 0.6 web/m<sup>2</sup> and ampere conductor per meter are 34000. Use circular poles with ratio of core length to pole pitch = 0.65.

5. Answer **any two** questions : **(2×10=20)**

- State and explain different leakage reactance in case of single phase induction motor.
- Determine the overall dimensions of 200 KVA, 6600/440 V, three phase and 50 Hz core type transformer. Using following data :  
Emf per turn = 10V, Maximum flux density = 1.3 wb/sq.m., current density = 2.5 A/mm<sup>2</sup> Kw = 0.3, stacking factor = 0.9, overall height = overall width, use three stepped core for which width of largest stamping is 0.9 d.  $A_i = 0.6d^2$ .
- Explain double revolving field theory and based on the same draw the equivalent circuit diagram of single phase induction motor, hence show that

$$Z_f = \frac{j \frac{X_m}{2} \left( \frac{r'_2}{S} + jX'_2 \right)}{\frac{r'_2}{S} + j \left( \frac{X_m}{2} + X'_2 \right)}; Z_b = \frac{j \frac{X_m}{2} \left( \frac{r'_2}{2-S} + jX'_2 \right)}{\frac{r'_2}{2-S} + j \left( \frac{X_m}{2} + X'_2 \right)}$$


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**B.E. (E&E) (Part – II) Examination, 2017  
ELECTRICAL MACHINE DESIGN**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

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 Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) A synchronous motor will have  
A) 2 slip rings      B) 3 slip rings      C) No slip ring      D) Four slip rings
- 2) Turbo alternators have  
A) Large diameter and large core length  
B) Small diameter and small core length  
C) Small diameter and large core length  
D) Large diameter and small core length
- 3) In an induction motor air gap is increased  
A) Speed will reduce      B) Efficiency will improve  
C) Power factor will be lowered      D) Breakdown torque will reduce
- 4) Transformer action requires a  
A) Constant magnetic flux      B) Increasing magnetic flux  
C) Alternating magnetic flux      D) Alternating electric flux
- 5) Specific magnetic loading is not governed by  
A) Heating      B) Speed of machine  
C) Machine size      D) Magnetizing current
- 6) High current density increases  
A) Copper cost      B) Copper loss      C) Efficiency      D) None of the above
- 7) The rotor slots in 3 phase induction motor are kept inclined. This Phenomenon is known as  
A) Skewing      B) Crawling      C) Cogging      D) None of the above
- 8) Transformer-core laminations are made of  
A) Cast iron      B) Silicon steel      C) Wrought iron      D) Cast steel

P.T.O.





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**B.E. (E&E) (Part – II) Examination, 2017  
ELECTRICAL MACHINE DESIGN**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** questions : **(4×5=20)**
- a) Explain the design of cooling tubes for the transformer.
  - b) Derive the output equation of three phase transformer. State assumptions made.
  - c) Explain the choice of flux density and choice of current density for transformer.
  - d) A single phase 400 V, 50 Hz transformer is built from stampings having a relative permeability of 1000. The length of the flux path is 2.5 m, the area of cross section of the core is  $2.5 \times 10^{-3} \text{ m}^2$  and the primary winding has 800 turns. Estimate the maximum flux and no load current of the transformer.
  - e) Discuss the factors which governs the choice (selection) of specific loadings for a 3 phase induction motor.
  - f) Find the current in the bars and end rings of a cage rotor of a 6 pole 3 phase squirrel cage induction motor having 72 stator slots with 15 conductors in each slot, if the stator current per phase is 24.1 and rotor slots are 55. The coil span is 11 slots and the phase spread is  $60^\circ$ . The power factor is 0.83.
3. Answer **any two** questions : **(2×10=20)**
- a) Derive the expression for leakage reactance for transformer. State assumptions made.
  - b) Calculate the equivalent resistance per phase of the rotor referred to the stator of a squirrel cage induction motor given the following data :  
Stator : Voltage/phase = 400 V, No. of phases = 3, No. of poles = 4, Frequency = 50 Hz, slots = 48, Conductors/slot = 30,  $\cos \phi = 0.958$ .  
Rotor : slots = 53, conductors/slot = 1, Area of bar =  $60 \text{ mm}^2$ , length of Bar = 12 cm, end ring cross-section =  $150 \text{ mm}^2$ , mean diameter of end Ring = 18 cm, Resistivity of copper =  $0.021 \text{ mm}^2/\text{m}$ . Assume that stator mmf = rotor mmf.
  - c) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 5 KVA, 11 KV/400 V, 50 Hz, single phase distribution transformer. The net copper area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for core, a flux density of 1 web/sq.m., current density of 1.4 A/Sq. mm, window space factor of 0.2 and ratio of window height to width is 3.

Set Q



## SECTION – II

4. Answer **any four** questions : **(4×5=20)**

- Define the terms specific magnetic loading and specific electric load and derive the output equation of a single phase induction motor.
- Draw a neat circuit diagram for shaded pole single phase induction motor, explain in brief its working principle and construction.
- Explain the rotor design of single phase induction motor.
- What are different types of pole constructions used for salient pole alternator ?
- Calculate the main dimensions of a 370 W, single phase induction motor in mm at 1430 rpm. The available supply is 230 V at 50 Hz 4-pole, its efficiency is 0.65 and power factor is 0.62.
- Find the main dimensions of a 3000 KVA, 6.6 KV, 50 Hz, 187.5 rpm, 3-phase water wheel generator. The average gap density is 0.6 web/m<sup>2</sup> and ampere conductor per meter are 34000. Use circular poles with ratio of core length to pole pitch = 0.65.

5. Answer **any two** questions : **(2×10=20)**

- State and explain different leakage reactance in case of single phase induction motor.
- Determine the overall dimensions of 200 KVA, 6600/440 V, three phase and 50 Hz core type transformer. Using following data :  
Emf per turn = 10V, Maximum flux density = 1.3 wb/sq.m., current density = 2.5 A/mm<sup>2</sup> Kw = 0.3, stacking factor = 0.9, overall height = overall width, use three stepped core for which width of largest stamping is 0.9 d. Ai = 0.6d<sup>2</sup>.
- Explain double revolving field theory and based on the same draw the equivalent circuit diagram of single phase induction motor, hence show that

$$Z_f = \frac{j \frac{X_m}{2} \left( \frac{r'_2}{S} + jX'_2 \right)}{\frac{r'_2}{S} + j \left( \frac{X_m}{2} + X'_2 \right)}; Z_b = \frac{j \frac{X_m}{2} \left( \frac{r'_2}{2-S} + jX'_2 \right)}{\frac{r'_2}{2-S} + j \left( \frac{X_m}{2} + X'_2 \right)}$$


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SLR-TJ – 476

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**B.E. (E&E) (Part – II) Examination, 2017  
ELECTRICAL MACHINE DESIGN**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

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 Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) For a overall good design of 3 phase induction motor should have =  $L/T$   
A) 1.5                      B) 1.5 to 2                      C) 1.0                      D) 0.8
- 2) Small air gap length in an induction motor yields \_\_\_\_\_ power factor and \_\_\_\_\_ noise.  
A) Good, increased                      B) Poor, increased  
C) Good, reduced                      D) Poor, reduced
- 3) To avoid cogging in induction motor the difference between stator slots and rotor slots should not be equal to  
A) 3 P                      B) 5 P                      C) 2 P                      D) P
- 4) Deep and narrow slots are used in 3 phase induction motors for getting  
A) High power factor                      B) Reduced noise level  
C) High starting torque                      D) High efficiency
- 5) Higher value of current density can be adopted for  
A) Forced air cooled transformer  
B) Oil immersed self (natural) cooled type transformer  
C) Natural oil, forced air type transformer  
D) Oil forced, water forced type transformer
- 6) A synchronous motor will have  
A) 2 slip rings                      B) 3 slip rings                      C) No slip ring                      D) Four slip rings
- 7) Turbo alternators have  
A) Large diameter and large core length  
B) Small diameter and small core length  
C) Small diameter and large core length  
D) Large diameter and small core length

P.T.O.



- 8) In an induction motor air gap is increased  
A) Speed will reduce                      B) Efficiency will improve  
C) Power factor will be lowered        D) Breakdown torque will reduce
- 9) Transformer action requires a  
A) Constant magnetic flux                B) Increasing magnetic flux  
C) Alternating magnetic flux            D) Alternating electric flux
- 10) Specific magnetic loading is not governed by  
A) Heating                                    B) Speed of machine  
C) Machine size                              D) Magnetizing current
- 11) High current density increases  
A) Copper cost    B) Copper loss    C) Efficiency        D) None of the above
- 12) The rotor slots in 3 phase induction motor are kept inclined. This Phenomenon is known as  
A) Skewing            B) Crawling            C) Cogging            D) None of the above
- 13) Transformer-core laminations are made of  
A) Cast iron            B) Silicon steel        C) Wrought iron    D) Cast steel
- 14) Line joining tangent and torque line in a circle diagram gives  
A) Copper loss                              B) Stator loss  
C) Maximum output                        D) Maximum torque
- 15) The effect of harmonics in rotating machines can be minimized by  
A) Use of longer air gap                    B) Skewing the poles  
C) Use of distributed winding              D) All of the above
- 16) Current density in rotor bars of an induction motor is  
A) 3 – 4 A/mm<sup>2</sup>    B) 4 – 7 A/mm<sup>2</sup>    C) 3 – 10 A/mm<sup>2</sup>    D) 10 – 15 A/mm<sup>2</sup>
- 17) In a transformer with cruciform core the net iron area is  
A) 0.45 d<sup>2</sup>            B) 0.6 d<sup>2</sup>            C) 0.62 d<sup>2</sup>            D) 0.56 d<sup>2</sup>
- 18) The core and winding of a transformer dissipate heat to surrounding by  
A) Convection    B) Conduction    C) Radiation        D) All of these
- 19) A single phase shell type distribution transformer has sandwich type winding because to  
A) save copper                                B) improve voltage regulation  
C) reduce leakage reactance              D) both B) and C)
- 20) When a 3 phase induction motor is designed with higher values of  $B_{av}$  it will provide  
A) Better full load p.f.                      B) A higher starting torque  
C) Higher full load efficiency              D) High overload capacity
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**B.E. (E&E) (Part – II) Examination, 2017  
ELECTRICAL MACHINE DESIGN**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** questions : **(4×5=20)**
- a) Explain the design of cooling tubes for the transformer.
  - b) Derive the output equation of three phase transformer. State assumptions made.
  - c) Explain the choice of flux density and choice of current density for transformer.
  - d) A single phase 400 V, 50 Hz transformer is built from stampings having a relative permeability of 1000. The length of the flux path is 2.5 m, the area of cross section of the core is  $2.5 \times 10^{-3} \text{ m}^2$  and the primary winding has 800 turns. Estimate the maximum flux and no load current of the transformer.
  - e) Discuss the factors which governs the choice (selection) of specific loadings for a 3 phase induction motor.
  - f) Find the current in the bars and end rings of a cage rotor of a 6 pole 3 phase squirrel cage induction motor having 72 stator slots with 15 conductors in each slot, if the stator current per phase is 24.1 and rotor slots are 55. The coil span is 11 slots and the phase spread is  $60^\circ$ . The power factor is 0.83.
3. Answer **any two** questions : **(2×10=20)**
- a) Derive the expression for leakage reactance for transformer. State assumptions made.
  - b) Calculate the equivalent resistance per phase of the rotor referred to the stator of a squirrel cage induction motor given the following data :  
Stator : Voltage/phase = 400 V, No. of phases = 3, No. of poles = 4, Frequency = 50 Hz, slots = 48, Conductors/slot = 30, Kw = 0.958.  
Rotor : slots = 53, conductors/slot = 1, Area of bar =  $60 \text{ mm}^2$ , length of Bar = 12 cm, end ring cross-section =  $150 \text{ mm}^2$ , mean diameter of end Ring = 18 cm, Resistivity of copper =  $0.021 \text{ mm}^2/\text{m}$ . Assume that stator mmf = rotor mmf.
  - c) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 5 KVA, 11 KV/400 V, 50 Hz, single phase distribution transformer. The net copper area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for core, a flux density of 1 web/sq.m., current density of 1.4 A/Sq. mm, window space factor of 0.2 and ratio of window height to width is 3.

Set R



## SECTION – II

4. Answer **any four** questions : **(4×5=20)**

- a) Define the terms specific magnetic loading and specific electric load and derive the output equation of a single phase induction motor.
- b) Draw a neat circuit diagram for shaded pole single phase induction motor, explain in brief its working principle and construction.
- c) Explain the rotor design of single phase induction motor.
- d) What are different types of pole constructions used for salient pole alternator ?
- e) Calculate the main dimensions of a 370 W, single phase induction motor in mm at 1430 rpm. The available supply is 230 V at 50 Hz 4-pole, its efficiency is 0.65 and power factor is 0.62.
- f) Find the main dimensions of a 3000 KVA, 6.6 KV, 50 Hz, 187.5 rpm, 3-phase water wheel generator. The average gap density is 0.6 web/m<sup>2</sup> and ampere conductor per meter are 34000. Use circular poles with ratio of core length to pole pitch = 0.65.

