SLR-TC – 474

Seat No.	

Set **P**

S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

N. B. : 1) *Figures to extreme **right** indicates marks.*
2) ***Use** of calculator is **allowed**.*
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=14)**

1) The complementary function of $(D-2)^2y = e^{2x}$ is
a) $2C_1e^{2x}$ b) $(C_1 + C_2x)e^x$ c) $(C_1 + C_2x + C_3x^2)C^{2x}$ d) $C_1e^{2x} + xC_2e^{2x}$

2) The particular integral of $(D^2 + 2D + 1)y = \sqrt{x}\, e^{-x}$ is
a) $\frac{2}{15}e^x x^{5/2}$ b) $\frac{8}{15}e^{-x}x^{5/2}$ c) $\frac{4}{15}e^{-x}x^{5/2}$ d) $3e^{-x}x^{3/2}$

3) The solution of the differential equation $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + 2y = 0$ is
a) $x(C_1 \cos \log x + C_2 \sin \log x)$ b) $x^2(C_1 \cos \log x + C_2 \sin \log x)$
c) $C_1\cos^2 + C_2 \sin^2$ d) $(C_1 + C_2z)\cos z$

4) The solution of $\sqrt{p} + \sqrt{q} = 2x$ is z =
a) $(a + 2x)^3 + c$ b) $\frac{(a+2x)^3}{6} + a^2y + c$
c) $2(a + 2x)^3 + a^2y + c$ d) none of these

P.T.O.

5) The solution of $2p + 3q = 1$ is

a) $4(3x - 2y, y - 3z) = 0$ b) $4(3x + 2y, y + 3z) = 0$

c) $4(3x - 2y, y - z) = 0$ d) $4(3x + 2y, y - 3z) = 0$

6) If $x_k = 3^k$, $k \geq 0$, then $z(x_k) =$ _____ with $|z| > 3$.

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

7) If $z(x_k) = F(z)$ then $z(a^k x_k) =$ _____

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

8) In the Fourier expansion of $f(x) = 4 - x^2$ in the interval (0, 2) the constant term is

a) $\frac{4}{3}$ b) $\frac{8}{3}$ c) $\frac{16}{3\pi}$ d) 0

9) The Fourier series of $f(x) = 1 - x^2$ in $(-1, 1)$ contains

a) only sine terms b) only cosine terms

c) both sine and cosine terms d) expansion does not exist

10) The Fourier cosine transform of $f(x) = e^{-x}$, $x \geq 0$ is _____

a) $\frac{S}{1+S^2}$ b) $\frac{1}{1+S^2}$ c) $\frac{2}{\pi}\frac{1}{1+S^2}$ d) $\sqrt{\frac{2}{\pi}} \cdot \frac{1}{1+S^2}$

11) $L^{-1}\left[\frac{S-3}{S^2-6s+13}\right] =$

a) $e^{3t}\cos 2t$ b) $e^{t}\cos 3t$ c) $e^{t}\cos 6t$ d) $e^{3t}\cos 6t$

12) $L[e^{-t}\sin 4t] =$

a) $\frac{4}{S^2+17}$ b) $\frac{S+1}{(S+1)^2+4^2}$ c) $\frac{4}{(S-1)^2+4^2}$ d) $\frac{4}{(S+1)^2+4^2}$

13) A unit normal to the surface $2xy = Z$ at the point (2, 1, 2) is _____

a) $\frac{1}{\sqrt{21}}(2i + 4j - k)$ b) $\frac{1}{\sqrt{21}}(4i + 2j)$ c) $\frac{1}{3}(2i + 4j - k)$ d) None of these

14) Find 'a' such that the vector field
$\bar{F} = (ax + 4y^2z)i + (x^3\sin z - 3y)j - (e^x + 4\cos(x^2y))k$ is solenoidal

a) $a = 0$ b) $a = 1$ c) $a = 4$ d) $a = 3$

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SLR-TC – 474

Seat No.	

S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. a) Solve $(D^3 - 1)y = (e^x + 1)^2$. **3**

b) Solve $(D^2 + 4)y = x\sin x$. **3**

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

If $\omega = \frac{1}{\sqrt{LC}}$ and initially $Q = Q_0$ and the current $i = i_0$ at $t = 0$, show that the charge at any time t is given by $Q = Q_o \cos\omega t + \frac{i_o}{\omega} \sin\omega t + \frac{E_o}{2L\omega} t \sin\omega t$. **4**

3. a) Solve the Legendre's equation

$$(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 2\sin\log(1+x).$$ **4**

b) Solve $z^2 = (p^2 + q^2 + 1)$. **2**

c) Solve $z^2(p^2 + q^2) = x^2 + y^2$. **3**

4. a) Find the z-transform of the following functions : **5**

   i) $x_k = \left(\frac{1}{4}\right)^{|k|}$ for all k.

   ii) $x_k = \frac{ak}{k}, k \geq 1$

   iii) Find z-transform of unit step function U(k) = 1, $k \geq 0$.

   b) Find $z^{-1}\left(\frac{z}{(z-3)(z-2)}\right)$ for $2 < |z| < 3$. **4**

5. Attempt **any three** :

   a) Solve the following partial differential equation by the method of separation of variables $\frac{\partial z}{\partial x} = K\frac{\partial z}{\partial y}$. **3**

   b) Solve $(D^2 + 5D + 4)y = 3 - 2x$. **3**

   c) Solve $xzp + yzq = z^2$. **3**

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

SECTION – II

6. a) Find half range sine series for f(x), where **5**

$$f(x) = \begin{cases} x & \text{for } 0 < x < \pi/2 \\ (\pi - x) & \text{for } \pi/2 < x < \pi \end{cases}$$

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

   b) Find Fourier series for $f(x) = x^2$ in $(-\pi, \pi)$. **4**

7. a) Express the function $f(x) = \begin{cases} \pi/2 & \text{for } 0 < x < \pi \\ 0 & \text{for } x < \pi \end{cases}$ as Fourier sine integral.

   Hence show that $\int_0^\infty \frac{1-\cos\pi\omega}{\omega} \cdot \sin\omega x = \frac{\pi}{2}$ when $0 < x < \pi$. **4**

Set P

b) Find the Inverse Laplace transform of $\frac{S}{(S^2+16)^2}$ by convolution theorem. **3**

c) Find Inverse Laplace transform of $\frac{(S+29)}{(S+4)(S^2+9)}$ by partial fractions or otherwise. **3**

8. a) Find the directional derivative of $\phi = xy^2 + yz^3$ at (1, –1, 1) along :

i) The vector i + 2j + 2k

ii) Towards the point (2, 1, –1)

iii) Along the direction of normal to the surface $x^2 + y^2 + z^2 = 9$ at (1, 2, 2). **5**

b) For a constant vector $\bar{a}$ show that

i) $\nabla(\bar{a} \cdot \bar{r}) = \bar{a}$

ii) $\nabla \times (\bar{a} \times \bar{r}) = 2\bar{a}$. **4**

9. Attempt **any 3** :

a) Solve by using Laplace Transform $\frac{d^2y}{dx^2} + 25y = 10 \cos 5t$, with y(0) = 2, y′(0) = 0. **3**

b) If the directional derivative of $\phi = axy + byz + czx$ at (1, 1, 1) has maximum magnitude and in the direction parallel to x-axis, find the values of a, b and c. **3**

c) Find the Fourier series expansion of $f(x) = \frac{1}{2}(\pi - x)$ in $(0, 2\pi)$. **3**

d) If $f_s(S) = \frac{e^{-as}}{S}$, find f(x). Hence obtain the inverse Fourier sine transform of $\frac{1}{S}$. **3**

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Set P

SLR-TC – 474

Seat No.	

Set Q

S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
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Duration : 30 Minutes Marks : 14

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1) In the Fourier expansion of $f(x) = 4 - x^2$ in the interval (0, 2) the constant term is

a) $\frac{4}{3}$ b) $\frac{8}{3}$ c) $\frac{16}{3\pi}$ d) 0

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P.T.O.

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SLR-TC – 474

Seat No.	

S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56

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SECTION – I

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SECTION – II

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Set Q

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Set Q

SLR-TC – 474

Seat No.	

Set **R**

S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

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MCQ/Objective Type Questions

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1) The solution of $2p + 3q = 1$ is
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2) If $x_k = 3^k$, $k \geq 0$, then $z(x_k) =$ _____ with $|z| > 3$.
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P.T.O.

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SLR-TC – 474

Seat No.	

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SECTION – I

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   b) Find $z^{-1}\left(\frac{z}{(z-3)(z-2)}\right)$ for $2 < |z| < 3$. **4**

5. Attempt **any three** :

   a) Solve the following partial differential equation by the method of separation of variables $\frac{\partial z}{\partial x} = K\frac{\partial z}{\partial y}$. **3**

   b) Solve $(D^2 + 5D + 4)y = 3 - 2x$. **3**

   c) Solve $xzp + yzq = z^2$. **3**

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

SECTION – II

6. a) Find half range sine series for f(x), where **5**

$$f(x) = \begin{cases} x & \text{for } 0 < x < \pi/2 \\ (\pi - x) & \text{for } \pi/2 < x < \pi \end{cases}$$

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

   b) Find Fourier series for $f(x) = x^2$ in $(-\pi, \pi)$. **4**

7. a) Express the function $f(x) = \begin{cases} \pi/2 & \text{for } 0 < x < \pi \\ 0 & \text{for } x < \pi \end{cases}$ as Fourier sine integral.