5. Answer **any two** questions : **(2×10=20)**

- a) State and explain different leakage reactance in case of single phase induction motor.
- b) Determine the overall dimensions of 200 KVA, 6600/440 V, three phase and 50 Hz core type transformer. Using following data :  
 Emf per turn = 10V, Maximum flux density = 1.3 wb/sq.m.,  
 current density = 2.5 A/mm<sup>2</sup> Kw = 0.3, stacking factor = 0.9, overall height = overall width, use three stepped core for which width of largest stamping is 0.9 d.  
 $A_i = 0.6d^2$ .
- c) Explain double revolving field theory and based on the same draw the equivalent circuit diagram of single phase induction motor, hence show that

$$Z_f = \frac{j \frac{X_m}{2} \left( \frac{r'_2}{S} + jX'_2 \right)}{\frac{r'_2}{S} + j \left( \frac{X_m}{2} + X'_2 \right)}; Z_b = \frac{j \frac{X_m}{2} \left( \frac{r'_2}{2-S} + jX'_2 \right)}{\frac{r'_2}{2-S} + j \left( \frac{X_m}{2} + X'_2 \right)}$$


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**B.E. (E&E) (Part – II) Examination, 2017  
ELECTRICAL MACHINE DESIGN**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

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 Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) Current density in rotor bars of an induction motor is  
A) 3 – 4 A/mm<sup>2</sup>    B) 4 – 7 A/mm<sup>2</sup>    C) 3 – 10 A/mm<sup>2</sup>    D) 10 – 15 A/mm<sup>2</sup>
- 2) In a transformer with cruciform core the net iron area is  
A) 0.45 d<sup>2</sup>    B) 0.6 d<sup>2</sup>    C) 0.62 d<sup>2</sup>    D) 0.56 d<sup>2</sup>
- 3) The core and winding of a transformer dissipate heat to surrounding by  
A) Convection    B) Conduction    C) Radiation    D) All of these
- 4) A single phase shell type distribution transformer has sandwich type winding because to  
A) save copper    B) improve voltage regulation  
C) reduce leakage reactance    D) both B) and C)
- 5) When a 3 phase induction motor is designed with higher values of  $B_{av}$  it will provide  
A) Better full load p.f.    B) A higher starting torque  
C) Higher full load efficiency    D) High overload capacity
- 6) For a overall good design of 3 phase induction motor should have  $\frac{L}{T}$   
A) 1.5    B) 1.5 to 2    C) 1.0    D) 0.8
- 7) Small air gap length in an induction motor yields \_\_\_\_\_ power factor and \_\_\_\_\_ noise.  
A) Good, increased    B) Poor, increased  
C) Good, reduced    D) Poor, reduced
- 8) To avoid cogging in induction motor the difference between stator slots and rotor slots should not be equal to  
A) 3 P    B) 5 P    C) 2 P    D) P

P.T.O.





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**B.E. (E&E) (Part – II) Examination, 2017  
ELECTRICAL MACHINE DESIGN**

Day and Date : Wednesday, 22-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** questions : **(4×5=20)**
- a) Explain the design of cooling tubes for the transformer.
  - b) Derive the output equation of three phase transformer. State assumptions made.
  - c) Explain the choice of flux density and choice of current density for transformer.
  - d) A single phase 400 V, 50 Hz transformer is built from stampings having a relative permeability of 1000. The length of the flux path is 2.5 m, the area of cross section of the core is  $2.5 \times 10^{-3} \text{ m}^2$  and the primary winding has 800 turns. Estimate the maximum flux and no load current of the transformer.
  - e) Discuss the factors which governs the choice (selection) of specific loadings for a 3 phase induction motor.
  - f) Find the current in the bars and end rings of a cage rotor of a 6 pole 3 phase squirrel cage induction motor having 72 stator slots with 15 conductors in each slot, if the stator current per phase is 24.1 and rotor slots are 55. The coil span is 11 slots and the phase spread is  $60^\circ$ . The power factor is 0.83.
3. Answer **any two** questions : **(2×10=20)**
- a) Derive the expression for leakage reactance for transformer. State assumptions made.
  - b) Calculate the equivalent resistance per phase of the rotor referred to the stator of a squirrel cage induction motor given the following data :  
Stator : Voltage/phase = 400 V, No. of phases = 3, No. of poles = 4, Frequency = 50 Hz, slots = 48, Conductors/slot = 30, Kw = 0.958.  
Rotor : slots = 53, conductors/slot = 1, Area of bar =  $60 \text{ mm}^2$ , length of Bar = 12 cm, end ring cross-section =  $150 \text{ mm}^2$ , mean diameter of end Ring = 18 cm, Resistivity of copper =  $0.021 \text{ mm}^2/\text{m}$ . Assume that stator mmf = rotor mmf.
  - c) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 5 KVA, 11 KV/400 V, 50 Hz, single phase distribution transformer. The net copper area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for core, a flux density of 1 web/sq.m., current density of 1.4 A/Sq. mm, window space factor of 0.2 and ratio of window height to width is 3.



## SECTION – II

4. Answer **any four** questions : **(4×5=20)**

- Define the terms specific magnetic loading and specific electric load and derive the output equation of a single phase induction motor.
- Draw a neat circuit diagram for shaded pole single phase induction motor, explain in brief its working principle and construction.
- Explain the rotor design of single phase induction motor.
- What are different types of pole constructions used for salient pole alternator ?
- Calculate the main dimensions of a 370 W, single phase induction motor in mm at 1430 rpm. The available supply is 230 V at 50 Hz 4-pole, its efficiency is 0.65 and power factor is 0.62.
- Find the main dimensions of a 3000 KVA, 6.6 KV, 50 Hz, 187.5 rpm, 3-phase water wheel generator. The average gap density is 0.6 web/m<sup>2</sup> and ampere conductor per meter are 34000. Use circular poles with ratio of core length to pole pitch = 0.65.

5. Answer **any two** questions : **(2×10=20)**

- State and explain different leakage reactance in case of single phase induction motor.
- Determine the overall dimensions of 200 KVA, 6600/440 V, three phase and 50 Hz core type transformer. Using following data :  
Emf per turn = 10V, Maximum flux density = 1.3 wb/sq.m., current density = 2.5 A/mm<sup>2</sup> Kw = 0.3, stacking factor = 0.9, overall height = overall width, use three stepped core for which width of largest stamping is 0.9 d.  $A_i = 0.6d^2$ .
- Explain double revolving field theory and based on the same draw the equivalent circuit diagram of single phase induction motor, hence show that

$$Z_f = \frac{j \frac{X_m}{2} \left( \frac{r'_2}{S} + jX'_2 \right)}{\frac{r'_2}{S} + j \left( \frac{X_m}{2} + X'_2 \right)}; Z_b = \frac{j \frac{X_m}{2} \left( \frac{r'_2}{2-S} + jX'_2 \right)}{\frac{r'_2}{2-S} + j \left( \frac{X_m}{2} + X'_2 \right)}$$


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**B.E. (E&E) (Part – II) Examination, 2017**  
**ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

**N.B. :** 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=20)

- 1) Which of the skill is most needed for top-level managers ?
  - a) Technical and human
  - b) Technical and conceptual
  - c) Only human
  - d) Human and conceptual
- 2) A manager who acts as a crises manager is playing which of the roles ?
  - a) Resource allocator
  - b) Disturbance handler
  - c) Entrepreneur
  - d) Negotiator
- 3) The father of scientific management is
  - a) Henri Fayol
  - b) Frederick Winslow Taylor
  - c) Frank Gilbert
  - d) H. Emerson
- 4) Scientific management focused on
  - a) One best way to solve operating problems
  - b) Standardization of working conditions
  - c) Scientific selection procedures
  - d) All of the above
- 5) Planning is
  - a) Measurement and correction of the performance of subordinates
  - b) Selection from among alternative of future courses of action
  - c) What is to be done within a time frame
  - d) Getting things done through others
- 6) A joint stock company consist of more than \_\_\_\_\_ persons.
  - a) 10
  - b) 20
  - c) 30
  - d) No limitations
- 7) The industries in which investments in plant and machinery does not exceeded Rs. 25 lakhs is called as
  - a) Cottage industry
  - b) Tiny industry
  - c) Small scale industry
  - d) Ancillary unit
- 8) To earn more profit the capital should be
  - a) Maximised
  - b) Minimised
  - c) Same
  - d) Can't say

P.T.O.



- 9) In \_\_\_\_\_ concept product enjoy the supreme importance.  
a) Selling                      b) Marketing                      c) Advertising                      d) Distribution
- 10) Private company can raise capital  
a) By selling share                      b) By public borrowing  
c) By both above                      d) By none of the above
- 11) Line organization is  
a) Organization run by top management                      b) Organization run by only workers  
c) Both a) and b)                      d) None of above
- 12) Managing is best defined as  
a) Decision making  
b) Getting things done through sub-ordinates  
c) Planning  
d) Creating a climate conducive to goal accomplishment
- 13) Factors of production are  
a) Input and output  
b) Output only  
c) Input only  
d) The minimum set of inputs that can produce a certain fixed quantity output
- 14) Maintenance problems are more prone to decision under  
a) Certainty                      b) Risk                      c) Uncertainty                      d) Ambiguity
- 15) A test of sound objective is  
a) It is too low                      b) It is complex  
c) It is set for long term period                      d) It is specific
- 16) Pooled decision making is  
a) Taking decision by pooling several problems  
b) Taking decision by pooling long term impacts  
c) Taking decision by pooling authority of managers  
d) Taking decision by pooling up programmed decisions
- 17) Objective should be set by  
a) The board of directors  
b) Middle management  
c) Level authorized to initiate and approve of program  
d) Lower management
- 18) In \_\_\_\_\_ function of management the actual performance of sub-ordinates is guided towards common goal.  
a) Staffing                      b) Controlling                      c) Leadership                      d) Directing
- 19) Improved technology shall bring out  
a) Increase in cost of production                      b) Increase in demand  
c) Increase in scale of production                      d) None of above
- 20) The three dimensions of learning organization are  
a) Staff, style and skills  
b) Creative tension, systems thinking and culture facilitations  
c) Open systems, boundaries and closed systems  
d) None of the above



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**B.E. (E&E) (Part – II) Examination, 2017**  
**ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

- N.B.** : 1) **All questions are compulsory.**  
2) **Figures to the right indicate full marks.**

SECTION – I

2. a) Explain make and buy decision. 5  
b) Explain five year plan in Indian economy. 5  
3. Explain in details tools of engineering economics. 10

OR

What are the types of business organizations ? Explain private and public organization with its advantages and disadvantages. 10

4. Write short notes on **any four** : (5×4=20)  
a) Break Even Analysis.  
b) Line and staff organization.  
c) Economic Lot (Batch) size.  
d) Joint stock company.  
e) Value engineering.

**Set P**



SECTION – II

5. Explain functions of management in details. **10**
6. Explain entrepreneur and entrepreneurship. **10**

OR

Explain the various steps and procedures for setting small scale industry. **10**

7. Write short notes on **any four** : **(5×4=20)**
- a) Management information system.
  - b) Industrial safety.
  - c) Project planning tools.
  - d) Tiny industry.
  - e) Cottage industry.
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**B.E. (E&E) (Part – II) Examination, 2017**  
**ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

- N.B.** : 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=20)

- 1) Pooled decision making is
  - a) Taking decision by pooling several problems
  - b) Taking decision by pooling long term impacts
  - c) Taking decision by pooling authority of managers
  - d) Taking decision by pooling up programmed decisions
- 2) Objective should be set by
  - a) The board of directors
  - b) Middle management
  - c) Level authorized to initiate and approve of program
  - d) Lower management
- 3) In \_\_\_\_\_ function of management the actual performance of sub-ordinates is guided towards common goal.
  - a) Staffing
  - b) Controlling
  - c) Leadership
  - d) Directing
- 4) Improved technology shall bring out
  - a) Increase in cost of production
  - b) Increase in demand
  - c) Increase in scale of production
  - d) None of above
- 5) The three dimensions of learning organization are
  - a) Staff, style and skills
  - b) Creative tension, systems thinking and culture facilitations
  - c) Open systems, boundaries and closed systems
  - d) None of the above
- 6) Which of the skill is most needed for top-level managers ?
  - a) Technical and human
  - b) Technical and conceptual
  - c) Only human
  - d) Human and conceptual
- 7) A manager who acts as a crises manager is playing which of the roles ?
  - a) Resource allocator
  - b) Disturbance handler
  - c) Entrepreneur
  - d) Negotiator

P.T.O.



- 8) The father of scientific management is  
a) Henri Fayol  
b) Frederick Winslow Taylor  
c) Frank Gilbert  
d) H. Emerson
- 9) Scientific management focused on  
a) One best way to solve operating problems  
b) Standardization of working conditions  
c) Scientific selection procedures  
d) All of the above
- 10) Planning is  
a) Measurement and correction of the performance of subordinates  
b) Selection from among alternative of future courses of action  
c) What is to be done within a time frame  
d) Getting things done through others
- 11) A joint stock company consist of more than \_\_\_\_\_ persons.  
a) 10  
b) 20  
c) 30  
d) No limitations
- 12) The industries in which investments in plant and machinery does not exceeded Rs. 25 lakhs is called as  
a) Cottage industry  
b) Tiny industry  
c) Small scale industry  
d) Ancillary unit
- 13) To earn more profit the capital should be  
a) Maximised  
b) Minimised  
c) Same  
d) Can't say
- 14) In \_\_\_\_\_ concept product enjoy the supreme importance.  
a) Selling  
b) Marketing  
c) Advertising  
d) Distribution
- 15) Private company can raise capital  
a) By selling share  
b) By public borrowing  
c) By both above  
d) By none of the above
- 16) Line organization is  
a) Organization run by top management  
b) Organization run by only workers  
c) Both a) and b)  
d) None of above
- 17) Managing is best defined as  
a) Decision making  
b) Getting things done through sub-ordinates  
c) Planning  
d) Creating a climate conducive to goal accomplishment
- 18) Factors of production are  
a) Input and output  
b) Output only  
c) Input only  
d) The minimum set of inputs that can produce a certain fixed quantity output
- 19) Maintenance problems are more prone to decision under  
a) Certainty  
b) Risk  
c) Uncertainty  
d) Ambiguity
- 20) A test of sound objective is  
a) It is too low  
b) It is complex  
c) It is set for long term period  
d) It is specific



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**B.E. (E&E) (Part – II) Examination, 2017**  
**ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

- N.B.** : 1) **All questions are compulsory.**  
2) **Figures to the right indicate full marks.**

SECTION – I

2. a) Explain make and buy decision. 5  
b) Explain five year plan in Indian economy. 5  
3. Explain in details tools of engineering economics. 10

OR

What are the types of business organizations ? Explain private and public organization with its advantages and disadvantages. 10

4. Write short notes on **any four** : (5×4=20)  
a) Break Even Analysis.  
b) Line and staff organization.  
c) Economic Lot (Batch) size.  
d) Joint stock company.  
e) Value engineering.

**Set Q**



SECTION – II

5. Explain functions of management in details. **10**
6. Explain entrepreneur and entrepreneurship. **10**

OR

Explain the various steps and procedures for setting small scale industry. **10**

7. Write short notes on **any four** : **(5×4=20)**
- a) Management information system.
  - b) Industrial safety.
  - c) Project planning tools.
  - d) Tiny industry.
  - e) Cottage industry.
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**B.E. (E&E) (Part – II) Examination, 2017**  
**ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

**N.B.** : 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=20)

- 1) Line organization is
  - a) Organization run by top management
  - b) Organization run by only workers
  - c) Both a) and b)
  - d) None of above
- 2) Managing is best defined as
  - a) Decision making
  - b) Getting things done through sub-ordinates
  - c) Planning
  - d) Creating a climate conducive to goal accomplishment
- 3) Factors of production are
  - a) Input and output
  - b) Output only
  - c) Input only
  - d) The minimum set of inputs that can produce a certain fixed quantity output
- 4) Maintenance problems are more prone to decision under
  - a) Certainty
  - b) Risk
  - c) Uncertainty
  - d) Ambiguity
- 5) A test of sound objective is
  - a) It is too low
  - b) It is complex
  - c) It is set for long term period
  - d) It is specific
- 6) Pooled decision making is
  - a) Taking decision by pooling several problems
  - b) Taking decision by pooling long term impacts
  - c) Taking decision by pooling authority of managers
  - d) Taking decision by pooling up programmed decisions
- 7) Objective should be set by
  - a) The board of directors
  - b) Middle management
  - c) Level authorized to initiate and approve of program
  - d) Lower management

P.T.O.



- 8) In \_\_\_\_\_ function of management the actual performance of sub-ordinates is guided towards common goal.  
a) Staffing                      b) Controlling                      c) Leadership                      d) Directing
- 9) Improved technology shall bring out  
a) Increase in cost of production                      b) Increase in demand  
c) Increase in scale of production                      d) None of above
- 10) The three dimensions of learning organization are  
a) Staff, style and skills  
b) Creative tension, systems thinking and culture facilitations  
c) Open systems, boundaries and closed systems  
d) None of the above
- 11) Which of the skill is most needed for top-level managers ?  
a) Technical and human                      b) Technical and conceptual  
c) Only human                      d) Human and conceptual
- 12) A manager who acts as a crises manager is playing which of the roles ?  
a) Resource allocator                      b) Disturbance handler  
c) Entrepreneur                      d) Negotiator
- 13) The father of scientific management is  
a) Henri Fayol                      b) Frederick Winslow Taylor  
c) Frank Gilbert                      d) H. Emerson
- 14) Scientific management focused on  
a) One best way to solve operating problems                      b) Standardization of working conditions  
c) Scientific selection procedures                      d) All of the above
- 15) Planning is  
a) Measurement and correction of the performance of subordinates  
b) Selection from among alternative of future courses of action  
c) What is to be done within a time frame  
d) Getting things done through others
- 16) A joint stock company consist of more than \_\_\_\_\_ persons.  
a) 10                      b) 20                      c) 30                      d) No limitations
- 17) The industries in which investments in plant and machinery does not exceeded Rs. 25 lakhs is called as  
a) Cottage industry                      b) Tiny industry  
c) Small scale industry                      d) Ancillary unit
- 18) To earn more profit the capital should be  
a) Maximised                      b) Minimised                      c) Same                      d) Can't say
- 19) In \_\_\_\_\_ concept product enjoy the supreme importance.  
a) Selling                      b) Marketing                      c) Advertising                      d) Distribution
- 20) Private company can raise capital  
a) By selling share                      b) By public borrowing  
c) By both above                      d) By none of the above



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**B.E. (E&E) (Part – II) Examination, 2017**  
**ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

- N.B.** : 1) **All questions are compulsory.**  
2) **Figures to the right indicate full marks.**

SECTION – I

2. a) Explain make and buy decision. 5  
b) Explain five year plan in Indian economy. 5  
3. Explain in details tools of engineering economics. 10

OR

What are the types of business organizations ? Explain private and public organization with its advantages and disadvantages. 10

4. Write short notes on **any four** : (5×4=20)  
a) Break Even Analysis.  
b) Line and staff organization.  
c) Economic Lot (Batch) size.  
d) Joint stock company.  
e) Value engineering.

**Set R**



SECTION – II

5. Explain functions of management in details. **10**
6. Explain entrepreneur and entrepreneurship. **10**

OR

Explain the various steps and procedures for setting small scale industry. **10**

7. Write short notes on **any four** : **(5×4=20)**
- a) Management information system.
  - b) Industrial safety.
  - c) Project planning tools.
  - d) Tiny industry.
  - e) Cottage industry.
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**B.E. (E&E) (Part – II) Examination, 2017**  
**ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Max. Marks : 100

**N.B.** : 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=20)

- 1) A joint stock company consist of more than \_\_\_\_\_ persons.  
a) 10                                      b) 20                                      c) 30                                      d) No limitations
- 2) The industries in which investments in plant and machinery does not exceeded Rs. 25 lakhs is called as  
a) Cottage industry                                      b) Tiny industry  
c) Small scale industry                                      d) Ancillary unit
- 3) To earn more profit the capital should be  
a) Maximised                                      b) Minimised                                      c) Same                                      d) Can't say
- 4) In \_\_\_\_\_ concept product enjoy the supreme importance.  
a) Selling                                      b) Marketing                                      c) Advertising                                      d) Distribution
- 5) Private company can raise capital  
a) By selling share                                      b) By public borrowing  
c) By both above                                      d) By none of the above
- 6) Line organization is  
a) Organization run by top management                                      b) Organization run by only workers  
c) Both a) and b)                                      d) None of above
- 7) Managing is best defined as  
a) Decision making  
b) Getting things done through sub-ordinates  
c) Planning  
d) Creating a climate conducive to goal accomplishment
- 8) Factors of production are  
a) Input and output  
b) Output only  
c) Input only  
d) The minimum set of inputs that can produce a certain fixed quantity output

P.T.O.



- 9) Maintenance problems are more prone to decision under  
a) Certainty                      b) Risk                      c) Uncertainty                      d) Ambiguity
- 10) A test of sound objective is  
a) It is too low                      b) It is complex  
c) It is set for long term period                      d) It is specific
- 11) Pooled decision making is  
a) Taking decision by pooling several problems  
b) Taking decision by pooling long term impacts  
c) Taking decision by pooling authority of managers  
d) Taking decision by pooling up programmed decisions
- 12) Objective should be set by  
a) The board of directors  
b) Middle management  
c) Level authorized to initiate and approve of program  
d) Lower management
- 13) In \_\_\_\_\_ function of management the actual performance of sub-ordinates is guided towards common goal.  
a) Staffing                      b) Controlling                      c) Leadership                      d) Directing
- 14) Improved technology shall bring out  
a) Increase in cost of production                      b) Increase in demand  
c) Increase in scale of production                      d) None of above
- 15) The three dimensions of learning organization are  
a) Staff, style and skills  
b) Creative tension, systems thinking and culture facilitations  
c) Open systems, boundaries and closed systems  
d) None of the above
- 16) Which of the skill is most needed for top-level managers ?  
a) Technical and human                      b) Technical and conceptual  
c) Only human                      d) Human and conceptual
- 17) A manager who acts as a crises manager is playing which of the roles ?  
a) Resource allocator                      b) Disturbance handler  
c) Entrepreneur                      d) Negotiator
- 18) The father of scientific management is  
a) Henri Fayol                      b) Frederick Winslow Taylor  
c) Frank Gilbert                      d) H. Emerson
- 19) Scientific management focused on  
a) One best way to solve operating problems                      b) Standardization of working conditions  
c) Scientific selection procedures                      d) All of the above
- 20) Planning is  
a) Measurement and correction of the performance of subordinates  
b) Selection from among alternative of future courses of action  
c) What is to be done within a time frame  
d) Getting things done through others



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**B.E. (E&E) (Part – II) Examination, 2017**  
**ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT**

Day and Date : Thursday, 23-11-2017  
Time : 3.00 p.m. to 6.00 p.m.

Marks : 80

- N.B.** : 1) **All questions are compulsory.**  
2) **Figures to the right indicate full marks.**

SECTION – I

2. a) Explain make and buy decision. 5  
b) Explain five year plan in Indian economy. 5  
3. Explain in details tools of engineering economics. 10

OR

What are the types of business organizations ? Explain private and public organization with its advantages and disadvantages. 10

4. Write short notes on **any four** : (5×4=20)  
a) Break Even Analysis.  
b) Line and staff organization.  
c) Economic Lot (Batch) size.  
d) Joint stock company.  
e) Value engineering.

**Set S**



SECTION – II

5. Explain functions of management in details. **10**
6. Explain entrepreneur and entrepreneurship. **10**

OR

Explain the various steps and procedures for setting small scale industry. **10**

7. Write short notes on **any four** : **(5×4=20)**
- a) Management information system.
  - b) Industrial safety.
  - c) Project planning tools.
  - d) Tiny industry.
  - e) Cottage industry.
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**B.E. (Electrical & Electronics Engineering) (Part – II) Examination, 2017  
Elective – II : ENERGY CONSERVATION AND AUDITING**

Day and Date : Friday, 24-11-2017

Max. Marks : 100

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

- N.B. :**
- 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 :

(1×20=20)

- 1) In material balance of a process, recycle product is always considered as
  - a) Input to process
  - b) Output to process
  - c) Both (a) and (b)
  - d) None of above
- 2) Sankey diagram is an useful tool to represent
  - a) Financial strength of the company
  - b) Management philosophy
  - c) Input and output energy flow the company
  - d) Human resource strength of the company
- 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 policy
- 4) The energy used by any manufacturing process varies with
  - a) Production volume
  - b) Type of process
  - c) Resource input
  - d) All the above
- 5) What determines the thermal loading on the motor ?
  - a) Duty/Load cycle
  - b) Temperature of the winding
  - c) Age of the motor
  - d) Ambient conditions
- 6) The ozone layer in the stratosphere acts as an efficient filter for
  - a) Solar UV-B rays
  - b) X-rays
  - c) Gamma rays
  - d) UV-A rays
- 7) The force field analysis in energy action planning deals with barriers having
  - a) Positive forces only
  - b) Negative forces only
  - c) Both negative and positive forces
  - d) No force

P.T.O.



- 8) Name the Act, which is proposed to bring the qualitative transformation of the electricity sector
- a) Regulatory Commission Act 1998      b) Indian Electricity Act 1910  
c) Supply Act 1948      d) Electricity Act 2003
- 9) Which of the following is highest contributor to the air pollution ?
- a) Carbon Monoxide      b) Hydro Carbons  
c) Sulphur Oxides      d) Particulate
- 10) The heat input required for generating 'one' kilo watt-hour of electrical output is called as
- a) Efficiency      b) Heat Rate      c) Calorific Value      d) Heat value
- 11) The power loss in transmission/distribution line depends on
- a) Current in the line      b) Resistance of the line  
c) Length of the line      d) All
- 12) If the distribution voltage is raised from 11 kV to 33 kV, the line loss would be lower by a factor
- a) 1/9      b) 9      c) 3      d) None
- 13) What is specific energy consumption ?
- a) Energy consumption per month      b) Energy consumed per unit of production  
c) Energy consumption per year      d) None of the above
- 14) Sankey diagram shows in graphics
- a) Energy input      b) Energy output  
c) Energy balance      d) All the above
- 15) Which of the following is the predominant loss in furnace oil fired boiler ?
- a) Dry flue gas losses      b) Heat loss due to moisture in air  
c) Heat loss due to radiation and convection      d) Heat loss due to moisture in fuel
- 16) The unit of one lux is
- a) 1000 lumen per square feet      b) 10 lumen per square meter  
c) One lumen per square meter      d) 1 lumen per square feet
- 17) The efficiency figures for energy efficient motors (in comparison with standard efficiency motor) can be generally higher by \_\_\_\_\_ %.
- a) 1%      b) 3-7%      c) 10% and above      d) 8-10%
- 18) The speed of motor can be varied by
- a) Changing supply frequency      b) Changing no. of poles  
c) Using multi speed windings      d) All the above
- 19) The objective of material and energy balance is to assess the
- a) Input-output      b) Conversion efficiency  
c) Losses      d) All the above
- 20) A CUSUM graph follows a random fluctuation trend and oscillators around.
- a) 100      b) 100%      c) 0      d) none of the above
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**B.E. (Electrical & Electronics Engineering) (Part – II) Examination, 2017  
Elective – II : ENERGY CONSERVATION AND AUDITING**

Day and Date : Friday, 24-11-2017

Marks : 80

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

**SECTION – I**

2. Attempt **any four** : **(4×5=20)**

- A) What is energy conservation ? Explain its importance.
- B) State Energy policy statement of an organization/company with an appropriate example.
- C) Explain Supply Side management.
- D) Explain in brief what are the Elements of Monitoring and Targeting System ?
- E) Explain SCADA and automatic meter reading.

3. Attempt **any two** : **(10×2=20)**

- A) Explain Indian Electricity Act, 2003.
- B) Explain Clean Development Mechanism (CDM). How CDM Works and also explain project cycle for CDM.
- C) Responsibilities and duties to be Assigned Under the Energy Conservation Act, 2001.

**SECTION – II**

4. Attempt **any four** : **(4×5=20)**

- A) Define Energy Management and state Objectives of Energy Management.
- B) What are the direct and indirect benefits of waste heat recovery ? Give two examples of waste heat recovery.

**Set P**



- C) What are the methods of capacity control in reciprocating air compressors ?
- D) Explain Sankey diagram.
- E) Explain the need of energy audit.