   Hence show that $\int_0^\infty \frac{1-\cos\pi\omega}{\omega} \cdot \sin\omega x = \frac{\pi}{2}$ when $0 < x < \pi$. **4**

Set R

b) Find the Inverse Laplace transform of $\frac{S}{(S^2+16)^2}$ by convolution theorem. **3**

c) Find Inverse Laplace transform of $\frac{(S+29)}{(S+4)(S^2+9)}$ by partial fractions or otherwise. **3**

8. a) Find the directional derivative of $\phi = xy^2 + yz^3$ at (1, –1, 1) along :

i) The vector i + 2j + 2k

ii) Towards the point (2, 1, –1)

iii) Along the direction of normal to the surface $x^2 + y^2 + z^2 = 9$ at (1, 2, 2). **5**

b) For a constant vector $\bar{a}$ show that

i) $\nabla(\bar{a} \cdot \bar{r}) = \bar{a}$

ii) $\nabla \times (\bar{a} \times \bar{r}) = 2\bar{a}$. **4**

9. Attempt **any 3** :

a) Solve by using Laplace Transform $\frac{d^2y}{dx^2} + 25y = 10 \cos 5t$, with y(0) = 2, y′(0) = 0. **3**

b) If the directional derivative of $\phi = axy + byz + czx$ at (1, 1, 1) has maximum magnitude and in the direction parallel to x-axis, find the values of a, b and c. **3**

c) Find the Fourier series expansion of $f(x) = \frac{1}{2}(\pi - x)$ in $(0, 2\pi)$. **3**

d) If $f_s(S) = \frac{e^{-as}}{S}$, find f(x). Hence obtain the inverse Fourier sine transform of $\frac{1}{S}$. **3**

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Set R

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Seat No.	

Set S

S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

N. B. : *1) Figures to extreme **right** indicates marks.*
*2) **Use** of calculator is **allowed**.*
*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=14)**

1) The Fourier cosine transform of $f(x) = e^{-x}$, $x \geq 0$ is _____

a) $\frac{S}{1+S^2}$ b) $\frac{1}{1+S^2}$ c) $\frac{2}{\pi}\frac{1}{1+S^2}$ d) $\sqrt{\frac{2}{\pi}}\cdot\frac{1}{1+S^2}$

2) $L^{-1}\left[\frac{S-3}{S^2-6s+13}\right] =$

a) $e^{3t}\cos 2t$ b) $e^{t}\cos 3t$ c) $e^{t}\cos 6t$ d) $e^{3t}\cos 6t$

3) $L[e^{-t}\sin 4t] =$

a) $\frac{4}{S^2+17}$ b) $\frac{S+1}{(S+1)^2+4^2}$ c) $\frac{4}{(S-1)^2+4^2}$ d) $\frac{4}{(S+1)^2+4^2}$

4) A unit normal to the surface $2xy = Z$ at the point (2, 1, 2) is _____

a) $\frac{1}{\sqrt{21}}(2i+4j-k)$ b) $\frac{1}{\sqrt{21}}(4i+2j)$ c) $\frac{1}{3}(2i+4j-k)$ d) None of these

P.T.O.

5) Find 'a' such that the vector field
$\bar{F} = (ax + 4y^2z)i + (x^3\sin z - 3y)j - (e^x + 4\cos(x^2y))k$ is solenoidal

a) a = 0 b) a = 1 c) a = 4 d) a = 3

6) The complementary function of $(D-2)^2y = e^{2x}$ is

a) $2C_1e^{2x}$ b) $(C_1 + C_2x)e^x$ c) $(C_1 + C_2x + C_3x^2)C^{2x}$ d) $C_1e^{2x} + xC_2e^{2x}$

7) The particular integral of $(D^2 + 2D + 1)y = \sqrt{x}\, e^{-x}$ is

a) $\frac{2}{15}e^x x^{5/2}$ b) $\frac{8}{15}e^{-x}x^{5/2}$ c) $\frac{4}{15}e^{-x}x^{5/2}$ d) $3e^{-x}x^{3/2}$

8) The solution of the differential equation $x^2\frac{d^2y}{dx^2} - x\frac{dy}{dx} + 2y = 0$ is

a) $x(C_1 \cos \log x + C_2 \sin \log x)$ b) $x^2(C_1 \cos \log x + C_2 \sin \log x)$

c) $C_1\cos^2 + C_2\sin^2$ d) $(C_1 + C_2z)\cos z$

9) The solution of $\sqrt{p} + \sqrt{q} = 2x$ is z =

a) $(a + 2x)^3 + c$ b) $\frac{(a+2x)^3}{6} + a^2y + c$

c) $2(a + 2x)^3 + a^2y + c$ d) none of these

10) The solution of 2p + 3q = 1 is

a) 4(3x – 2y, y – 3z) = 0 b) 4(3x + 2y, y + 3z) = 0

c) 4(3x – 2y, y – z) = 0 d) 4(3x + 2y, y – 3z) = 0

11) If $x_k = 3^k$, $k \geq 0$, then $z(x_k)$ = _____ with $|z| > 3$.

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

12) If $z(x_k) = F(z)$ then $z(a^kx_k)$ = _____

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

13) In the Fourier expansion of $f(x) = 4 - x^2$ in the interval (0, 2) the constant term is

a) $\frac{4}{3}$ b) $\frac{8}{3}$ c) $\frac{16}{3\pi}$ d) 0

14) The Fourier series of $f(x) = 1 - x^2$ in (–1, 1) contains

a) only sine terms b) only cosine terms

c) both sine and cosine terms d) expansion does not exist

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Seat No.	

S.E. (E&E) (Part – I) (Old CGPA) Examination, 2018
ENGINEERING MATHEMATICS – III

Day and Date : Thursday, 3-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. a) Solve $(D^3 - 1)y = (e^x + 1)^2$. **3**

b) Solve $(D^2 + 4)y = x\sin x$. **3**

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

If $\omega = \frac{1}{\sqrt{LC}}$ and initially $Q = Q_0$ and the current $i = i_0$ at $t = 0$, show that the charge at any time t is given by $Q = Q_o \cos\omega t + \frac{i_o}{\omega} \sin\omega t + \frac{E_o}{2L\omega} t \sin\omega t$. **4**

3. a) Solve the Legendre's equation

$$(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 2\sin\log(1+x).$$ **4**

b) Solve $z^2 = (p^2 + q^2 + 1)$. **2**

c) Solve $z^2(p^2 + q^2) = x^2 + y^2$. **3**

4. a) Find the z-transform of the following functions : **5**

   i) $x_k = \left(\frac{1}{4}\right)^{|k|}$ for all k.

   ii) $x_k = \frac{ak}{k}, k \geq 1$

   iii) Find z-transform of unit step function U(k) = 1, $k \geq 0$.

   b) Find $z^{-1}\left(\frac{z}{(z-3)(z-2)}\right)$ for $2 < |z| < 3$. **4**

5. Attempt **any three** :

   a) Solve the following partial differential equation by the method of separation of variables $\frac{\partial z}{\partial x} = K\frac{\partial z}{\partial y}$. **3**

   b) Solve $(D^2 + 5D + 4)y = 3 - 2x$. **3**

   c) Solve $xzp + yzq = z^2$. **3**

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

SECTION – II

6. a) Find half range sine series for f(x), where **5**

$$f(x) = \begin{cases} x & \text{for } 0 < x < \pi/2 \\ (\pi - x) & \text{for } \pi/2 < x < \pi \end{cases}$$

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

   b) Find Fourier series for $f(x) = x^2$ in $(-\pi, \pi)$. **4**

7. a) Express the function $f(x) = \begin{cases} \pi/2 & \text{for } 0 < x < \pi \\ 0 & \text{for } x < \pi \end{cases}$ as Fourier sine integral.

   Hence show that $\int_0^\infty \frac{1-\cos\pi\omega}{\omega} \cdot \sin\omega x = \frac{\pi}{2}$ when $0 < x < \pi$. **4**

Set S

b) Find the Inverse Laplace transform of $\frac{S}{(S^2+16)^2}$ by convolution theorem. **3**

c) Find Inverse Laplace transform of $\frac{(S+29)}{(S+4)(S^2+9)}$ by partial fractions or otherwise. **3**

8. a) Find the directional derivative of $\phi = xy^2 + yz^3$ at (1, –1, 1) along :

i) The vector i + 2j + 2k

ii) Towards the point (2, 1, –1)

iii) Along the direction of normal to the surface $x^2 + y^2 + z^2 = 9$ at (1, 2, 2). **5**

b) For a constant vector $\bar{a}$ show that

i) $\nabla(\bar{a} \cdot \bar{r}) = \bar{a}$

ii) $\nabla \times (\bar{a} \times \bar{r}) = 2\bar{a}$. **4**

9. Attempt **any 3** :

a) Solve by using Laplace Transform $\frac{d^2y}{dx^2} + 25y = 10 \cos 5t$, with y(0) = 2, y′(0) = 0. **3**

b) If the directional derivative of $\phi = axy + byz + czx$ at (1, 1, 1) has maximum magnitude and in the direction parallel to x-axis, find the values of a, b and c. **3**

c) Find the Fourier series expansion of $f(x) = \frac{1}{2}(\pi - x)$ in $(0, 2\pi)$. **3**

d) If $f_s(S) = \frac{e^{-as}}{S}$, find f(x). Hence obtain the inverse Fourier sine transform of $\frac{1}{S}$. **3**

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Set S

SLR-TC – 475

Seat No.	

Set **P**

S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018
DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 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 alternative : **(1×14=14)**

1) In Dc generator armature reaction is produced actually by
   a) Its field current b) Field pole winding
   c) Armature conductor d) Load current in armature

2) Back E.M.F. in a DC motor
   a) Opposes the applied voltage b) Aids the applied voltage
   c) Aids the armature current d) None of the above

3) _____ motor should be never started at no load.
   a) Series b) Shunt
   c) Long compound d) Short compound

4) Which of the load would be best driven by DC compound motor ?
   a) Reciprocating pump b) Electric locomotive
   c) Centrifugal pump d) Fan

5) The speed of DC motor can be controlled by varying
   a) Its flux per pole b) Resistance of armature circuit
   c) Applied voltage d) All of the above

6) Which of the following is power equation ?
   a) $VI_a = E_bI_a + I_a \text{ ^ } 2R_a$ b) $V = E_bI_a + I_a \text{ ^ } 2R_a$
   c) $I_a \text{ ^ } 2V = E_bI_a \text{ ^ } 2 + I_a \text{ ^ } 2R_a$ d) $V = E_b + I_aR_a$

7) The E.M.F. induced in DC machine is _____ E.M.F.
   a) Dynamically
   b) Statically
   c) Both a) and b)
   d) None of the above

8) A transformer transfers electric power from primary to secondary usually with change in
   a) Frequency
   b) Voltage
   c) Power
   d) Time period

9) The transformer has a full load Cu loss of 400 W, the Cu loss at half load is
   a) 100 W
   b) 1000 W
   c) 200 W
   d) 400 W

10) The efficiency of single phase transformer is given by
   a) $n = (VA\ rating*\cos\phi)/[(VA\ rating*\cos\phi) + Pi + Pcu]$
   b) $n = (V_2I_2\cos\phi)/[(V_2I_2\cos\phi) + Pi + Pcu]$
   c) Both a) and b)
   d) None of the above

11) A Universal motor is one which
   a) Is available universally
   b) Can be marketed internationally
   c) Can be operated either on DC or AC supply
   d) Runs at dangerously high speed on no load

12) A transformer having 1000 primary turns is connected to 200 V AC supply, for a secondary voltage of 400 V, the no. of turns for the secondary should be
   a) 1600
   b) 2000
   c) 2500
   d) 1250

13) In parallel operation of 3 ph transformer it is essential to have _____ phase sequence.
   a) 120
   b) 90
   c) same
   d) opposite

14) The primary and secondary of a transformer are _____ coupled.
   a) Electrically
   b) Magnetically
   c) Electrically and Magnetically
   d) None of the above

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SLR-TC – 475

Seat No.	