5. Attempt **any two** :

**(10×2=20)**

- A) Explain briefly the difference between preliminary and detailed energy audits.
  - B) Explain the steps involved in detailed audit.
  - C) What is discounted cash flow method ? What are the advantages and disadvantages of it ?
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**B.E. (Electrical & Electronics Engineering) (Part – II) Examination, 2017  
Elective – II : ENERGY CONSERVATION AND AUDITING**

Day and Date : Friday, 24-11-2017

Max. Marks : 100

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

- N.B. :** 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 :

(1×20=20)

- 1) The unit of one lux is
  - a) 1000 lumen per square feet
  - b) 10 lumen per square meter
  - c) One lumen per square meter
  - d) 1 lumen per square feet
- 2) The efficiency figures for energy efficient motors (in comparison with standard efficiency motor) can be generally higher by \_\_\_\_\_ %.
  - a) 1%
  - b) 3-7%
  - c) 10% and above
  - d) 8-10%
- 3) The speed of motor can be varied by
  - a) Changing supply frequency
  - b) Changing no. of poles
  - c) Using multi speed windings
  - d) All the above
- 4) The objective of material and energy balance is to assess the
  - a) Input-output
  - b) Conversion efficiency
  - c) Losses
  - d) All the above
- 5) A CUSUM graph follows a random fluctuation trend and oscillators around.
  - a) 100
  - b) 100%
  - c) 0
  - d) none of the above
- 6) In material balance of a process, recycle product is always considered as
  - a) Input to process
  - b) Output to process
  - c) Both (a) and (b)
  - d) None of above
- 7) Sankey diagram is an useful tool to represent
  - a) Financial strength of the company
  - b) Management philosophy
  - c) Input and output energy flow the company
  - d) Human resource strength of the company

P.T.O.



- 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 policy
- 9) The energy used by any manufacturing process varies with
- a) Production volume
  - b) Type of process
  - c) Resource input
  - d) All the above
- 10) What determines the thermal loading on the motor ?
- a) Duty/Load cycle
  - b) Temperature of the winding
  - c) Age of the motor
  - d) Ambient conditions
- 11) The ozone layer in the stratosphere acts as an efficient filter for
- a) Solar UV-B rays
  - b) X-rays
  - c) Gamma rays
  - d) UV-A rays
- 12) The force field analysis in energy action planning deals with barriers having
- a) Positive forces only
  - b) Negative forces only
  - c) Both negative and positive forces
  - d) No force
- 13) Name the Act, which is proposed to bring the qualitative transformation of the electricity sector
- a) Regulatory Commission Act 1998
  - b) Indian Electricity Act 1910
  - c) Supply Act 1948
  - d) Electricity Act 2003
- 14) Which of the following is highest contributor to the air pollution ?
- a) Carbon Monoxide
  - b) Hydro Carbons
  - c) Sulphur Oxides
  - d) Particulate
- 15) The heat input required for generating 'one' kilo watt-hour of electrical output is called as
- a) Efficiency
  - b) Heat Rate
  - c) Calorific Value
  - d) Heat value
- 16) The power loss in transmission/distribution line depends on
- a) Current in the line
  - b) Resistance of the line
  - c) Length of the line
  - d) All
- 17) If the distribution voltage is raised from 11 kV to 33 kV, the line loss would be lower by a factor
- a) 1/9
  - b) 9
  - c) 3
  - d) None
- 18) What is specific energy consumption ?
- a) Energy consumption per month
  - b) Energy consumed per unit of production
  - c) Energy consumption per year
  - d) None of the above
- 19) Sankey diagram shows in graphics
- a) Energy input
  - b) Energy output
  - c) Energy balance
  - d) All the above
- 20) Which of the following is the predominant loss in furnace oil fired boiler ?
- a) Dry flue gas losses
  - b) Heat loss due to moisture in air
  - c) Heat loss due to radiation and convection
  - d) Heat loss due to moisture in fuel



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**B.E. (Electrical & Electronics Engineering) (Part – II) Examination, 2017  
Elective – II : ENERGY CONSERVATION AND AUDITING**

Day and Date : Friday, 24-11-2017

Marks : 80

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

**SECTION – I**

2. Attempt **any four** : **(4×5=20)**

- A) What is energy conservation ? Explain its importance.
- B) State Energy policy statement of an organization/company with an appropriate example.
- C) Explain Supply Side management.
- D) Explain in brief what are the Elements of Monitoring and Targeting System ?
- E) Explain SCADA and automatic meter reading.

3. Attempt **any two** : **(10×2=20)**

- A) Explain Indian Electricity Act, 2003.
- B) Explain Clean Development Mechanism (CDM). How CDM Works and also explain project cycle for CDM.
- C) Responsibilities and duties to be Assigned Under the Energy Conservation Act, 2001.

**SECTION – II**

4. Attempt **any four** : **(4×5=20)**

- A) Define Energy Management and state Objectives of Energy Management.
- B) What are the direct and indirect benefits of waste heat recovery ? Give two examples of waste heat recovery.

**Set Q**



- C) What are the methods of capacity control in reciprocating air compressors ?
- D) Explain Sankey diagram.
- E) Explain the need of energy audit.

5. Attempt **any two** :

**(10×2=20)**

- A) Explain briefly the difference between preliminary and detailed energy audits.
  - B) Explain the steps involved in detailed audit.
  - C) What is discounted cash flow method ? What are the advantages and disadvantages of it ?
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**B.E. (Electrical & Electronics Engineering) (Part – II) Examination, 2017  
Elective – II : ENERGY CONSERVATION AND AUDITING**

Day and Date : Friday, 24-11-2017

Max. Marks : 100

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

- N.B. :** 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 :

(1×20=20)

- 1) The power loss in transmission/distribution line depends on
  - a) Current in the line
  - b) Resistance of the line
  - c) Length of the line
  - d) All
- 2) If the distribution voltage is raised from 11 kV to 33 kV, the line loss would be lower by a factor
  - a) 1/9
  - b) 9
  - c) 3
  - d) None
- 3) What is specific energy consumption ?
  - a) Energy consumption per month
  - b) Energy consumed per unit of production
  - c) Energy consumption per year
  - d) None of the above
- 4) Sankey diagram shows in graphics
  - a) Energy input
  - b) Energy output
  - c) Energy balance
  - d) All the above
- 5) Which of the following is the predominant loss in furnace oil fired boiler ?
  - a) Dry flue gas losses
  - b) Heat loss due to moisture in air
  - c) Heat loss due to radiation and convection
  - d) Heat loss due to moisture in fuel
- 6) The unit of one lux is
  - a) 1000 lumen per square feet
  - b) 10 lumen per square meter
  - c) One lumen per square meter
  - d) 1 lumen per square feet
- 7) The efficiency figures for energy efficient motors (in comparison with standard efficiency motor) can be generally higher by \_\_\_\_\_ %.
  - a) 1%
  - b) 3-7%
  - c) 10% and above
  - d) 8-10%
- 8) The speed of motor can be varied by
  - a) Changing supply frequency
  - b) Changing no. of poles
  - c) Using multi speed windings
  - d) All the above

P.T.O.



- 9) The objective of material and energy balance is to assess the
- a) Input-output
  - b) Conversion efficiency
  - c) Losses
  - d) All the above
- 10) A CUSUM graph follows a random fluctuation trend and oscillators around.
- a) 100
  - b) 100%
  - c) 0
  - d) none of the above
- 11) In material balance of a process, recycle product is always considered as
- a) Input to process
  - b) Output to process
  - c) Both (a) and (b)
  - d) None of above
- 12) Sankey diagram is an useful tool to represent
- a) Financial strength of the company
  - b) Management philosophy
  - c) Input and output energy flow the company
  - d) Human resource strength of the company
- 13) 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 policy
- 14) The energy used by any manufacturing process varies with
- a) Production volume
  - b) Type of process
  - c) Resource input
  - d) All the above
- 15) What determines the thermal loading on the motor ?
- a) Duty/Load cycle
  - b) Temperature of the winding
  - c) Age of the motor
  - d) Ambient conditions
- 16) The ozone layer in the stratosphere acts as an efficient filter for
- a) Solar UV-B rays
  - b) X-rays
  - c) Gamma rays
  - d) UV-A rays
- 17) The force field analysis in energy action planning deals with barriers having
- a) Positive forces only
  - b) Negative forces only
  - c) Both negative and positive forces
  - d) No force
- 18) Name the Act, which is proposed to bring the qualitative transformation of the electricity sector
- a) Regulatory Commission Act 1998
  - b) Indian Electricity Act 1910
  - c) Supply Act 1948
  - d) Electricity Act 2003
- 19) Which of the following is highest contributor to the air pollution ?
- a) Carbon Monoxide
  - b) Hydro Carbons
  - c) Sulphur Oxides
  - d) Particulate
- 20) The heat input required for generating 'one' kilo watt-hour of electrical output is called as
- a) Efficiency
  - b) Heat Rate
  - c) Calorific Value
  - d) Heat value
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**B.E. (Electrical & Electronics Engineering) (Part – II) Examination, 2017  
Elective – II : ENERGY CONSERVATION AND AUDITING**

Day and Date : Friday, 24-11-2017

Marks : 80

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

**SECTION – I**

2. Attempt **any four** : **(4×5=20)**

- A) What is energy conservation ? Explain its importance.
- B) State Energy policy statement of an organization/company with an appropriate example.
- C) Explain Supply Side management.
- D) Explain in brief what are the Elements of Monitoring and Targeting System ?
- E) Explain SCADA and automatic meter reading.

3. Attempt **any two** : **(10×2=20)**

- A) Explain Indian Electricity Act, 2003.
- B) Explain Clean Development Mechanism (CDM). How CDM Works and also explain project cycle for CDM.
- C) Responsibilities and duties to be Assigned Under the Energy Conservation Act, 2001.

**SECTION – II**

4. Attempt **any four** : **(4×5=20)**

- A) Define Energy Management and state Objectives of Energy Management.
- B) What are the direct and indirect benefits of waste heat recovery ? Give two examples of waste heat recovery.

**Set R**



- C) What are the methods of capacity control in reciprocating air compressors ?
- D) Explain Sankey diagram.
- E) Explain the need of energy audit.

5. Attempt **any two** :

**(10×2=20)**

- A) Explain briefly the difference between preliminary and detailed energy audits.
  - B) Explain the steps involved in detailed audit.
  - C) What is discounted cash flow method ? What are the advantages and disadvantages of it ?
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**B.E. (Electrical & Electronics Engineering) (Part – II) Examination, 2017  
Elective – II : ENERGY CONSERVATION AND AUDITING**

Day and Date : Friday, 24-11-2017

Max. Marks : 100

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

- N.B. :** 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 : (1×20=20)
- 1) The ozone layer in the stratosphere acts as an efficient filter for  
a) Solar UV-B rays    b) X-rays    c) Gamma rays    d) UV-A rays
  - 2) The force field analysis in energy action planning deals with barriers having  
a) Positive forces only    b) Negative forces only  
c) Both negative and positive forces    d) No force
  - 3) Name the Act, which is proposed to bring the qualitative transformation of the electricity sector  
a) Regulatory Commission Act 1998    b) Indian Electricity Act 1910  
c) Supply Act 1948    d) Electricity Act 2003
  - 4) Which of the following is highest contributor to the air pollution ?  
a) Carbon Monoxide    b) Hydro Carbons  
c) Sulphur Oxides    d) Particulate
  - 5) The heat input required for generating 'one' kilo watt-hour of electrical output is called as  
a) Efficiency    b) Heat Rate    c) Calorific Value    d) Heat value
  - 6) The power loss in transmission/distribution line depends on  
a) Current in the line    b) Resistance of the line  
c) Length of the line    d) All
  - 7) If the distribution voltage is raised from 11 kV to 33 kV, the line loss would be lower by a factor  
a) 1/9    b) 9    c) 3    d) None
  - 8) What is specific energy consumption ?  
a) Energy consumption per month    b) Energy consumed per unit of production  
c) Energy consumption per year    d) None of the above

P.T.O.



- 9) Sankey diagram shows in graphics
- a) Energy input
  - b) Energy output
  - c) Energy balance
  - d) All the above
- 10) Which of the following is the predominant loss in furnace oil fired boiler ?
- a) Dry flue gas losses
  - b) Heat loss due to moisture in air
  - c) Heat loss due to radiation and convection
  - d) Heat loss due to moisture in fuel
- 11) The unit of one lux is
- a) 1000 lumen per square feet
  - b) 10 lumen per square meter
  - c) One lumen per square meter
  - d) 1 lumen per square feet
- 12) The efficiency figures for energy efficient motors (in comparison with standard efficiency motor) can be generally higher by \_\_\_\_\_ %.
- a) 1%
  - b) 3-7%
  - c) 10% and above
  - d) 8-10%
- 13) The speed of motor can be varied by
- a) Changing supply frequency
  - b) Changing no. of poles
  - c) Using multi speed windings
  - d) All the above
- 14) The objective of material and energy balance is to assess the
- a) Input-output
  - b) Conversion efficiency
  - c) Losses
  - d) All the above
- 15) A CUSUM graph follows a random fluctuation trend and oscillators around.
- a) 100
  - b) 100%
  - c) 0
  - d) none of the above
- 16) In material balance of a process, recycle product is always considered as
- a) Input to process
  - b) Output to process
  - c) Both (a) and (b)
  - d) None of above
- 17) Sankey diagram is an useful tool to represent
- a) Financial strength of the company
  - b) Management philosophy
  - c) Input and output energy flow the company
  - d) Human resource strength of the company
- 18) 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 policy
- 19) The energy used by any manufacturing process varies with
- a) Production volume
  - b) Type of process
  - c) Resource input
  - d) All the above
- 20) What determines the thermal loading on the motor ?
- a) Duty/Load cycle
  - b) Temperature of the winding
  - c) Age of the motor
  - d) Ambient conditions
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**B.E. (Electrical & Electronics Engineering) (Part – II) Examination, 2017  
Elective – II : ENERGY CONSERVATION AND AUDITING**

Day and Date : Friday, 24-11-2017

Marks : 80

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

**SECTION – I**

2. Attempt **any four** : **(4×5=20)**

- A) What is energy conservation ? Explain its importance.
- B) State Energy policy statement of an organization/company with an appropriate example.
- C) Explain Supply Side management.
- D) Explain in brief what are the Elements of Monitoring and Targeting System ?
- E) Explain SCADA and automatic meter reading.

3. Attempt **any two** : **(10×2=20)**

- A) Explain Indian Electricity Act, 2003.
- B) Explain Clean Development Mechanism (CDM). How CDM Works and also explain project cycle for CDM.
- C) Responsibilities and duties to be Assigned Under the Energy Conservation Act, 2001.

**SECTION – II**

4. Attempt **any four** : **(4×5=20)**

- A) Define Energy Management and state Objectives of Energy Management.
- B) What are the direct and indirect benefits of waste heat recovery ? Give two examples of waste heat recovery.

**Set S**



- C) What are the methods of capacity control in reciprocating air compressors ?
- D) Explain Sankey diagram.
- E) Explain the need of energy audit.

5. Attempt **any two** :

**(10×2=20)**

- A) Explain briefly the difference between preliminary and detailed energy audits.
  - B) Explain the steps involved in detailed audit.
  - C) What is discounted cash flow method ? What are the advantages and disadvantages of it ?
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**B.E. (E & E) (Old) (Part – II) Examination, 2017**  
**Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

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 Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) Modern HVDC systems are all
  - a) 3-pulse converters
  - b) 6-pulse converters
  - c) 24-pulse converters
  - d) 12-pulse converters
- 2) In 12-pulse connections, transformers are connected
  - a) Delta/Delta (both)
  - b) Star/Star (both)
  - c) Star/Delta (both)
  - d) One star/star and other star/delta
- 3) If a angle of advance is  $30^\circ$  and overlap angle is  $12^\circ$ , the extension angle will be
  - a)  $42^\circ$
  - b)  $(30/2)^\circ$
  - c)  $18^\circ$
  - d)  $21^\circ$
- 4) A surge diverter is used across the DC CB to
  - a) Limit recovery voltage
  - b) Limit fault current
  - c) Absorb the arc energy
  - d) All of the above
- 5) Which of the following is a series connected FACTS device ?
  - a) UPFC
  - b) STATCOM
  - c) TCSC
  - d) TCPST
- 6) Multi terminal systems are
  - a) Series connected
  - b) Parallel connected
  - c) Ring connected
  - d) All of above
- 7) Most frequent type of fault in DC system is
  - a) Converter internal fault
  - b) DC line fault
  - c) Commutation failure
  - d) Arc back and arc through
- 8) HVDC transmission is opted when
  - a) Bulk power transfer is needed
  - b) Improvement of stability
  - c) Long distance and cable transmission is required
  - d) All of the above
- 9) Filters used in 12-pulse converters usually on the AC side are
  - a) 5<sup>th</sup>, 7<sup>th</sup> and high-pass
  - b) 11<sup>th</sup>, 13<sup>th</sup> and high-pass
  - c) 6<sup>th</sup>, 12<sup>th</sup> and high-pass
  - d) only high-pass filter

P.T.O.





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**B.E. (E & E) (Old) (Part – II) Examination, 2017**  
**Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** questions : **(4×5=20)**
- a) Write the advantages and disadvantages of HVDC transmission system.
  - b) Explain the phenomenon of Arc Through in case of converter.
  - c) Explain EPC scheme in detail.
  - d) What is misfire ? Explain causes and remedies.
  - e) Explain the various applications of HVDC transmission.
  - f) Draw and explain over current protection.
3. Answer **any two** questions : **(10×2=20)**
- a) Compare EHVAC and HVDC transmission with suitable comments.
  - b) Draw and explain typical HVDC converter station in detail.
  - c) Explain with neat diagram the different types of DC links.

SECTION – II

4. Answer **any four** questions : **(5×4=20)**
- a) Explain Static Var systems.
  - b) Explain the current margin method for protection of MTDC system.
  - c) Write a short note on SVC.
  - d) Explain DC filters.
  - e) What are the types of MTDC systems ? Explain series type in detail.
  - f) Write a short note on protection of MTDC system.
5. Answer **any two** questions : **(10×2=20)**
- a) What are the causes of generation of harmonics and what are the troubles caused by it ?
  - b) Compare series MTDC system with parallel MTDC system.
  - c) What are the potential applications of MTDC systems ? Explain each in detail.





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Set **Q**

**B.E. (E & E) (Old) (Part – II) Examination, 2017**  
**Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

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 Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) The common control done in the converters is
  - a) Rectifier as both voltage and current controller
  - b) Inverter as both voltage and current controller
  - c) Inverter as current controller
  - d) Rectifier as voltage controller and inverter as current controller
- 2) HVDC-VSC scheme employs
  - a) IGBT valves
  - b) Light or optically triggered thyristor valves
  - c) Mercury arc valves
  - d) MOSFET's and GTO valves
- 3) During commutation in a converter
  - a) Voltage is exchanged
  - b) Current is transformed from one valve to the other
  - c) DC voltage is blocked
  - d) None of the above
- 4) In HVDC transmission system, rectifier firing angle  $\alpha$  is kept near
  - a)  $0^\circ$
  - b)  $15^\circ$
  - c)  $30^\circ$
  - d)  $180^\circ$
- 5) A system is said to be weak if SCR is
  - a) Less than 3
  - b) Less than 1
  - c) More than 5
  - d) 3 to 5
- 6) Modern HVDC systems are all
  - a) 3-pulse converters
  - b) 6-pulse converters
  - c) 24-pulse converters
  - d) 12-pulse converters
- 7) In 12-pulse connections, transformers are connected
  - a) Delta/Delta (both)
  - b) Star/Star (both)
  - c) Star/Delta (both)
  - d) One star/star and other star/delta
- 8) If a angle of advance is  $30^\circ$  and overlap angle is  $12^\circ$ , the extension angle will be
  - a)  $42^\circ$
  - b)  $(30/2)^\circ$
  - c)  $18^\circ$
  - d)  $21^\circ$

P.T.O.



- 9) A surge diverter is used across the DC CB to
- a) Limit recovery voltage
  - b) Limit fault current
  - c) Absorb the arc energy
  - d) All of the above
- 10) Which of the following is a series connected FACTS device ?
- a) UPFC
  - b) STATCOM
  - c) TCSC
  - d) TCPST
- 11) Multi terminal systems are
- a) Series connected
  - b) Parallel connected
  - c) Ring connected
  - d) All of above
- 12) Most frequent type of fault in DC system is
- a) Converter internal fault
  - b) DC line fault
  - c) Commutation failure
  - d) Arc back and arc through
- 13) HVDC transmission is opted when
- a) Bulk power transfer is needed
  - b) Improvement of stability
  - c) Long distance and cable transmission is required
  - d) All of the above
- 14) Filters used in 12-pulse converters usually on the AC side are
- a) 5<sup>th</sup>, 7<sup>th</sup> and high-pass
  - b) 11<sup>th</sup>, 13<sup>th</sup> and high-pass
  - c) 6<sup>th</sup>, 12<sup>th</sup> and high-pass
  - d) only high-pass filter
- 15) Characteristic of a converter is the relation between
- a) AC voltage and  $I_d$
  - b) DC output voltage and  $I_d$
  - c) DC power and  $I_d$
  - d) None of these
- 16) The initial HVDC valves were
- a) IGATS
  - b) Thyristors
  - c) Mercury arc rectifiers
  - d) None of above
- 17) In a monopolar system usually the pole is
- a) Positive
  - b) Negative
  - c) Positive and negative
  - d) Alternatively positive and negative
- 18) Thyristor valves came into operation in the year
- a) 1950
  - b) 1954
  - c) 1972
  - d) 2000
- 19) 12-pulse converters are used in modern converters because of
- a) Reduced current
  - b) Reduced ripple
  - c) Increased voltage and reduced harmonics
  - d) Both b) and c)
- 20) Power transfer in DC line depends on
- a) Sending and receiving end voltages
  - b) Number of pulses in the rectifier
  - c) Line resistance
  - d) None of the above
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**B.E. (E & E) (Old) (Part – II) Examination, 2017**  
**Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** questions : **(4×5=20)**
- a) Write the advantages and disadvantages of HVDC transmission system.
  - b) Explain the phenomenon of Arc Through in case of converter.
  - c) Explain EPC scheme in detail.
  - d) What is misfire ? Explain causes and remedies.
  - e) Explain the various applications of HVDC transmission.
  - f) Draw and explain over current protection.
3. Answer **any two** questions : **(10×2=20)**
- a) Compare EHVAC and HVDC transmission with suitable comments.
  - b) Draw and explain typical HVDC converter station in detail.
  - c) Explain with neat diagram the different types of DC links.

SECTION – II

4. Answer **any four** questions : **(5×4=20)**
- a) Explain Static Var systems.
  - b) Explain the current margin method for protection of MTDC system.
  - c) Write a short note on SVC.
  - d) Explain DC filters.
  - e) What are the types of MTDC systems ? Explain series type in detail.
  - f) Write a short note on protection of MTDC system.
5. Answer **any two** questions : **(10×2=20)**
- a) What are the causes of generation of harmonics and what are the troubles caused by it ?
  - b) Compare series MTDC system with parallel MTDC system.
  - c) What are the potential applications of MTDC systems ? Explain each in detail.







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**B.E. (E & E) (Old) (Part – II) Examination, 2017**  
**Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

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 Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) The initial HVDC valves were
  - a) IGATS
  - b) Thyristors
  - c) Mercury arc rectifiers
  - d) None of above
- 2) In a monopolar system usually the pole is
  - a) Positive
  - b) Negative
  - c) Positive and negative
  - d) Alternatively positive and negative
- 3) Thyristor valves came into operation in the year
  - a) 1950
  - b) 1954
  - c) 1972
  - d) 2000
- 4) 12-pulse converters are used in modern converters because of
  - a) Reduced current
  - b) Reduced ripple
  - c) Increased voltage and reduced harmonics
  - d) Both b) and c)
- 5) Power transfer in DC line depends on
  - a) Sending and receiving end voltages
  - b) Number of pulses in the rectifier
  - c) Line resistance
  - d) None of the above
- 6) The common control done in the converters is
  - a) Rectifier as both voltage and current controller
  - b) Inverter as both voltage and current controller
  - c) Inverter as current controller
  - d) Rectifier as voltage controller and inverter as current controller
- 7) HVDC-VSC scheme employs
  - a) IGBT valves
  - b) Light or optically triggered thyristor valves
  - c) Mercury arc valves
  - d) MOSFET's and GTO valves

P.T.O.



- 8) During commutation in a converter
- Voltage is exchanged
  - Current is transformed from one valve to the other
  - DC voltage is blocked
  - None of the above
- 9) In HVDC transmission system, rectifier firing angle  $\alpha$  is kept near
- $0^\circ$
  - $15^\circ$
  - $30^\circ$
  - $180^\circ$
- 10) A system is said to be weak if SCR is
- Less than 3
  - Less than 1
  - More than 5
  - 3 to 5
- 11) Modern HVDC systems are all
- 3-pulse converters
  - 6-pulse converters
  - 24-pulse converters
  - 12-pulse converters
- 12) In 12-pulse connections, transformers are connected
- Delta/Delta (both)
  - Star/Star (both)
  - Star/Delta (both)
  - One star/star and other star/delta
- 13) If a angle of advance is  $30^\circ$  and overlap angle is  $12^\circ$ , the extension angle will be
- $42^\circ$
  - $(30/2)^\circ$
  - $18^\circ$
  - $21^\circ$
- 14) A surge diverter is used across the DC CB to
- Limit recovery voltage
  - Limit fault current
  - Absorb the arc energy
  - All of the above
- 15) Which of the following is a series connected FACTS device ?
- UPFC
  - STATCOM
  - TCSC
  - TCPST
- 16) Multi terminal systems are
- Series connected
  - Parallel connected
  - Ring connected
  - All of above
- 17) Most frequent type of fault in DC system is
- Converter internal fault
  - DC line fault
  - Commutation failure
  - Arc back and arc through
- 18) HVDC transmission is opted when
- Bulk power transfer is needed
  - Improvement of stability
  - Long distance and cable transmission is required
  - All of the above
- 19) Filters used in 12-pulse converters usually on the AC side are
- $5^{\text{th}}$ ,  $7^{\text{th}}$  and high-pass
  - $11^{\text{th}}$ ,  $13^{\text{th}}$  and high-pass
  - $6^{\text{th}}$ ,  $12^{\text{th}}$  and high-pass
  - only high-pass filter
- 20) Characteristic of a converter is the relation between
- AC voltage and  $I_d$
  - DC output voltage and  $I_d$
  - DC power and  $I_d$
  - None of these
-



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**B.E. (E & E) (Old) (Part – II) Examination, 2017  
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 80

**SECTION – I**

2. Answer **any four** questions : **(4×5=20)**
- a) Write the advantages and disadvantages of HVDC transmission system.
  - b) Explain the phenomenon of Arc Through in case of converter.
  - c) Explain EPC scheme in detail.
  - d) What is misfire ? Explain causes and remedies.
  - e) Explain the various applications of HVDC transmission.
  - f) Draw and explain over current protection.
3. Answer **any two** questions : **(10×2=20)**
- a) Compare EHVAC and HVDC transmission with suitable comments.
  - b) Draw and explain typical HVDC converter station in detail.
  - c) Explain with neat diagram the different types of DC links.

**SECTION – II**

4. Answer **any four** questions : **(5×4=20)**
- a) Explain Static Var systems.
  - b) Explain the current margin method for protection of MTDC system.
  - c) Write a short note on SVC.
  - d) Explain DC filters.
  - e) What are the types of MTDC systems ? Explain series type in detail.
  - f) Write a short note on protection of MTDC system.
5. Answer **any two** questions : **(10×2=20)**
- a) What are the causes of generation of harmonics and what are the troubles caused by it ?
  - b) Compare series MTDC system with parallel MTDC system.
  - c) What are the potential applications of MTDC systems ? Explain each in detail.