S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018
DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) Draw and explain the power stages of a DC machine.
   b) Explain three point starter with neat diagram.
   c) Why DC series motor should not be started on no-load ?
   d) What is armature reaction ? Explain its two important effects in case of 2 pole generator.
   e) A 250 V, 4 pole, wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75Ω. The motor takes a current of 40 A. Find its speed and gross torque developed if it has a flux per pole of 25 mwb.

3. Solve **any two** : **(2×6=12)**
   a) Draw and explain torque-speed, armature current-torque and armature current-speed characteristics of DC shunt and series motor.
   b) A 250 V, 14.9 kW, 8 pole DC motor has single turn coils. The armature is wave wound with 94 commutator segments. If the brushes are given a lead of 2 commutator segments at full load, calculate
      a) Total armature reaction ampere turns per pole
      b) Cross magnetizing ampere turns per pole. Assume efficiency of 80%.
   c) What is back E.M.F. ? Explain its significance and derive equation for it.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Why transformer is called constant flux machine ?
   b) Explain operation of universal motor on both AC and DC.
   c) Draw phaser diagram of single phase transformer on resistive and capacitive load.

d) Explain the construction and working principle of single phase transformer.

e) A 150 kVA transformer has iron loss of 1.4 kW and full load Cu loss of 2.8 kW at 0.8 p.f. lagging. Calculate

i) Efficiency of transformer at full load.

ii) The maximum efficiency of the transformer.

5. Solve the following questions : **(2×6=12)**

a) Explain use of transformer having vector group YY 0, DY 1, DD 0 and DY 11. Draw the vector group with connection diagram for each group.

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.

OR

b) A 100 kVA, 3ϕ, 50 Hz, 3300/400 V transformer is delta connected on the H.V. side and star connected on the L.V. side. The resistance of the H.V. winding is 3.5 Ω per phase and that of L.V. winding 0.02 Ω per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency is 95.8% at 0.8 p.f. lagging.

SLR-TC – 475

Seat No.	

Set **Q**

S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018
DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 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 alternative : **(1×14=14)**

1) A transformer transfers electric power from primary to secondary usually with change in
   a) Frequency b) Voltage
   c) Power d) Time period

2) The transformer has a full load Cu loss of 400 W, the Cu loss at half load is
   a) 100 W b) 1000 W
   c) 200 W d) 400 W

3) The efficiency of single phase transformer is given by
   a) $n = (VA\ rating*\cos\phi)/[(VA\ rating*\cos\phi) + Pi + Pcu]$
   b) $n = (V_2I_2\cos\phi)/[(V_2I_2\cos\phi) + Pi + Pcu]$
   c) Both a) and b)
   d) None of the above

4) A Universal motor is one which
   a) Is available universally
   b) Can be marketed internationally
   c) Can be operated either on DC or AC supply
   d) Runs at dangerously high speed on no load

5) A transformer having 1000 primary turns is connected to 200 V AC supply, for a secondary voltage of 400 V, the no. of turns for the secondary should be
   a) 1600 b) 2000
   c) 2500 d) 1250

P.T.O.

6) In parallel operation of 3 ph transformer it is essential to have _____ phase sequence.
   a) 120 b) 90
   c) same d) opposite

7) The primary and secondary of a transformer are _____ coupled.
   a) Electrically b) Magnetically
   c) Electrically and Magnetically d) None of the above

8) In Dc generator armature reaction is produced actually by
   a) Its field current b) Field pole winding
   c) Armature conductor d) Load current in armature

9) Back E.M.F. in a DC motor
   a) Opposes the applied voltage b) Aids the applied voltage
   c) Aids the armature current d) None of the above

10) _____ motor should be never started at no load.
   a) Series b) Shunt
   c) Long compound d) Short compound

11) Which of the load would be best driven by DC compound motor ?
   a) Reciprocating pump b) Electric locomotive
   c) Centrifugal pump d) Fan

12) The speed of DC motor can be controlled by varying
   a) Its flux per pole b) Resistance of armature circuit
   c) Applied voltage d) All of the above

13) Which of the following is power equation ?
   a) $VI_a = E_bI_a + I_a \text{ ^ } 2R_a$ b) $V = E_bI_a + I_a \text{ ^ } 2R_a$
   c) $I_a \text{ ^ } 2V = E_bI_a \text{ ^ } 2 + I_a \text{ ^ } 2R_a$ d) $V = E_b + I_aR_a$

14) The E.M.F. induced in DC machine is _____ E.M.F.
   a) Dynamically b) Statically
   c) Both a) and b) d) None of the above

_____

SLR-TC – 475

Seat No.	

S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018
DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) Draw and explain the power stages of a DC machine.
   b) Explain three point starter with neat diagram.
   c) Why DC series motor should not be started on no-load ?
   d) What is armature reaction ? Explain its two important effects in case of 2 pole generator.
   e) A 250 V, 4 pole, wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75Ω. The motor takes a current of 40 A. Find its speed and gross torque developed if it has a flux per pole of 25 mwb.

3. Solve **any two** : **(2×6=12)**
   a) Draw and explain torque-speed, armature current-torque and armature current-speed characteristics of DC shunt and series motor.
   b) A 250 V, 14.9 kW, 8 pole DC motor has single turn coils. The armature is wave wound with 94 commutator segments. If the brushes are given a lead of 2 commutator segments at full load, calculate
      a) Total armature reaction ampere turns per pole
      b) Cross magnetizing ampere turns per pole. Assume efficiency of 80%.
   c) What is back E.M.F. ? Explain its significance and derive equation for it.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Why transformer is called constant flux machine ?
   b) Explain operation of universal motor on both AC and DC.
   c) Draw phaser diagram of single phase transformer on resistive and capacitive load.

Set Q

d) Explain the construction and working principle of single phase transformer.

e) A 150 kVA transformer has iron loss of 1.4 kW and full load Cu loss of 2.8 kW at 0.8 p.f. lagging. Calculate

i) Efficiency of transformer at full load.

ii) The maximum efficiency of the transformer.

5. Solve the following questions : **(2×6=12)**

a) Explain use of transformer having vector group YY 0, DY 1, DD 0 and DY 11. Draw the vector group with connection diagram for each group.

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.

OR

b) A 100 kVA, 3ϕ, 50 Hz, 3300/400 V transformer is delta connected on the H.V. side and star connected on the L.V. side. The resistance of the H.V. winding is 3.5 Ω per phase and that of L.V. winding 0.02 Ω per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency is 95.8% at 0.8 p.f. lagging.

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Seat No.	

Set **R**

S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018
DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 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 alternative : **(1×14=14)**

1) The speed of DC motor can be controlled by varying
   a) Its flux per pole
   b) Resistance of armature circuit
   c) Applied voltage
   d) All of the above

2) Which of the following is power equation ?
   a) $VI_a = E_bI_a + I_a \text{ ^ } 2R_a$
   b) $V = E_bI_a + I_a \text{ ^ } 2R_a$
   c) $I_a \text{ ^ } 2V = E_bI_a \text{ ^ } 2 + I_a \text{ ^ } 2R_a$
   d) $V = E_b + I_aR_a$

3) The E.M.F. induced in DC machine is _____ E.M.F.
   a) Dynamically
   b) Statically
   c) Both a) and b)
   d) None of the above

4) A transformer transfers electric power from primary to secondary usually with change in
   a) Frequency
   b) Voltage
   c) Power
   d) Time period

5) The transformer has a full load Cu loss of 400 W, the Cu loss at half load is
   a) 100 W
   b) 1000 W
   c) 200 W
   d) 400 W

6) The efficiency of single phase transformer is given by
   a) n = (VA rating*cosϕ)/[(VA rating*cosϕ) + Pi + Pcu]
   b) n = (V_2I_2cosϕ)/[(V_2I_2cosϕ) + Pi + Pcu]
   c) Both a) and b)
   d) None of the above

P.T.O.

7) A Universal motor is one which
   a) Is available universally
   b) Can be marketed internationally
   c) Can be operated either on DC or AC supply
   d) Runs at dangerously high speed on no load

8) A transformer having 1000 primary turns is connected to 200 V AC supply, for a secondary voltage of 400 V, the no. of turns for the secondary should be
   a) 1600 b) 2000
   c) 2500 d) 1250

9) In parallel operation of 3 ph transformer it is essential to have _____ phase sequence.
   a) 120 b) 90
   c) same d) opposite

10) The primary and secondary of a transformer are _____ coupled.
   a) Electrically b) Magnetically
   c) Electrically and Magnetically d) None of the above

11) In Dc generator armature reaction is produced actually by
   a) Its field current b) Field pole winding
   c) Armature conductor d) Load current in armature

12) Back E.M.F. in a DC motor
   a) Opposes the applied voltage b) Aids the applied voltage
   c) Aids the armature current d) None of the above

13) _____ motor should be never started at no load.
   a) Series b) Shunt
   c) Long compound d) Short compound

14) Which of the load would be best driven by DC compound motor ?
   a) Reciprocating pump b) Electric locomotive
   c) Centrifugal pump d) Fan

_____

SLR-TC – 475

Seat No.	