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**B.E. (E & E) (Old) (Part – II) Examination, 2017**  
**Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

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 Type Questions**

Duration : 30 Minutes

Marks : 20

1. Choose the correct answer :

(20×1=20)

- 1) Multi terminal systems are
  - a) Series connected
  - b) Parallel connected
  - c) Ring connected
  - d) All of above
- 2) Most frequent type of fault in DC system is
  - a) Converter internal fault
  - b) DC line fault
  - c) Commutation failure
  - d) Arc back and arc through
- 3) HVDC transmission is opted when
  - a) Bulk power transfer is needed
  - b) Improvement of stability
  - c) Long distance and cable transmission is required
  - d) All of the above
- 4) Filters used in 12-pulse converters usually on the AC side are
  - a) 5<sup>th</sup>, 7<sup>th</sup> and high-pass
  - b) 11<sup>th</sup>, 13<sup>th</sup> and high-pass
  - c) 6<sup>th</sup>, 12<sup>th</sup> and high-pass
  - d) only high-pass filter
- 5) Characteristic of a converter is the relation between
  - a) AC voltage and  $I_d$
  - b) DC output voltage and  $I_d$
  - c) DC power and  $I_d$
  - d) None of these
- 6) The initial HVDC valves were
  - a) IGATS
  - b) Thyristors
  - c) Mercury arc rectifiers
  - d) None of above
- 7) In a monopolar system usually the pole is
  - a) Positive
  - b) Negative
  - c) Positive and negative
  - d) Alternatively positive and negative
- 8) Thyristor valves came into operation in the year
  - a) 1950
  - b) 1954
  - c) 1972
  - d) 2000

P.T.O.



- 9) 12-pulse converters are used in modern converters because of
- Reduced current
  - Reduced ripple
  - Increased voltage and reduced harmonics
  - Both b) and c)
- 10) Power transfer in DC line depends on
- Sending and receiving end voltages
  - Number of pulses in the rectifier
  - Line resistance
  - None of the above
- 11) The common control done in the converters is
- Rectifier as both voltage and current controller
  - Inverter as both voltage and current controller
  - Inverter as current controller
  - Rectifier as voltage controller and inverter as current controller
- 12) HVDC-VSC scheme employs
- IGBT valves
  - Light or optically triggered thyristor valves
  - Mercury arc valves
  - MOSFET's and GTO valves
- 13) During commutation in a converter
- Voltage is exchanged
  - Current is transformed from one valve to the other
  - DC voltage is blocked
  - None of the above
- 14) In HVDC transmission system, rectifier firing angle  $\alpha$  is kept near
- $0^\circ$
  - $15^\circ$
  - $30^\circ$
  - $180^\circ$
- 15) A system is said to be weak if SCR is
- Less than 3
  - Less than 1
  - More than 5
  - 3 to 5
- 16) Modern HVDC systems are all
- 3-pulse converters
  - 6-pulse converters
  - 24-pulse converters
  - 12-pulse converters
- 17) In 12-pulse connections, transformers are connected
- Delta/Delta (both)
  - Star/Star (both)
  - Star/Delta (both)
  - One star/star and other star/delta
- 18) If a angle of advance is  $30^\circ$  and overlap angle is  $12^\circ$ , the extension angle will be
- $42^\circ$
  - $(30/2)^\circ$
  - $18^\circ$
  - $21^\circ$
- 19) A surge diverter is used across the DC CB to
- Limit recovery voltage
  - Limit fault current
  - Absorb the arc energy
  - All of the above
- 20) Which of the following is a series connected FACTS device ?
- UPFC
  - STATCOM
  - TCSC
  - TCPST



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**B.E. (E & E) (Old) (Part – II) Examination, 2017**  
**Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 1.00 p.m.

Marks : 80

SECTION – I

2. Answer **any four** questions : **(4×5=20)**
- a) Write the advantages and disadvantages of HVDC transmission system.
  - b) Explain the phenomenon of Arc Through in case of converter.
  - c) Explain EPC scheme in detail.
  - d) What is misfire ? Explain causes and remedies.
  - e) Explain the various applications of HVDC transmission.
  - f) Draw and explain over current protection.
3. Answer **any two** questions : **(10×2=20)**
- a) Compare EHVAC and HVDC transmission with suitable comments.
  - b) Draw and explain typical HVDC converter station in detail.
  - c) Explain with neat diagram the different types of DC links.

SECTION – II

4. Answer **any four** questions : **(5×4=20)**
- a) Explain Static Var systems.
  - b) Explain the current margin method for protection of MTDC system.
  - c) Write a short note on SVC.
  - d) Explain DC filters.
  - e) What are the types of MTDC systems ? Explain series type in detail.
  - f) Write a short note on protection of MTDC system.
5. Answer **any two** questions : **(10×2=20)**
- a) What are the causes of generation of harmonics and what are the troubles caused by it ?
  - b) Compare series MTDC system with parallel MTDC system.
  - c) What are the potential applications of MTDC systems ? Explain each in detail.







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**T.E. (Part – I) (All Branches) (CGPA) Examination, 2017**  
**SOCIOLOGY**  
**Introduction to Sociology (Self Learning) (HSS)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 Noon

Max. Marks : 50

- Instructions :** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. **Each** question carries **one** mark.  
2) Figures to the **right** indicate **full** marks.  
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**

Marks : 10

1. Choose the correct answer :

10

- 1) The term sociology was for the first time coined by
  - a) Auguste Comte
  - b) Ginsberg
  - c) Aristotle
  - d) Socrates
- 2) Sociology as a subject deals with \_\_\_\_\_
  - a) Man and society
  - b) Human associations
  - c) Social relations among individuals
  - d) Rights and duties of the citizens
- 3) Which of the following is not a characteristic of primary group ?
  - a) Formality
  - b) Closeness
  - c) Familiarity
  - d) Integrity
- 4) The nature of urbanization is \_\_\_\_\_
  - a) Pioneering
  - b) Static
  - c) Dynamic
  - d) Homogeneous
- 5) Social change is responsible for \_\_\_\_\_
  - a) Social progress
  - b) Social evolution
  - c) Social disorganisation
  - d) All the above

P.T.O.



- 6) An unskilled worker becomes semiskilled and later on skilled. What type of mobility is this ?
- a) Intra generational occupational mobility
  - b) Inter generational occupational mobility
  - c) Vertical social mobility
  - d) Horizontal social mobility
- 7) Who has been initiated the Narmada Bachao Andolan (Movement) ?
- a) Anna Hazare
  - b) Medha Patkar
  - c) Sundarlal Bahuguna
  - d) J. P. Narayan
- 8) Which of the following is the example of informal sector ?
- a) Street vendor
  - b) Waste picker
  - c) Rag picker
  - d) All the above
- 9) \_\_\_\_\_ is a natural and continues process.
- a) Change
  - b) Poverty
  - c) Modernization
  - d) All the above
- 10) Process of socialization starts \_\_\_\_\_
- a) After birth of child
  - b) Before child's birth
  - c) After getting maturity
  - d) In youth age
- \_\_\_\_\_



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**T.E. (Part – I) (All Branches) (CGPA) Examination, 2017**  
**SOCIOLOGY**  
**Introduction to Sociology (Self Learning) (HSS)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 Noon

Marks : 40

**Instructions :** I) Attempt **any 4** from the following questions.  
II) Figures to the **right** indicate **full** marks.

2. Define sociology and explain the characteristics of culture. **10**
  3. Define industrialization and explain its key features in Indian context. **10**
  4. Elucidate the vital trends of urbanization in India. **10**
  5. Define social movements and elucidate the objectives of “India against corruption movement”. **10**
  6. Do you think that modern technology leads to environment crisis ? Discuss. **10**
  7. Discuss the changing pattern of family system in urban society. **10**
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SLR-TJ – 601

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**T.E. (Part – I) (All Branches) (CGPA) Examination, 2017**  
**SOCIOLOGY**  
**Introduction to Sociology (Self Learning) (HSS)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 Noon

Max. Marks : 50

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. **Each** question carries **one** mark.  
2) Figures to the **right** indicate **full** marks.  
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**

Marks : 10

1. Choose the correct answer : 10
- 1) \_\_\_\_\_ is a natural and continues process.  
a) Change  
b) Poverty  
c) Modernization  
d) All the above
  - 2) Process of socialization starts \_\_\_\_\_  
a) After birth of child  
b) Before child's birth  
c) After getting maturity  
d) In youth age
  - 3) Who has been initiated the Narmada Bachao Andolan (Movement) ?  
a) Anna Hazare  
b) Medha Patkar  
c) Sundarlal Bahuguna  
d) J. P. Narayan
  - 4) Which of the following is the example of informal sector ?  
a) Street vendor  
b) Waste picker  
c) Rag picker  
d) All the above
  - 5) The term sociology was for the first time coined by  
a) Auguste Comte  
b) Ginsberg  
c) Aristotle  
d) Socrates

P.T.O.



- 6) Sociology as a subject deals with \_\_\_\_\_
- a) Man and society
  - b) Human associations
  - c) Social relations among individuals
  - d) Rights and duties of the citizens
- 7) Which of the following is not a characteristic of primary group ?
- a) Formality
  - b) Closeness
  - c) Familiarity
  - d) Integrity
- 8) The nature of urbanization is \_\_\_\_\_
- a) Pioneering
  - b) Static
  - c) Dynamic
  - d) Homogeneous
- 9) Social change is responsible for \_\_\_\_\_
- a) Social progress
  - b) Social evolution
  - c) Social disorganisation
  - d) All the above
- 10) An unskilled worker becomes semiskilled and later on skilled. What type of mobility is this ?
- a) Intra generational occupational mobility
  - b) Inter generational occupational mobility
  - c) Vertical social mobility
  - d) Horizontal social mobility
- \_\_\_\_\_



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**T.E. (Part – I) (All Branches) (CGPA) Examination, 2017**  
**SOCIOLOGY**  
**Introduction to Sociology (Self Learning) (HSS)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 Noon

Marks : 40

**Instructions :** I) Attempt **any 4** from the following questions.  
II) Figures to the **right** indicate **full** marks.

2. Define sociology and explain the characteristics of culture. **10**
3. Define industrialization and explain its key features in Indian context. **10**
4. Elucidate the vital trends of urbanization in India. **10**
5. Define social movements and elucidate the objectives of “India against corruption movement”. **10**
6. Do you think that modern technology leads to environment crisis ? Discuss. **10**
7. Discuss the changing pattern of family system in urban society. **10**







SLR-TJ – 601

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**T.E. (Part – I) (All Branches) (CGPA) Examination, 2017**  
**SOCIOLOGY**  
**Introduction to Sociology (Self Learning) (HSS)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 Noon

Max. Marks : 50

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. **Each** question carries **one** mark.  
2) Figures to the **right** indicate **full** marks.  
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**

Marks : 10

1. Choose the correct answer :

10

- 1) Social change is responsible for \_\_\_\_\_
  - a) Social progress
  - b) Social evolution
  - c) Social disorganisation
  - d) All the above
- 2) An unskilled worker becomes semiskilled and later on skilled. What type of mobility is this ?
  - a) Intra generational occupational mobility
  - b) Inter generational occupational mobility
  - c) Vertical social mobility
  - d) Horizontal social mobility
- 3) \_\_\_\_\_ is a natural and continues process.
  - a) Change
  - b) Poverty
  - c) Modernization
  - d) All the above
- 4) Process of socialization starts \_\_\_\_\_
  - a) After birth of child
  - b) Before child's birth
  - c) After getting maturity
  - d) In youth age
- 5) Which of the following is not a characteristic of primary group ?
  - a) Formality
  - b) Closeness
  - c) Familiarity
  - d) Integrity

P.T.O.





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**T.E. (Part – I) (All Branches) (CGPA) Examination, 2017**  
**SOCIOLOGY**  
**Introduction to Sociology (Self Learning) (HSS)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 Noon

Marks : 40

**Instructions :** I) Attempt **any 4** from the following questions.  
II) Figures to the **right** indicate **full** marks.

2. Define sociology and explain the characteristics of culture. **10**
  3. Define industrialization and explain its key features in Indian context. **10**
  4. Elucidate the vital trends of urbanization in India. **10**
  5. Define social movements and elucidate the objectives of “India against corruption movement”. **10**
  6. Do you think that modern technology leads to environment crisis ? Discuss. **10**
  7. Discuss the changing pattern of family system in urban society. **10**
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**T.E. (Part – I) (All Branches) (CGPA) Examination, 2017**  
**SOCIOLOGY**  
**Introduction to Sociology (Self Learning) (HSS)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 Noon

Max. Marks : 50

- Instructions:** 1) Q. No. 1 is **compulsory**. It should be solved in Answer Book Page No. 3. **Each** question carries **one** mark.  
2) Figures to the **right** indicate **full** marks.  
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**

Marks : 10

1. Choose the correct answer :

10

- 1) Which of the following is not a characteristic of primary group ?
  - a) Formality
  - b) Closeness
  - c) Familiarity
  - d) Integrity
- 2) The nature of urbanization is \_\_\_\_\_
  - a) Pioneering
  - b) Static
  - c) Dynamic
  - d) Homogeneous
- 3) Social change is responsible for \_\_\_\_\_
  - a) Social progress
  - b) Social evolution
  - c) Social disorganisation
  - d) All the above
- 4) An unskilled worker becomes semiskilled and later on skilled. What type of mobility is this ?
  - a) Intra generational occupational mobility
  - b) Inter generational occupational mobility
  - c) Vertical social mobility
  - d) Horizontal social mobility
- 5) Who has been initiated the Narmada Bachao Andolan (Movement) ?
  - a) Anna Hazare
  - b) Medha Patkar
  - c) Sundarlal Bahuguna
  - d) J. P. Narayan

P.T.O.



- 6) Which of the following is the example of informal sector ?
- a) Street vendor
  - b) Waste picker
  - c) Rag picker
  - d) All the above
- 7) \_\_\_\_\_ is a natural and continues process.
- a) Change
  - b) Poverty
  - c) Modernization
  - d) All the above
- 8) Process of socialization starts \_\_\_\_\_
- a) After birth of child
  - b) Before child's birth
  - c) After getting maturity
  - d) In youth age
- 9) The term sociology was for the first time coined by
- a) Auguste Comte
  - b) Ginsberg
  - c) Aristotle
  - d) Socrates
- 10) Sociology as a subject deals with \_\_\_\_\_
- a) Man and society
  - b) Human associations
  - c) Social relations among individuals
  - d) Rights and duties of the citizens
- \_\_\_\_\_



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**T.E. (Part – I) (All Branches) (CGPA) Examination, 2017**  
**SOCIOLOGY**  
**Introduction to Sociology (Self Learning) (HSS)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 Noon

Marks : 40

**Instructions :** I) Attempt **any 4** from the following questions.  
II) Figures to the **right** indicate **full** marks.

2. Define sociology and explain the characteristics of culture. **10**
  3. Define industrialization and explain its key features in Indian context. **10**
  4. Elucidate the vital trends of urbanization in India. **10**
  5. Define social movements and elucidate the objectives of “India against corruption movement”. **10**
  6. Do you think that modern technology leads to environment crisis ? Discuss. **10**
  7. Discuss the changing pattern of family system in urban society. **10**
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SLR-TJ – 602

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| Set | P |
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN  
VALUES**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- Note :** 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.**  
3) Figures to **right** indicate **full** marks.  
4) Make suitable assumptions, if required and state them **clearly**.

**MCQ/Objective Type Questions**

Marks : 10

1. Choose the correct answer :

**(10×1=10)**

- 1) HR means
  - A) Head Resource
  - B) Honorary Responsibility
  - C) Human Resource
  - D) All of the above
- 2) CSR means
  - A) Corporate Social Responsibility
  - B) Cooperation Society Responsibility
  - C) Class Social Representative
  - D) None of the above
- 3) \_\_\_\_\_ is not the part of internal communication.
  - A) Mailers
  - B) Electronic mails
  - C) Advertise and market honoring values
  - D) Internal news letter
- 4) In SWOT, T represents
  - A) Temperature
  - B) Threats
  - C) Table
  - D) Teacher
- 5) FMEA is a tool of
  - A) Financial analysis
  - B) Risk analysis
  - C) Equity analysis
  - D) None of the above

P.T.O.



- 6) Rights theory is related to
- |               |                  |
|---------------|------------------|
| A) Motivation | B) Ethics        |
| C) Leadership | D) Team building |
- 7) Maslow has demonstrated the hierarchy of
- |            |                      |
|------------|----------------------|
| A) Beliefs | B) Team              |
| C) Needs   | D) None of the above |
- 8) The bargain by a Trade Union for improving the economic and other interest is called as
- |                          |                             |
|--------------------------|-----------------------------|
| A) Strike                | B) Authority Responsibility |
| C) Collective bargaining | D) None of the above        |
- 9) Gilligan theory is related to
- |                      |                 |
|----------------------|-----------------|
| A) Moral development | B) Human values |
| C) Motivation        | D) Team working |
- 10) A specific exclusive right, describing rights given to creator for their literature and artistic work is called as
- |               |                      |
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| A) Patent     | B) Trademark         |
| C) Copy right | D) None of the above |
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN  
VALUES**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

**Note :** Solve *any 4* questions.

2. Explain variety of moral issues. 10
  3. Differentiate between Kohlberg's and Gilligan's theory. 10
  4. Explain types of inquiries in detail. 10
  5. Explain the method of Failure Mode and Effect Analysis (FMEA). 10
  6. What are human values ? Explain their types. 10
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SLR-TJ – 602

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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN  
VALUES**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- Note :** 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.**  
3) Figures to **right** indicate **full** marks.  
4) Make suitable assumptions, if required and state them **clearly**.

**MCQ/Objective Type Questions**

Marks : 10

1. Choose the correct answer : **(10×1=10)**
- 1) Gilligan theory is related to  
A) Moral development  
B) Human values  
C) Motivation  
D) Team working
  - 2) A specific exclusive right, describing rights given to creator for their literature and artistic work is called as  
A) Patent  
B) Trademark  
C) Copy right  
D) None of the above
  - 3) Maslow has demonstrated the hierarchy of  
A) Beliefs  
B) Team  
C) Needs  
D) None of the above
  - 4) The bargain by a Trade Union for improving the economic and other interest is called as  
A) Strike  
B) Authority Responsibility  
C) Collective bargaining  
D) None of the above
  - 5) HR means  
A) Head Resource  
B) Honorary Responsibility  
C) Human Resource  
D) All of the above

P.T.O.



- 6) CSR means  
A) Corporate Social Responsibility    B) Cooperation Society Responsibility  
C) Class Social Representative        D) None of the above
- 7) \_\_\_\_\_ is not the part of internal communication.  
A) Mailers  
B) Electronic mails  
C) Advertise and market honoring values  
D) Internal news letter
- 8) In SWOT, T represents  
A) Temperature                            B) Threats  
C) Table                                      D) Teacher
- 9) FMEA is a tool of  
A) Financial analysis                      B) Risk analysis  
C) Equity analysis                         D) None of the above
- 10) Rights theory is related to  
A) Motivation                                B) Ethics  
C) Leadership                                D) Team building
-



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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN  
VALUES**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

**Note :** Solve *any 4* questions.

2. Explain variety of moral issues. 10
  3. Differentiate between Kohlberg's and Gilligan's theory. 10
  4. Explain types of inquiries in detail. 10
  5. Explain the method of Failure Mode and Effect Analysis (FMEA). 10
  6. What are human values ? Explain their types. 10
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SLR-TJ – 602

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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN  
VALUES**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- Note :** 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.**  
3) Figures to **right** indicate **full** marks.  
4) Make suitable assumptions, if required and state them **clearly**.

**MCQ/Objective Type Questions**

Marks : 10

1. Choose the correct answer :

**(10×1=10)**

- 1) FMEA is a tool of
  - A) Financial analysis
  - B) Risk analysis
  - C) Equity analysis
  - D) None of the above
- 2) Rights theory is related to
  - A) Motivation
  - B) Ethics
  - C) Leadership
  - D) Team building
- 3) Gilligan theory is related to
  - A) Moral development
  - B) Human values
  - C) Motivation
  - D) Team working
- 4) A specific exclusive right, describing rights given to creator for their literature and artistic work is called as
  - A) Patent
  - B) Trademark
  - C) Copy right
  - D) None of the above
- 5) \_\_\_\_\_ is not the part of internal communication.
  - A) Mailers
  - B) Electronic mails
  - C) Advertise and market honoring values
  - D) Internal news letter

P.T.O.



- 6) In SWOT, T represents
    - A) Temperature
    - B) Threats
    - C) Table
    - D) Teacher
  - 7) HR means
    - A) Head Resource
    - B) Honorary Responsibility
    - C) Human Resource
    - D) All of the above
  - 8) CSR means
    - A) Corporate Social Responsibility
    - B) Cooperation Society Responsibility
    - C) Class Social Representative
    - D) None of the above
  - 9) Maslow has demonstrated the hierarchy of
    - A) Beliefs
    - B) Team
    - C) Needs
    - D) None of the above
  - 10) The bargain by a Trade Union for improving the economic and other interest is called as
    - A) Strike
    - B) Authority Responsibility
    - C) Collective bargaining
    - D) None of the above
-



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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN  
VALUES**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

**Note :** Solve *any 4* questions.

2. Explain variety of moral issues. 10
  3. Differentiate between Kohlberg's and Gilligan's theory. 10
  4. Explain types of inquiries in detail. 10
  5. Explain the method of Failure Mode and Effect Analysis (FMEA). 10
  6. What are human values ? Explain their types. 10
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SLR-TJ – 602

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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN  
VALUES**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- Note :** 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.**  
3) Figures to **right** indicate **full** marks.  
4) Make suitable assumptions, if required and state them **clearly**.

**MCQ/Objective Type Questions**

Marks : 10

1. Choose the correct answer :

**(10×1=10)**

- 1) \_\_\_\_\_ is not the part of internal communication.  
A) Mailers  
B) Electronic mails  
C) Advertise and market honoring values  
D) Internal news letter
- 2) In SWOT, T represents  
A) Temperature  
B) Threats  
C) Table  
D) Teacher
- 3) FMEA is a tool of  
A) Financial analysis  
B) Risk analysis  
C) Equity analysis  
D) None of the above
- 4) Rights theory is related to  
A) Motivation  
B) Ethics  
C) Leadership  
D) Team building
- 5) Maslow has demonstrated the hierarchy of  
A) Beliefs  
B) Team  
C) Needs  
D) None of the above

P.T.O.



- 6) The bargain by a Trade Union for improving the economic and other interest is called as
- A) Strike  
B) Authority Responsibility  
C) Collective bargaining  
D) None of the above
- 7) Gilligan theory is related to
- A) Moral development  
B) Human values  
C) Motivation  
D) Team working
- 8) A specific exclusive right, describing rights given to creator for their literature and artistic work is called as
- A) Patent  
B) Trademark  
C) Copy right  
D) None of the above
- 9) HR means
- A) Head Resource  
B) Honorary Responsibility  
C) Human Resource  
D) All of the above
- 10) CSR means
- A) Corporate Social Responsibility  
B) Cooperation Society Responsibility  
C) Class Social Representative  
D) None of the above
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
SELF LEARNING – HSS – PROFESSIONAL ETHICS AND HUMAN  
VALUES**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

**Note :** Solve **any 4** questions.

2. Explain variety of moral issues. 10
  3. Differentiate between Kohlberg's and Gilligan's theory. 10
  4. Explain types of inquiries in detail. 10
  5. Explain the method of Failure Mode and Effect Analysis (FMEA). 10
  6. What are human values ? Explain their types. 10
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SLR-TJ – 603

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| Set | <b>P</b> |
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
ECONOMICS  
(Self Learning – H.S.S.)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Total Marks : 50

- Instructions :** 1) Attempt **any four** questions out of Q. 2 to 7.  
2) Figures at **right** indicates marks.  
3) Q. No. 1 is **compulsory**. It should be solved in **first 15 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 : 15 Minutes

Marks : 10

1. Choose the correct alternatives :

**10**

- 1) Macro study is
  - a) Study of individual
  - b) Study of aggregate
  - c) Both above
  - d) None of above
- 2) Utility analysis is
  - a) Subjective and changes
  - b) Objective and des no change
  - c) Can be measured numerically
  - d) Not measurable at all by any means
- 3) Demand is always influenced, as per law of demand, by
  - a) Price of commodity under reference
  - b) Price of substitute commodity
  - c) By both above
  - d) By none above
- 4) If the price of petrol continuously increase, it will create
  - a) Positive impact on demand of scooter
  - b) Negative impact on demand of scooter
  - c) Shall not create any impact
  - d) All above alternatives are irrelevant

P.T.O.



- 5) International trade is a trade between
- Two different firms in the same country
  - Two different industries in the same country
  - Two different firms in different countries
  - Two different regions in the same country
- 6) Balance of trade and balance of payment are
- Same concepts
  - Different in matter of quantity of trade
  - Balance of payment is wider than balance of trade
  - Balance of trade is wider than balance of payment
- 7) Monetary policy is
- Formulated and implemented by RBI
  - Formulated by RBI but implemented by Finance Dept.
  - Formulated by Finance Dept and implemented by RBI
  - Neither formulated nor implemented by RBI
- 8) RBI was established under
- |                                 |                             |
|---------------------------------|-----------------------------|
| a) Banking Regulation Act, 1949 | b) RBI Act, 1935            |
| c) RBI Act, 1934                | d) Govt. of India Act, 1935 |
- 9) Consumption is majorly influenced by
- |           |            |             |                  |
|-----------|------------|-------------|------------------|
| a) Income | b) Pricing | c) Taxation | d) Advertisement |
|-----------|------------|-------------|------------------|
- 10) Inflation refers to
- Continuous rise in prices
  - Continuous fall in prices
  - No change in the prices
  - Price has no relation with inflation
-



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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
ECONOMICS  
(Self Learning – H.S.S.)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

**Instructions :** 1) Attempt **any four** questions out of Q. 2 to 7.  
2) Figures to the **right** indicate marks.

2. Define Economics. Explain the importance of economics theories for business firms. 10
  3. “Law of demand shall come into effect only on remaining other things constant” – Discuss. 10
  4. Examine critically the laws of return to scale. 10
  5. What do you understand by National Income ? How it is measured in any country ? 10
  6. What is Central Banking ? In what respect it is different from commercial banking ? 10
  7. What do you understand by international trade ? Why countries go for international trade ? 10
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SLR-TJ – 603

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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
ECONOMICS  
(Self Learning – H.S.S.)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Total Marks : 50

- Instructions :** 1) Attempt **any four** questions out of Q. 2 to 7.  
2) Figures at **right** indicates marks.  
3) Q. No. 1 is **compulsory**. It should be solved in **first 15 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 : 15 Minutes

Marks : 10

1. Choose the correct alternatives :

10

- 1) Consumption is majorly influenced by
  - a) Income
  - b) Pricing
  - c) Taxation
  - d) Advertisement
- 2) Inflation refers to
  - a) Continuous rise in prices
  - b) Continuous fall in prices
  - c) No change in the prices
  - d) Price has no relation with inflation
- 3) Monetary policy is
  - a) Formulated and implemented by RBI
  - b) Formulated by RBI but implemented by Finance Dept.
  - c) Formulated by Finance Dept and implemented by RBI
  - d) Neither formulated nor implemented by RBI
- 4) RBI was established under
  - a) Banking Regulation Act, 1949
  - b) RBI Act, 1935
  - c) RBI Act, 1934
  - d) Govt. of India Act, 1935
- 5) Macro study is
  - a) Study of individual
  - b) Study of aggregate
  - c) Both above
  - d) None of above

P.T.O.