S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018
DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) Draw and explain the power stages of a DC machine.
   b) Explain three point starter with neat diagram.
   c) Why DC series motor should not be started on no-load ?
   d) What is armature reaction ? Explain its two important effects in case of 2 pole generator.
   e) A 250 V, 4 pole, wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75Ω. The motor takes a current of 40 A. Find its speed and gross torque developed if it has a flux per pole of 25 mwb.

3. Solve **any two** : **(2×6=12)**
   a) Draw and explain torque-speed, armature current-torque and armature current-speed characteristics of DC shunt and series motor.
   b) A 250 V, 14.9 kW, 8 pole DC motor has single turn coils. The armature is wave wound with 94 commutator segments. If the brushes are given a lead of 2 commutator segments at full load, calculate
      a) Total armature reaction ampere turns per pole
      b) Cross magnetizing ampere turns per pole. Assume efficiency of 80%.
   c) What is back E.M.F. ? Explain its significance and derive equation for it.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Why transformer is called constant flux machine ?
   b) Explain operation of universal motor on both AC and DC.
   c) Draw phaser diagram of single phase transformer on resistive and capacitive load.

Set R

d) Explain the construction and working principle of single phase transformer.

e) A 150 kVA transformer has iron loss of 1.4 kW and full load Cu loss of 2.8 kW at 0.8 p.f. lagging. Calculate

i) Efficiency of transformer at full load.

ii) The maximum efficiency of the transformer.

5. Solve the following questions : **(2×6=12)**

a) Explain use of transformer having vector group YY 0, DY 1, DD 0 and DY 11. Draw the vector group with connection diagram for each group.

b) Two single phase transformers with equal voltage ratios have impedances of (0.5 + j3)Ω and (0.6 + j10) Ω 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.

OR

b) A 100 kVA, 3ϕ, 50 Hz, 3300/400 V transformer is delta connected on the H.V. side and star connected on the L.V. side. The resistance of the H.V. winding is 3.5 Ω per phase and that of L.V. winding 0.02 Ω per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency is 95.8% at 0.8 p.f. lagging.

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SLR-TC – 475

Seat No.	

Set S

S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018
DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 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 alternative : **(1×14=14)**

1) The efficiency of single phase transformer is given by
   a) n = (VA rating*cosϕ)/[(VA rating*cosϕ) + Pi + Pcu]
   b) n = (V_2I_2cosϕ)/[(V_2I_2cosϕ) + Pi + Pcu]
   c) Both a) and b)
   d) None of the above

2) A Universal motor is one which
   a) Is available universally
   b) Can be marketed internationally
   c) Can be operated either on DC or AC supply
   d) Runs at dangerously high speed on no load

3) A transformer having 1000 primary turns is connected to 200 V AC supply, for a secondary voltage of 400 V, the no. of turns for the secondary should be
   a) 1600 b) 2000
   c) 2500 d) 1250

4) In parallel operation of 3 ph transformer it is essential to have _____ phase sequence.
   a) 120 b) 90
   c) same d) opposite

5) The primary and secondary of a transformer are _____ coupled.
   a) Electrically b) Magnetically
   c) Electrically and Magnetically d) None of the above

P.T.O.

6) In Dc generator armature reaction is produced actually by
   a) Its field current
   b) Field pole winding
   c) Armature conductor
   d) Load current in armature

7) Back E.M.F. in a DC motor
   a) Opposes the applied voltage
   b) Aids the applied voltage
   c) Aids the armature current
   d) None of the above

8) _____ motor should be never started at no load.
   a) Series
   b) Shunt
   c) Long compound
   d) Short compound

9) Which of the load would be best driven by DC compound motor ?
   a) Reciprocating pump
   b) Electric locomotive
   c) Centrifugal pump
   d) Fan

10) The speed of DC motor can be controlled by varying
   a) Its flux per pole
   b) Resistance of armature circuit
   c) Applied voltage
   d) All of the above

11) Which of the following is power equation ?
   a) $VI_a = E_b I_a + I_a \text{ ^ } 2R_a$
   b) $V = E_b I_a + I_a \text{ ^ } 2R_a$
   c) $I_a \text{ ^ } 2V = E_b I_a \text{ ^ } 2 + I_a \text{ ^ } 2R_a$
   d) $V = E_b + I_a R_a$

12) The E.M.F. induced in DC machine is _____ E.M.F.
   a) Dynamically
   b) Statically
   c) Both a) and b)
   d) None of the above

13) A transformer transfers electric power from primary to secondary usually with change in
   a) Frequency
   b) Voltage
   c) Power
   d) Time period

14) The transformer has a full load Cu loss of 400 W, the Cu loss at half load is
   a) 100 W
   b) 1000 W
   c) 200 W
   d) 400 W

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SLR-TC – 475

Seat No.	

S.E. (E & E) (Part – I) (Old CGPA) Examination, 2018
DC MACHINES AND TRANSFORMERS

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) Draw and explain the power stages of a DC machine.
   b) Explain three point starter with neat diagram.
   c) Why DC series motor should not be started on no-load ?
   d) What is armature reaction ? Explain its two important effects in case of 2 pole generator.
   e) A 250 V, 4 pole, wave wound series motor has 782 conductors on its armature. It has armature and series field resistance of 0.75Ω. The motor takes a current of 40 A. Find its speed and gross torque developed if it has a flux per pole of 25 mwb.

3. Solve **any two** : **(2×6=12)**
   a) Draw and explain torque-speed, armature current-torque and armature current-speed characteristics of DC shunt and series motor.
   b) A 250 V, 14.9 kW, 8 pole DC motor has single turn coils. The armature is wave wound with 94 commutator segments. If the brushes are given a lead of 2 commutator segments at full load, calculate
      a) Total armature reaction ampere turns per pole
      b) Cross magnetizing ampere turns per pole. Assume efficiency of 80%.
   c) What is back E.M.F. ? Explain its significance and derive equation for it.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Why transformer is called constant flux machine ?
   b) Explain operation of universal motor on both AC and DC.
   c) Draw phaser diagram of single phase transformer on resistive and capacitive load.

d) Explain the construction and working principle of single phase transformer.

e) A 150 kVA transformer has iron loss of 1.4 kW and full load Cu loss of 2.8 kW at 0.8 p.f. lagging. Calculate

i) Efficiency of transformer at full load.

ii) The maximum efficiency of the transformer.

5. Solve the following questions : **(2×6=12)**

a) Explain use of transformer having vector group YY 0, DY 1, DD 0 and DY 11. Draw the vector group with connection diagram for each group.

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.

OR

b) A 100 kVA, 3ϕ, 50 Hz, 3300/400 V transformer is delta connected on the H.V. side and star connected on the L.V. side. The resistance of the H.V. winding is 3.5 Ω per phase and that of L.V. winding 0.02 Ω per phase. Calculate the iron losses of the transformer at normal voltage and frequency if its full load efficiency is 95.8% at 0.8 p.f. lagging.

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SLR-TC – 476

Seat No.	

Set **P**

S.E. (Electrical and Electronics Engg.) (Part – I)
(Old CGPA) Examination, 2018
ELECTRICAL NETWORKS

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 : **(14×1=14)**

1) Which law plays a significant role in the loop analysis of the network ?
   a) KCL b) KVL
   c) Law of superposition theorem d) None of the above

2) If one of the resistors in a parallel circuit is removed, what happens to total resistance ?
   a) Decreases b) Increases
   c) Remains constant d) Exactly doubles

3) What will be the value of a rectangular (complete incidence) matrix, if an associated branch is oriented towards the node ?
   a) 1 b) –1
   c) 0 d) Not defined (∞)

P.T.O.

4) Which is the correct sequential order of steps to be undertaken while applying Thevenin's theorem ?
   A) Calculation of Thevenin's equivalent voltage
   B) Removal of branch impedance through which required current is to be estimated
   C) Estimation of equivalent impedance between two terminals of the branch
   D) Estimation of branch current by schematic representation of Thevenin's equivalent circuit
   a) A, C, B, D b) B, A, C, D
   c) D, A, C, B d) B, C, D, A

5) A tree has
   a) closed path b) no closed path c) single path d) none

6) An ideal current source has zero
   a) Internal resistance b) Internal conductance
   c) Ripple d) Voltage on the load

7) Superposition theorem can be applicable only to circuits having _____ elements.
   a) Non-linear b) Passive c) Resistive d) Linear bilateral

8) Which among the following condition is true at the resonance ?
   a) Xc > XL b) Xc = XL
   c) Xc < XL d) None of the above

9) The transient response occurs
   a) only in resistive networks b) only in capacitive circuits
   c) only in inductive circuits d) both b) and c)

10) An ideal voltage source should have
   a) Large value of E.M.F. b) Small value of E.M.F.
   c) Zero source resistance d) Infinite source resistance

11) With zero initial condition at t = 0 + , _____ acts as an open circuit.
   a) Resistor b) Inductor c) Capacitor d) All of the above

12) For a 2 port network, the condition AD-BC = 1 implies that the network is
   a) Unilateral element network b) Lumped element network
   c) Lossless d) Reciprocal

13) When a network function is expressed as a ratio of Laplace transforms of output to input variables of a system, then it is regarded as _____
   a) System function b) Transfer function
   c) Both a) and b) d) None of the above

14) In series RLC circuit if C is increased what happens to resonance frequency ?
   a) It increases b) It remains same
   c) It decreases d) It is zero

_____

SLR-TC – 476

Seat No.	

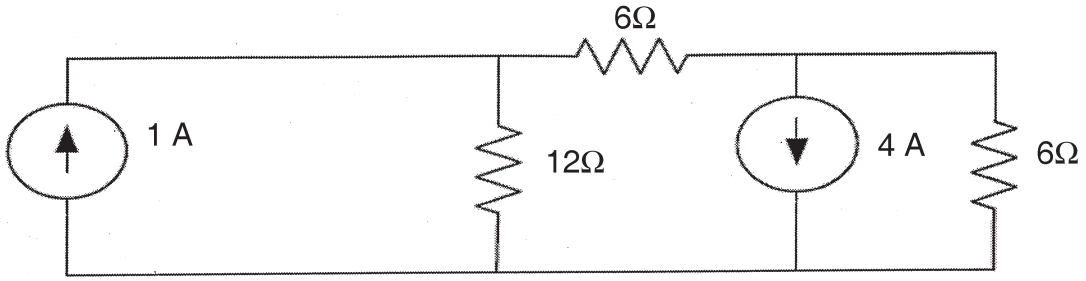
S.E. (Electrical and Electronics Engg.) (Part – I)
(Old CGPA) Examination, 2018
ELECTRICAL NETWORKS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

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

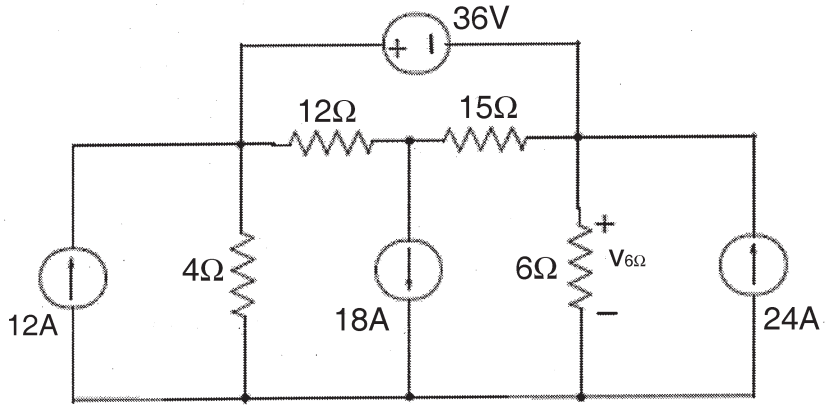
SECTION – I

2. Solve **any three** of the followings : **(4×3=12)**
   1) State and explain Thevenin's theorem for DC circuit.
   2) Determine node voltages of the following circuit.



   3) Define the terms : Tree, Cotree, Twigs and links.
   4) What is source transformation ? Explain the process step by step.

3. Solve **any two** of the followings : **(8×2=16)**
   1) Use superposition principle to compute voltage across 6Ω resistance ($V_{6\Omega}$)



Set P

2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance $R_s + JX_s$ to a load $R_L + JX_L$. What is the value of power transferred in this case ?

3) What is incidence matrix ? Explain generation of incidence matrix by taking an example. Compare with reduced incidence matrix.

SECTION – II

4. Solve **any three** of the followings : **(4×3=12)**

1) Derive transmissions parameters with suitable diagram.

2) Differentiate between series and parallel resonance.

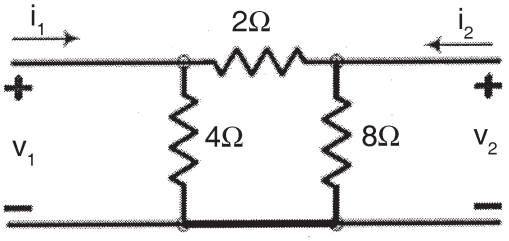
3) Obtain the Z parameters in terms of Y parameters.

4) An inductance 0.5H, a resistance of 5Ω and capacitance of 8μF are in series across a 220V AC supply. Calculate frequency at which the circuit impedance become minimum. Find the current at resonance.

5. Solve **any two** of the followings : **(8×2=16)**

1) What is parallel resonance ? State the properties of parallel resonance. A coil resistance 20Ω and inductance 0.2 H is connected in parallel with a capacitor of 100μF. Determine resonant frequency and input impedance at resonance.

2) Find Y-parameter for the network shown.



3) Derive the DC transient response of RL series circuit.

SLR-TC – 476

Seat No.	

Set **Q**

S.E. (Electrical and Electronics Engg.) (Part – I)
(Old CGPA) Examination, 2018
ELECTRICAL NETWORKS

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 : **(14×1=14)**

1) Which among the following condition is true at the resonance ?
   a) Xc > XL b) Xc = XL
   c) Xc < XL d) None of the above

2) The transient response occurs
   a) only in resistive networks b) only in capacitive circuits
   c) only in inductive circuits d) both b) and c)

3) An ideal voltage source should have
   a) Large value of E.M.F. b) Small value of E.M.F.
   c) Zero source resistance d) Infinite source resistance

4) With zero initial condition at t = 0 + , _____ acts as an open circuit.
   a) Resistor b) Inductor c) Capacitor d) All of the above

5) For a 2 port network, the condition AD-BC = 1 implies that the network is
   a) Unilateral element network b) Lumped element network
   c) Lossless d) Reciprocal

P.T.O.

6) When a network function is expressed as a ratio of Laplace transforms of output to input variables of a system, then it is regarded as _____
   a) System function b) Transfer function
   c) Both a) and b) d) None of the above

7) In series RLC circuit if C is increased what happens to resonance frequency ?
   a) It increases b) It remains same
   c) It decreases d) It is zero

8) Which law plays a significant role in the loop analysis of the network ?
   a) KCL b) KVL
   c) Law of superposition theorem d) None of the above

9) If one of the resistors in a parallel circuit is removed, what happens to total resistance ?
   a) Decreases b) Increases
   c) Remains constant d) Exactly doubles

10) What will be the value of a rectangular (complete incidence) matrix, if an associated branch is oriented towards the node ?
   a) 1 b) –1
   c) 0 d) Not defined (∞)

11) Which is the correct sequential order of steps to be undertaken while applying Thevenin's theorem ?
   A) Calculation of Thevenin's equivalent voltage
   B) Removal of branch impedance through which required current is to be estimated
   C) Estimation of equivalent impedance between two terminals of the branch
   D) Estimation of branch current by schematic representation of Thevenin's equivalent circuit
   a) A, C, B, D b) B, A, C, D
   c) D, A, C, B d) B, C, D, A

12) A tree has
   a) closed path b) no closed path c) single path d) none

13) An ideal current source has zero
   a) Internal resistance b) Internal conductance
   c) Ripple d) Voltage on the load

14) Superposition theorem can be applicable only to circuits having _____ elements.
   a) Non-linear b) Passive c) Resistive d) Linear bilateral

_____

SLR-TC – 476

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – I)
(Old CGPA) Examination, 2018
ELECTRICAL NETWORKS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

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 followings : **(4×3=12)**
   1) State and explain Thevenin's theorem for DC circuit.
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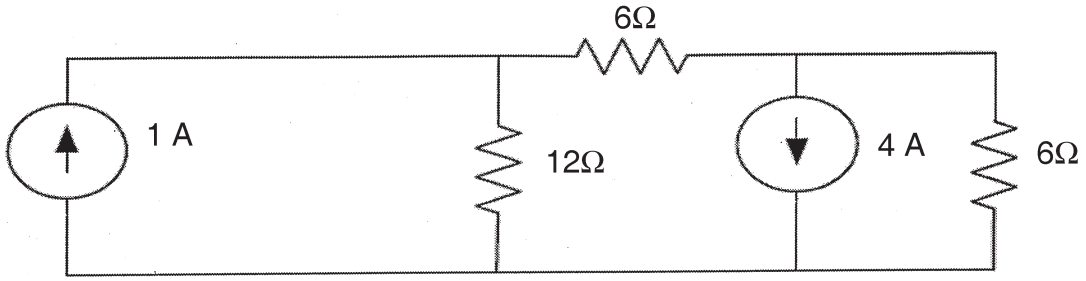
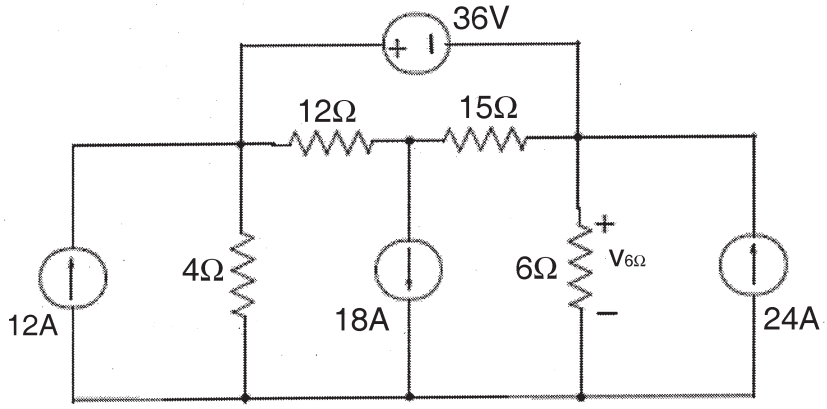


   3) Define the terms : Tree, Cotree, Twigs and links.
   4) What is source transformation ? Explain the process step by step.

3. Solve **any two** of the followings : **(8×2=16)**
   1) Use superposition principle to compute voltage across 6Ω resistance ($V_{6\Omega}$)



Set Q

2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance $R_s + JX_s$ to a load $R_L + JX_L$. What is the value of power transferred in this case ?

3) What is incidence matrix ? Explain generation of incidence matrix by taking an example. Compare with reduced incidence matrix.

SECTION – II

4. Solve **any three** of the followings : **(4×3=12)**

1) Derive transmissions parameters with suitable diagram.

2) Differentiate between series and parallel resonance.

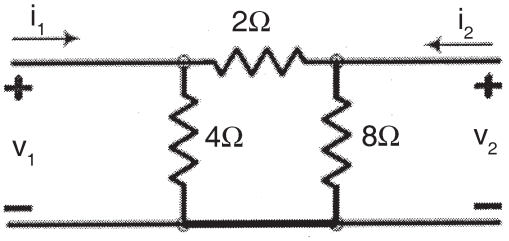
3) Obtain the Z parameters in terms of Y parameters.

4) An inductance 0.5H, a resistance of 5Ω and capacitance of 8μF are in series across a 220V AC supply. Calculate frequency at which the circuit impedance become minimum. Find the current at resonance.

5. Solve **any two** of the followings : **(8×2=16)**

1) What is parallel resonance ? State the properties of parallel resonance. A coil resistance 20Ω and inductance 0.2 H is connected in parallel with a capacitor of 100μF. Determine resonant frequency and input impedance at resonance.

2) Find Y-parameter for the network shown.



3) Derive the DC transient response of RL series circuit.

SLR-TC – 476

Seat No.	