- 6) Utility analysis is
    - a) Subjective and changes
    - b) Objective and des no change
    - c) Can be measured numerically
    - d) Not measurable at all by any means
  - 7) Demand is always influenced, as per law of demand, by
    - a) Price of commodity under reference
    - b) Price of substitute commodity
    - c) By both above
    - d) By none above
  - 8) If the price of petrol continuously increase, it will create
    - a) Positive impact on demand of scooter
    - b) Negative impact on demand of scooter
    - c) Shall not create any impact
    - d) All above alternatives are irrelevant
  - 9) International trade is a trade between
    - a) Two different firms in the same country
    - b) Two different industries in the same country
    - c) Two different firms in different countries
    - d) Two different regions in the same country
  - 10) Balance of trade and balance of payment are
    - a) Same concepts
    - b) Different in matter of quantity of trade
    - c) Balance of payment is wider than balance of trade
    - d) Balance of trade is wider than balance of payment
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
ECONOMICS  
(Self Learning – H.S.S.)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

**Instructions :** 1) Attempt **any four** questions out of Q. 2 to 7.  
2) Figures to the **right** indicate marks.

2. Define Economics. Explain the importance of economics theories for business firms. 10
  3. “Law of demand shall come into effect only on remaining other things constant” – Discuss. 10
  4. Examine critically the laws of return to scale. 10
  5. What do you understand by National Income ? How it is measured in any country ? 10
  6. What is Central Banking ? In what respect it is different from commercial banking ? 10
  7. What do you understand by international trade ? Why countries go for international trade ? 10
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SLR-TJ – 603

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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
ECONOMICS  
(Self Learning – H.S.S.)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Total Marks : 50

- Instructions :** 1) Attempt **any four** questions out of Q. 2 to 7.  
2) Figures at **right** indicates marks.  
3) Q. No. 1 is **compulsory**. It should be solved in **first 15 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 : 15 Minutes

Marks : 10

1. Choose the correct alternatives : 10
- 1) International trade is a trade between
    - a) Two different firms in the same country
    - b) Two different industries in the same country
    - c) Two different firms in different countries
    - d) Two different regions in the same country
  - 2) Balance of trade and balance of payment are
    - a) Same concepts
    - b) Different in matter of quantity of trade
    - c) Balance of payment is wider than balance of trade
    - d) Balance of trade is wider than balance of payment
  - 3) Consumption is majorly influenced by
    - a) Income
    - b) Pricing
    - c) Taxation
    - d) Advertisement
  - 4) Inflation refers to
    - a) Continuous rise in prices
    - b) Continuous fall in prices
    - c) No change in the prices
    - d) Price has no relation with inflation

P.T.O.



- 5) Demand is always influenced, as per law of demand, by
- Price of commodity under reference
  - Price of substitute commodity
  - By both above
  - By none above
- 6) If the price of petrol continuously increase, it will create
- Positive impact on demand of scooter
  - Negative impact on demand of scooter
  - Shall not create any impact
  - All above alternatives are irrelevant
- 7) Macro study is
- |                        |                       |
|------------------------|-----------------------|
| a) Study of individual | b) Study of aggregate |
| c) Both above          | d) None of above      |
- 8) Utility analysis is
- Subjective and changes
  - Objective and des no change
  - Can be measured numerically
  - Not measurable at all by any means
- 9) Monetary policy is
- Formulated and implemented by RBI
  - Formulated by RBI but implemented by Finance Dept.
  - Formulated by Finance Dept and implemented by RBI
  - Neither formulated nor implemented by RBI
- 10) RBI was established under
- |                                 |                             |
|---------------------------------|-----------------------------|
| a) Banking Regulation Act, 1949 | b) RBI Act, 1935            |
| c) RBI Act, 1934                | d) Govt. of India Act, 1935 |
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
ECONOMICS  
(Self Learning – H.S.S.)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

**Instructions :** 1) Attempt **any four** questions out of Q. 2 to 7.  
2) Figures to the **right** indicate marks.

2. Define Economics. Explain the importance of economics theories for business firms. 10
  3. “Law of demand shall come into effect only on remaining other things constant” – Discuss. 10
  4. Examine critically the laws of return to scale. 10
  5. What do you understand by National Income ? How it is measured in any country ? 10
  6. What is Central Banking ? In what respect it is different from commercial banking ? 10
  7. What do you understand by international trade ? Why countries go for international trade ? 10
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SLR-TJ – 603

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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
ECONOMICS  
(Self Learning – H.S.S.)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Total Marks : 50

- Instructions :**
- 1) Attempt **any four** questions out of Q. 2 to 7.
  - 2) Figures at **right** indicates marks.
  - 3) Q. No. 1 is **compulsory**. It should be solved in **first 15 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 : 15 Minutes

Marks : 10

1. Choose the correct alternatives :

10

- 1) Demand is always influenced, as per law of demand, by
  - a) Price of commodity under reference
  - b) Price of substitute commodity
  - c) By both above
  - d) By none above
- 2) If the price of petrol continuously increase, it will create
  - a) Positive impact on demand of scooter
  - b) Negative impact on demand of scooter
  - c) Shall not create any impact
  - d) All above alternatives are irrelevant
- 3) International trade is a trade between
  - a) Two different firms in the same country
  - b) Two different industries in the same country
  - c) Two different firms in different countries
  - d) Two different regions in the same country

P.T.O.



- 4) Balance of trade and balance of payment are
- a) Same concepts
  - b) Different in matter of quantity of trade
  - c) Balance of payment is wider than balance of trade
  - d) Balance of trade is wider than balance of payment
- 5) Monetary policy is
- a) Formulated and implemented by RBI
  - b) Formulated by RBI but implemented by Finance Dept.
  - c) Formulated by Finance Dept and implemented by RBI
  - d) Neither formulated nor implemented by RBI
- 6) RBI was established under
- a) Banking Regulation Act, 1949
  - b) RBI Act, 1935
  - c) RBI Act, 1934
  - d) Govt. of India Act, 1935
- 7) Consumption is majorly influenced by
- a) Income
  - b) Pricing
  - c) Taxation
  - d) Advertisement
- 8) Inflation refers to
- a) Continuous rise in prices
  - b) Continuous fall in prices
  - c) No change in the prices
  - d) Price has no relation with inflation
- 9) Macro study is
- a) Study of individual
  - b) Study of aggregate
  - c) Both above
  - d) None of above
- 10) Utility analysis is
- a) Subjective and changes
  - b) Objective and des no change
  - c) Can be measured numerically
  - d) Not measurable at all by any means
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**T.E. (All Branches) (Part – I(CGPA) Examination, 2017  
ECONOMICS  
(Self Learning – H.S.S.)**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Marks : 40

**Instructions :** 1) Attempt **any four** questions out of Q. 2 to 7.  
2) Figures to the **right** indicate marks.

2. Define Economics. Explain the importance of economics theories for business firms. 10
  3. “Law of demand shall come into effect only on remaining other things constant” – Discuss. 10
  4. Examine critically the laws of return to scale. 10
  5. What do you understand by National Income ? How it is measured in any country ? 10
  6. What is Central Banking ? In what respect it is different from commercial banking ? 10
  7. What do you understand by international trade ? Why countries go for international trade ? 10
-









2. Explain the individual ways to stress management. **10**
  3. Elaborate on the common sources of stress. **10**
  4. The consequences of stress can be harmful. Explain this statement. **10**
  5. Highlight the role of social support in minimising the effects of stress. **10**
  6. Define stress and state the current and historical status of stress. **10**
  7. Explain the nature of stress response. **10**
-



SLR-TJ – 605

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| Set | <b>P</b> |
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT  
AND MANAGEMENT (Self Learning (HSS))**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- N.B. :** 1) Attempt **all** questions.  
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 correct answers :

**10**

- 1) What is the term of a patent ?
  - a) 35 years
  - b) 25 years
  - c) 20 years
  - d) 15 years
- 2) What is copyright meant for ?
  - a) Film work
  - b) Books
  - c) Essay
  - d) All the above
- 3) A person develops a new process for making cheese from milk having low Fats and Cholesterol. He wishes to protect it. Which form of IPR would be suitable ?
  - a) Patent
  - b) Copyright
  - c) Trademarks
  - d) Industrial Design
- 4) The legislation covering Intellectual Property Right in India for Information Technology is
  - a) Information Technology Act, 2003
  - b) Information Technology Act, 2000
  - c) Information Technology Act, 2008
  - d) None of the above

P.T.O.



- 5) The first Patent Law was enacted in India in the year
- a) 1856
  - b) 1880
  - c) 1905
  - d) 1850
- 6) No patent shall be granted in respect of an invention relating to
- a) Atomic energy
  - b) Bio energy
  - c) Solar energy
  - d) Wind energy
- 7) Which of the following is not specifically protected by intellectual property legislation ?
- a) Industrial designs
  - b) Trademarks
  - c) Copyrights
  - d) Trade secrets
- 8) All of the following are examples of intellectual property protections EXCEPT
- a) Copyrights
  - b) Patents
  - c) Contracts
  - d) Trademarks
- 9) Intellectual Property Rights are result of
- a) Mental work
  - b) Physical work
  - c) Technical work
  - d) Communication
- 10) To apply for a patent, an inventor must
- a) File an application at a patent office which must comply with formal and technical requirements
  - b) Draft the full specification of the patent they seek, which cannot be later amended
  - c) Demonstrate that their invention works
  - d) None of above
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT  
AND MANAGEMENT (Self Learning (HSS))**

Day and Date : Wednesday, 13-12-2017

Marks : 40

Time : 10.00 a.m. to 12.00 noon

- N.B. :** 1) Attempt **all** questions.  
2) Figures to the **right** indicate **full** marks.

2. What are the essential requirements for granting patent ? Explain in detail. **10**
3. Elaborate the Indian Patent Act, 1970. **10**

OR

3. Explain role of confidentiality and information security in technology development. **10**
4. Write short notes on **any four** : **20**
- 1) Copyrights
  - 2) Trade secrets
  - 3) Biotechnology and intellectual property
  - 4) Publication and examination of patent applications
  - 5) Protection of traditional knowledge
  - 6) Copyright issues in creative works.





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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT  
AND MANAGEMENT (Self Learning (HSS))**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- N.B. :** 1) Attempt **all** questions.  
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 correct answers :

**10**

- 1) Intellectual Property Rights are result of
  - a) Mental work
  - b) Physical work
  - c) Technical work
  - d) Communication
- 2) To apply for a patent, an inventor must
  - a) File an application at a patent office which must comply with formal and technical requirements
  - b) Draft the full specification of the patent they seek, which cannot be later amended
  - c) Demonstrate that their invention works
  - d) None of above
- 3) Which of the following is not specifically protected by intellectual property legislation ?
  - a) Industrial designs
  - b) Trademarks
  - c) Copyrights
  - d) Trade secrets
- 4) All of the following are examples of intellectual property protections EXCEPT
  - a) Copyrights
  - b) Patents
  - c) Contracts
  - d) Trademarks

P.T.O.







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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT  
AND MANAGEMENT (Self Learning (HSS))**

Day and Date : Wednesday, 13-12-2017

Marks : 40

Time : 10.00 a.m. to 12.00 noon

- N.B. :** 1) Attempt **all** questions.  
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2. What are the essential requirements for granting patent ? Explain in detail. **10**
3. Elaborate the Indian Patent Act, 1970. **10**

OR

3. Explain role of confidentiality and information security in technology development. **10**
4. Write short notes on **any four** : **20**
- 1) Copyrights
  - 2) Trade secrets
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  - 4) Publication and examination of patent applications
  - 5) Protection of traditional knowledge
  - 6) Copyright issues in creative works.





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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT  
AND MANAGEMENT (Self Learning (HSS))**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

- N.B. :**
- 1) Attempt **all** questions.
  - 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 correct answers :

**10**

- 1) The first Patent Law was enacted in India in the year
  - a) 1856
  - b) 1880
  - c) 1905
  - d) 1850
- 2) No patent shall be granted in respect of an invention relating to
  - a) Atomic energy
  - b) Bio energy
  - c) Solar energy
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- 3) Intellectual Property Rights are result of
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  - b) Draft the full specification of the patent they seek, which cannot be later amended
  - c) Demonstrate that their invention works
  - d) None of above

**P.T.O.**



- 5) A person develops a new process for making cheese from milk having low Fats and Cholesterol. He wishes to protect it. Which form of IPR would be suitable ?
- a) Patent  
b) Copyright  
c) Trademarks  
d) Industrial Design
- 6) The legislation covering Intellectual Property Right in India for Information Technology is
- a) Information Technology Act, 2003  
b) Information Technology Act, 2000  
c) Information Technology Act, 2008  
d) None of the above
- 7) What is the term of a patent ?
- a) 35 years  
b) 25 years  
c) 20 years  
d) 15 years
- 8) What is copyright meant for ?
- a) Film work  
b) Books  
c) Essay  
d) All the above
- 9) Which of the following is not specifically protected by intellectual property legislation ?
- a) Industrial designs  
b) Trademarks  
c) Copyrights  
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- 10) All of the following are examples of intellectual property protections EXCEPT
- a) Copyrights  
b) Patents  
c) Contracts  
d) Trademarks
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT  
AND MANAGEMENT (Self Learning (HSS))**

Day and Date : Wednesday, 13-12-2017

Marks : 40

Time : 10.00 a.m. to 12.00 noon

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OR

3. Explain role of confidentiality and information security in technology development. **10**
4. Write short notes on **any four** : **20**
- 1) Copyrights
  - 2) Trade secrets
  - 3) Biotechnology and intellectual property
  - 4) Publication and examination of patent applications
  - 5) Protection of traditional knowledge
  - 6) Copyright issues in creative works.





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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
INTELLECTUAL PROPERTY RIGHTS FOR TECHNOLOGY DEVELOPMENT  
AND MANAGEMENT (Self Learning (HSS))**

Day and Date : Wednesday, 13-12-2017  
Time : 10.00 a.m. to 12.00 noon

Max. Marks : 50

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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 correct answers :

**10**

- 1) A person develops a new process for making cheese from milk having low Fats and Cholesterol. He wishes to protect it. Which form of IPR would be suitable ?
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  - b) Copyright
  - c) Trademarks
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  - c) 1905
  - d) 1850
- 4) No patent shall be granted in respect of an invention relating to
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  - b) Bio energy
  - c) Solar energy
  - d) Wind energy

P.T.O.



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  - b) Trademarks
  - c) Copyrights
  - d) Trade secrets
- 6) All of the following are examples of intellectual property protections EXCEPT
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**T.E. (All Branches) (Part – I) (CGPA) Examination, 2017  
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  - 6) Copyright issues in creative works.