Set **R**

S.E. (Electrical and Electronics Engg.) (Part – I)
(Old CGPA) Examination, 2018
ELECTRICAL NETWORKS

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 : **(14×1=14)**

1) A tree has
a) closed path b) no closed path c) single path d) none

2) An ideal current source has zero
a) Internal resistance b) Internal conductance
c) Ripple d) Voltage on the load

3) Superposition theorem can be applicable only to circuits having _____ elements.
a) Non-linear b) Passive c) Resistive d) Linear bilateral

4) Which among the following condition is true at the resonance ?
a) Xc > XL b) Xc = XL
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5) The transient response occurs
a) only in resistive networks b) only in capacitive circuits
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P.T.O.

6) An ideal voltage source should have
   a) Large value of E.M.F. b) Small value of E.M.F.
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8) For a 2 port network, the condition AD-BC = 1 implies that the network is
   a) Unilateral element network b) Lumped element network
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9) When a network function is expressed as a ratio of Laplace transforms of output to input variables of a system, then it is regarded as _____
   a) System function b) Transfer function
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   a) Decreases b) Increases
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13) What will be the value of a rectangular (complete incidence) matrix, if an associated branch is oriented towards the node ?
   a) 1 b) –1
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14) Which is the correct sequential order of steps to be undertaken while applying Thevenin's theorem ?
   A) Calculation of Thevenin's equivalent voltage
   B) Removal of branch impedance through which required current is to be estimated
   C) Estimation of equivalent impedance between two terminals of the branch
   D) Estimation of branch current by schematic representation of Thevenin's equivalent circuit
   a) A, C, B, D b) B, A, C, D
   c) D, A, C, B d) B, C, D, A

SLR-TC – 476

Seat No.	

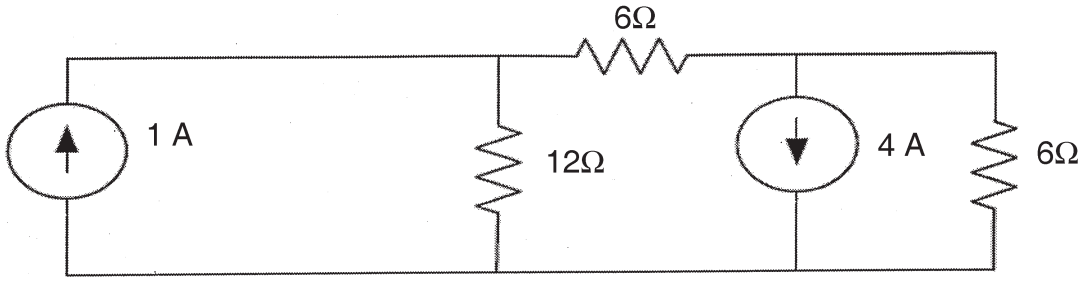
S.E. (Electrical and Electronics Engg.) (Part – I)
(Old CGPA) Examination, 2018
ELECTRICAL NETWORKS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

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

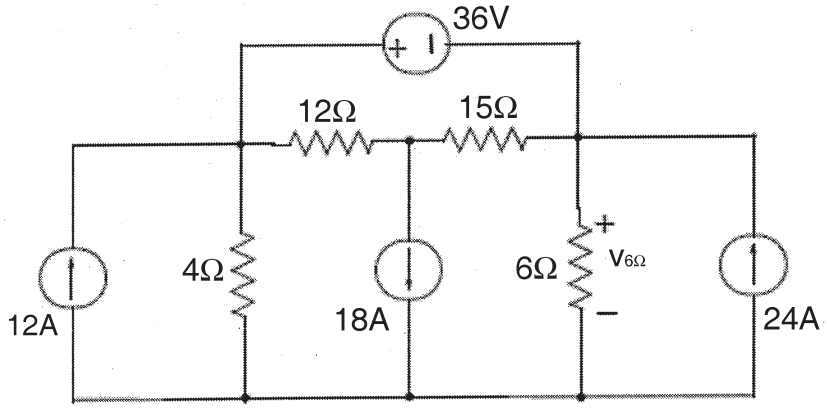
SECTION – I

2. Solve **any three** of the followings : **(4×3=12)**
   1) State and explain Thevenin's theorem for DC circuit.
   2) Determine node voltages of the following circuit.



   3) Define the terms : Tree, Cotree, Twigs and links.
   4) What is source transformation ? Explain the process step by step.

3. Solve **any two** of the followings : **(8×2=16)**
   1) Use superposition principle to compute voltage across 6Ω resistance ($V_{6\Omega}$)



Set R

2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance $R_s + JX_s$ to a load $R_L + JX_L$. What is the value of power transferred in this case ?

3) What is incidence matrix ? Explain generation of incidence matrix by taking an example. Compare with reduced incidence matrix.

SECTION – II

4. Solve **any three** of the followings : **(4×3=12)**

1) Derive transmissions parameters with suitable diagram.

2) Differentiate between series and parallel resonance.

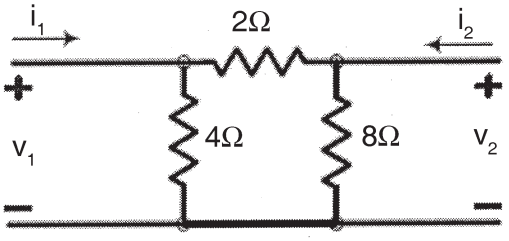
3) Obtain the Z parameters in terms of Y parameters.

4) An inductance 0.5H, a resistance of 5Ω and capacitance of 8μF are in series across a 220V AC supply. Calculate frequency at which the circuit impedance become minimum. Find the current at resonance.

5. Solve **any two** of the followings : **(8×2=16)**

1) What is parallel resonance ? State the properties of parallel resonance. A coil resistance 20Ω and inductance 0.2 H is connected in parallel with a capacitor of 100μF. Determine resonant frequency and input impedance at resonance.

2) Find Y-parameter for the network shown.



3) Derive the DC transient response of RL series circuit.

SLR-TC – 476

Seat No.	

Set **S**

S.E. (Electrical and Electronics Engg.) (Part – I)
(Old CGPA) Examination, 2018
ELECTRICAL NETWORKS

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 : **(14×1=14)**

1) An ideal voltage source should have
   a) Large value of E.M.F. b) Small value of E.M.F.
   c) Zero source resistance d) Infinite source resistance

2) With zero initial condition at t = 0 + , _____ acts as an open circuit.
   a) Resistor b) Inductor c) Capacitor d) All of the above

3) For a 2 port network, the condition AD-BC = 1 implies that the network is
   a) Unilateral element network b) Lumped element network
   c) Lossless d) Reciprocal

4) When a network function is expressed as a ratio of Laplace transforms of output to input variables of a system, then it is regarded as _____
   a) System function b) Transfer function
   c) Both a) and b) d) None of the above

P.T.O.

5) In series RLC circuit if C is increased what happens to resonance frequency ?
   a) It increases b) It remains same
   c) It decreases d) It is zero

6) Which law plays a significant role in the loop analysis of the network ?
   a) KCL b) KVL
   c) Law of superposition theorem d) None of the above

7) If one of the resistors in a parallel circuit is removed, what happens to total resistance ?
   a) Decreases b) Increases
   c) Remains constant d) Exactly doubles

8) What will be the value of a rectangular (complete incidence) matrix, if an associated branch is oriented towards the node ?
   a) 1 b) –1
   c) 0 d) Not defined (∞)

9) Which is the correct sequential order of steps to be undertaken while applying Thevenin's theorem ?
   A) Calculation of Thevenin's equivalent voltage
   B) Removal of branch impedance through which required current is to be estimated
   C) Estimation of equivalent impedance between two terminals of the branch
   D) Estimation of branch current by schematic representation of Thevenin's equivalent circuit
   a) A, C, B, D b) B, A, C, D
   c) D, A, C, B d) B, C, D, A

10) A tree has
   a) closed path b) no closed path c) single path d) none

11) An ideal current source has zero
   a) Internal resistance b) Internal conductance
   c) Ripple d) Voltage on the load

12) Superposition theorem can be applicable only to circuits having _____ elements.
   a) Non-linear b) Passive c) Resistive d) Linear bilateral

13) Which among the following condition is true at the resonance ?
   a) Xc > XL b) Xc = XL
   c) Xc < XL d) None of the above

14) The transient response occurs
   a) only in resistive networks b) only in capacitive circuits
   c) only in inductive circuits d) both b) and c)

_____

SLR-TC – 476

Seat No.	

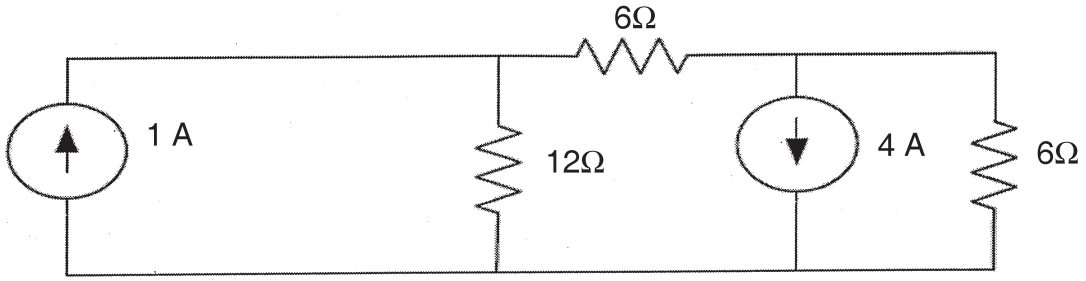
S.E. (Electrical and Electronics Engg.) (Part – I)
(Old CGPA) Examination, 2018
ELECTRICAL NETWORKS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

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

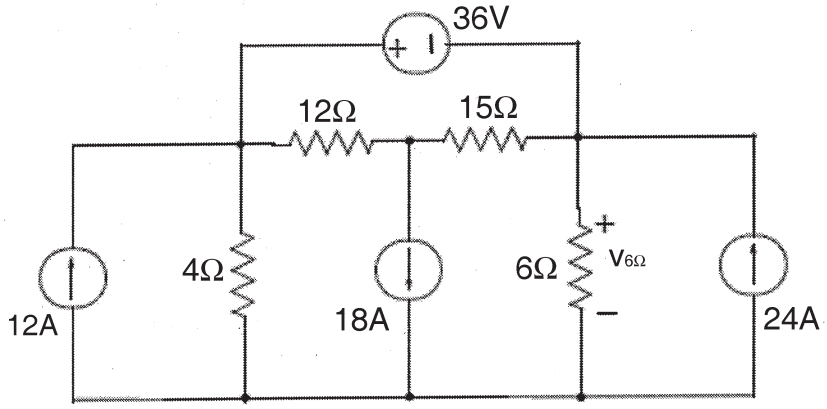
SECTION – I

2. Solve **any three** of the followings : **(4×3=12)**
   1) State and explain Thevenin's theorem for DC circuit.
   2) Determine node voltages of the following circuit.



   3) Define the terms : Tree, Cotree, Twigs and links.
   4) What is source transformation ? Explain the process step by step.

3. Solve **any two** of the followings : **(8×2=16)**
   1) Use superposition principle to compute voltage across 6Ω resistance ($V_{6\Omega}$)



Set S

2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance $R_s + JX_s$ to a load $R_L + JX_L$. What is the value of power transferred in this case ?

3) What is incidence matrix ? Explain generation of incidence matrix by taking an example. Compare with reduced incidence matrix.

SECTION – II

4. Solve **any three** of the followings : **(4×3=12)**

1) Derive transmissions parameters with suitable diagram.

2) Differentiate between series and parallel resonance.

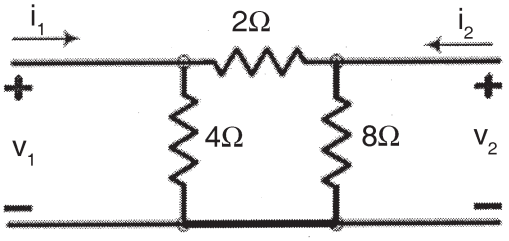
3) Obtain the Z parameters in terms of Y parameters.

4) An inductance 0.5H, a resistance of 5Ω and capacitance of 8μF are in series across a 220V AC supply. Calculate frequency at which the circuit impedance become minimum. Find the current at resonance.

5. Solve **any two** of the followings : **(8×2=16)**

1) What is parallel resonance ? State the properties of parallel resonance. A coil resistance 20Ω and inductance 0.2 H is connected in parallel with a capacitor of 100μF. Determine resonant frequency and input impedance at resonance.

2) Find Y-parameter for the network shown.



3) Derive the DC transient response of RL series circuit.

SLR-TC – 477

Seat No.	

Set P

S.E. (Electrical & Electronics Engineering) (Part – I)
(Old CGPA) Examination, 2018
ANALOG ELECTRONICS

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative :

1) The average value of load voltage for half wave rectifier is
   a) V_m/π b) $2V_m/\pi$ c) π/V_m d) $\pi/2V_m$

2) The gain of cascaded amplifier is equal to
   a) Product of individual gain b) Sum of individual gain
   c) Ratio of stage gain d) None of these

3) In class A amplifier the collector current flows for
   a) Less than half cycle b) For half cycle
   c) Less than full cycle d) For complete cycle

4) MOSFET can be used as a
   a) current controlled capacitor b) voltage controlled capacitor
   c) current controlled inductor d) voltage controlled inductor

P.T.O.

5) The output of class B amplifier
   a) is distortion free
   b) consist of positive half cycle only
   c) is like a output of FWR
   d) comprise short duration of current pulses

6) When transistor is used as amplifier its operation is confines in
   a) saturation region b) cutoff region
   c) active region d) both a & b

7) The main job of current mirror circuit is to provide _____ output current.
   a) sinusoidal b) constant c) smooth d) fluctuating

8) Two input terminals of op-amp are
   a) Positive & negative b) Differential & non-differential
   c) Inverting & non-inverting d) High & low

9) An ideal op-amp has
   a) Zero output resistance b) Infinite resistance
   c) Zero input resistance d) Both a & c

10) For inverting amplifier if $R_f = 10K\Omega$, $R_1 = 1K\Omega$ then gain is
   a) –11 b) –10 c) –9 d) –1

11) For sine input, output of an integrator is
   a) cosine wave b) pulse
   c) triangular wave d) square wave

12) A monostable multivibrator is called as
   a) one shot b) two shot c) unibrator d) both a & c

13) The Schmitt trigger circuit
   a) converts irregular waveform into pulse waveform
   b) uses positive feedback
   c) is fast operating voltage level detector
   d) all of above

14) The change in op-amp input offset voltage causes by variation in supply voltage called as
   a) SVRR b) PSS c) PSRR d) All

_____

SLR-TC – 477

Seat No.	

S.E. (Electrical & Electronics Engineering) (Part – I)
(Old CGPA) Examination, 2018
ANALOG ELECTRONICS

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **If necessary**, assume suitable data.*
*2) Figure to **right** indicate **full** marks.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

1) What is clamper ? Explain positive clamper.

2) What is load line analysis ? Explain Q-point.

3) Explain class A amplifier.

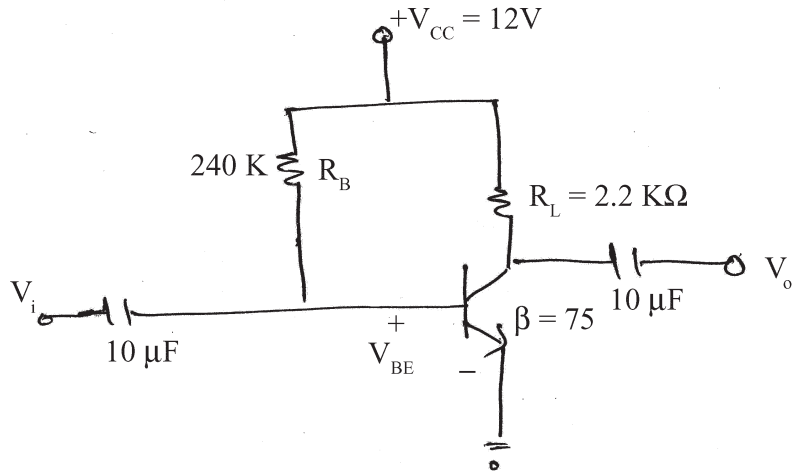
4) Explain the working of depletion type MOSFET.

3. Solve **any two** : **(2×8=16)**

1) For fixed bias configuration shown below, calculate

a) I_{BQ} and I_{CQ} b) V_{CEQ} c) V_B

d) V_C e) V_{BC} f) α



Set P

2) Explain working of unijunction transistor. Also discuss its VI characteristics.

3) What is rectifier ? State its types. Explain operation of bridge rectifier.

SECTION – II

4. Solve **any three** : **(4×3=12)**

1) Draw general block diagram of op-amp and pin diagram of IC 741.

2) Explain op-amp as a integrator.

3) Explain peak detector using op-amp.

4) What are closed loop inverting and non-inverting amplifiers ?

5. Solve **any two** : **(2×8=16)**

1) Explain instrumentation amplifier using transducer bridge.

2) Explain with neat diagram and waveforms of IC 555 as astable multivibrator. Also derive expression for frequency of oscillation.

3) What are ideal characteristics of op-amp ? Explain following terms in op-amp.

a) CMRR b) PSRR c) Slew rate.

———————

SLR-TC – 477

Seat No.	

Set Q

S.E. (Electrical & Electronics Engineering) (Part – I)
(Old CGPA) Examination, 2018
ANALOG ELECTRONICS

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative :

1) Two input terminals of op-amp are
   a) Positive & negative b) Differential & non-differential
   c) Inverting & non-inverting d) High & low

2) An ideal op-amp has
   a) Zero output resistance b) Infinite resistance
   c) Zero input resistance d) Both a & c

3) For inverting amplifier if $R_f = 10K\Omega$, $R_1 = 1K\Omega$ then gain is
   a) –11 b) –10 c) –9 d) –1

4) For sine input, output of an integrator is
   a) cosine wave b) pulse
   c) triangular wave d) square wave

5) A monostable multivibrator is called as
   a) one shot b) two shot c) unibrator d) both a & c

P.T.O.

6) The Schmitt trigger circuit
   a) converts irregular waveform into pulse waveform
   b) uses positive feedback
   c) is fast operating voltage level detector
   d) all of above

7) The change in op-amp input offset voltage causes by variation in supply voltage called as
   a) SVRR b) PSS c) PSRR d) All

8) The average value of load voltage for half wave rectifier is
   a) V_m/π b) $2V_m/\pi$ c) π/V_m d) $\pi/2V_m$

9) The gain of cascaded amplifier is equal to
   a) Product of individual gain b) Sum of individual gain
   c) Ratio of stage gain d) None of these

10) In class A amplifier the collector current flows for
   a) Less than half cycle b) For half cycle
   c) Less than full cycle d) For complete cycle

11) MOSFET can be used as a
   a) current controlled capacitor b) voltage controlled capacitor
   c) current controlled inductor d) voltage controlled inductor

12) The output of class B amplifier
   a) is distortion free
   b) consist of positive half cycle only
   c) is like a output of FWR
   d) comprise short duration of current pulses

13) When transistor is used as amplifier its operation is confines in
   a) saturation region b) cutoff region
   c) active region d) both a & b

14) The main job of current mirror circuit is to provide _____ output current.
   a) sinusoidal b) constant c) smooth d) fluctuating

_____

SLR-TC – 477

Seat No.	

S.E. (Electrical & Electronics Engineering) (Part – I)
(Old CGPA) Examination, 2018
ANALOG ELECTRONICS

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **If necessary**, assume suitable data.*
*2) Figure to **right** indicate **full** marks.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

1) What is clamper ? Explain positive clamper.

2) What is load line analysis ? Explain Q-point.

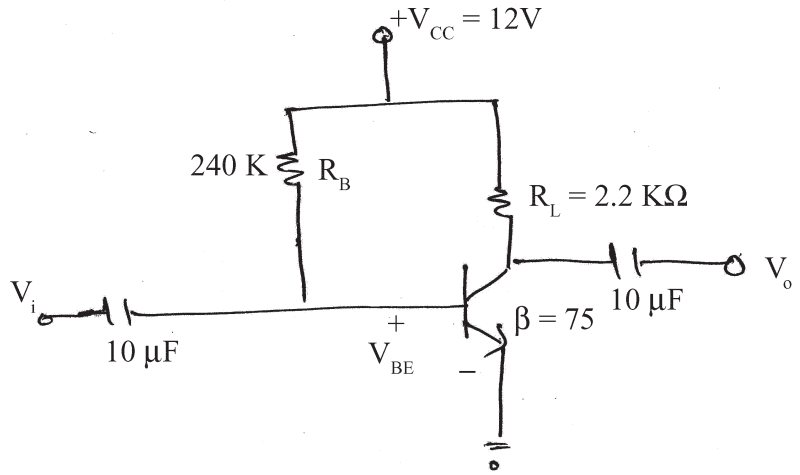
3) Explain class A amplifier.

4) Explain the working of depletion type MOSFET.

3. Solve **any two** : **(2×8=16)**

1) For fixed bias configuration shown below, calculate

a) I_{BQ} and I_{CQ} b) V_{CEQ} c) V_B
d) V_C e) V_{BC} f) α



Set Q

2) Explain working of unijunction transistor. Also discuss its VI characteristics.

3) What is rectifier ? State its types. Explain operation of bridge rectifier.

SECTION – II

4. Solve **any three** : **(4×3=12)**

1) Draw general block diagram of op-amp and pin diagram of IC 741.

2) Explain op-amp as a integrator.

3) Explain peak detector using op-amp.

4) What are closed loop inverting and non-inverting amplifiers ?

5. Solve **any two** : **(2×8=16)**

1) Explain instrumentation amplifier using transducer bridge.

2) Explain with neat diagram and waveforms of IC 555 as astable multivibrator. Also derive expression for frequency of oscillation.

3) What are ideal characteristics of op-amp ? Explain following terms in op-amp.

a) CMRR b) PSRR c) Slew rate.

———————

SLR-TC – 477

Seat No.	

Set R

S.E. (Electrical & Electronics Engineering) (Part – I)
(Old CGPA) Examination, 2018
ANALOG ELECTRONICS

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative :

1) The output of class B amplifier
   a) is distortion free
   b) consist of positive half cycle only
   c) is like a output of FWR
   d) comprise short duration of current pulses

2) When transistor is used as amplifier its operation is confines in
   a) saturation region b) cutoff region
   c) active region d) both a & b

3) The main job of current mirror circuit is to provide _____ output current.
   a) sinusoidal b) constant c) smooth d) fluctuating

4) Two input terminals of op-amp are
   a) Positive & negative b) Differential & non-differential
   c) Inverting & non-inverting d) High & low

P.T.O.

5) An ideal op-amp has
   a) Zero output resistance b) Infinite resistance
   c) Zero input resistance d) Both a & c

6) For inverting amplifier if $R_f = 10K\Omega$, $R_1 = 1K\Omega$ then gain is
   a) –11 b) –10 c) –9 d) –1

7) For sine input, output of an integrator is
   a) cosine wave b) pulse
   c) triangular wave d) square wave

8) A monostable multivibrator is called as
   a) one shot b) two shot c) unibrator d) both a & c

9) The Schmitt trigger circuit
   a) converts irregular waveform into pulse waveform
   b) uses positive feedback
   c) is fast operating voltage level detector
   d) all of above

10) The change in op-amp input offset voltage causes by variation in supply voltage called as
   a) SVRR b) PSS c) PSRR d) All

11) The average value of load voltage for half wave rectifier is
   a) V_m/π b) $2V_m/\pi$ c) π/V_m d) $\pi/2V_m$

12) The gain of cascaded amplifier is equal to
   a) Product of individual gain b) Sum of individual gain
   c) Ratio of stage gain d) None of these

13) In class A amplifier the collector current flows for
   a) Less than half cycle b) For half cycle
   c) Less than full cycle d) For complete cycle

14) MOSFET can be used as a
   a) current controlled capacitor b) voltage controlled capacitor
   c) current controlled inductor d) voltage controlled inductor

———————

SLR-TC – 477

Seat No.	

S.E. (Electrical & Electronics Engineering) (Part – I)
(Old CGPA) Examination, 2018
ANALOG ELECTRONICS

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **If necessary**, assume suitable data.*
*2) Figure to **right** indicate **full** marks.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

1) What is clamper ? Explain positive clamper.

2) What is load line analysis ? Explain Q-point.

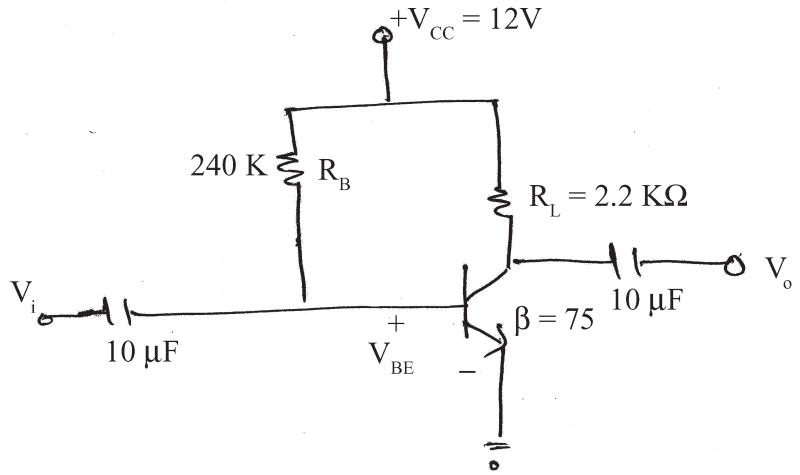
3) Explain class A amplifier.

4) Explain the working of depletion type MOSFET.

3. Solve **any two** : **(2×8=16)**

1) For fixed bias configuration shown below, calculate

a) I_{BQ} and I_{CQ} b) V_{CEQ} c) V_B
d) V_C e) V_{BC} f) α



Set R

2) Explain working of unijunction transistor. Also discuss its VI characteristics.

3) What is rectifier ? State its types. Explain operation of bridge rectifier.

SECTION – II

4. Solve **any three** : **(4×3=12)**

1) Draw general block diagram of op-amp and pin diagram of IC 741.

2) Explain op-amp as a integrator.

3) Explain peak detector using op-amp.

4) What are closed loop inverting and non-inverting amplifiers ?

5. Solve **any two** : **(2×8=16)**

1) Explain instrumentation amplifier using transducer bridge.

2) Explain with neat diagram and waveforms of IC 555 as astable multivibrator. Also derive expression for frequency of oscillation.

3) What are ideal characteristics of op-amp ? Explain following terms in op-amp.

a) CMRR b) PSRR c) Slew rate.

———————

SLR-TC – 477

Seat No.	

Set S

S.E. (Electrical & Electronics Engineering) (Part – I)
(Old CGPA) Examination, 2018
ANALOG ELECTRONICS

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative :

1) For inverting amplifier if $R_f = 10K\Omega$, $R_1 = 1K\Omega$ then gain is
   a) –11 b) –10 c) –9 d) –1

2) For sine input, output of an integrator is
   a) cosine wave b) pulse
   c) triangular wave d) square wave

3) A monostable multivibrator is called as
   a) one shot b) two shot c) unibrator d) both a & c

4) The Schmitt trigger circuit
   a) converts irregular waveform into pulse waveform
   b) uses positive feedback
   c) is fast operating voltage level detector
   d) all of above

P.T.O.

5) The change in op-amp input offset voltage causes by variation in supply voltage called as
   a) SVRR b) PSS c) PSRR d) All

6) The average value of load voltage for half wave rectifier is
   a) V_m/π b) $2V_m/\pi$ c) π/V_m d) $\pi/2V_m$

7) The gain of cascaded amplifier is equal to
   a) Product of individual gain b) Sum of individual gain
   c) Ratio of stage gain d) None of these

8) In class A amplifier the collector current flows for
   a) Less than half cycle b) For half cycle
   c) Less than full cycle d) For complete cycle

9) MOSFET can be used as a
   a) current controlled capacitor b) voltage controlled capacitor
   c) current controlled inductor d) voltage controlled inductor

10) The output of class B amplifier
   a) is distortion free
   b) consist of positive half cycle only
   c) is like a output of FWR
   d) comprise short duration of current pulses

11) When transistor is used as amplifier its operation is confines in
   a) saturation region b) cutoff region
   c) active region d) both a & b

12) The main job of current mirror circuit is to provide _____ output current.
   a) sinusoidal b) constant c) smooth d) fluctuating

13) Two input terminals of op-amp are
   a) Positive & negative b) Differential & non-differential
   c) Inverting & non-inverting d) High & low

14) An ideal op-amp has
   a) Zero output resistance b) Infinite resistance
   c) Zero input resistance d) Both a & c

_____

SLR-TC – 477

Seat No.	

S.E. (Electrical & Electronics Engineering) (Part – I)
(Old CGPA) Examination, 2018
ANALOG ELECTRONICS

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **If necessary**, assume suitable data.*
*2) Figure to **right** indicate **full** marks.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

1) What is clamper ? Explain positive clamper.

2) What is load line analysis ? Explain Q-point.

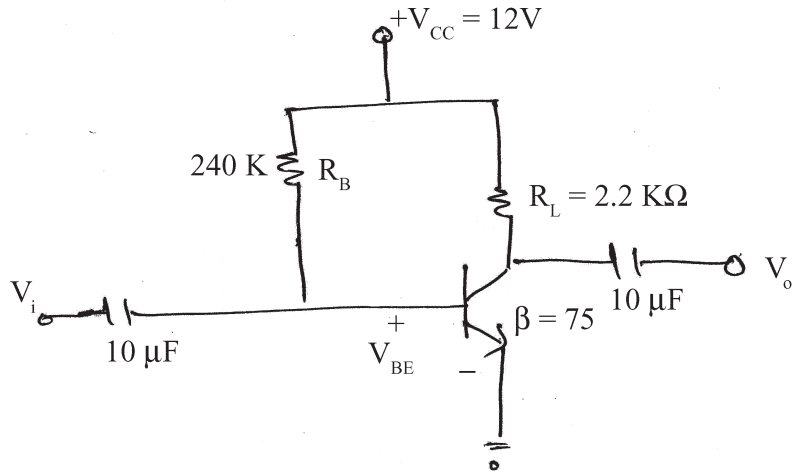
3) Explain class A amplifier.

4) Explain the working of depletion type MOSFET.

3. Solve **any two** : **(2×8=16)**

1) For fixed bias configuration shown below, calculate

a) I_{BQ} and I_{CQ} b) V_{CEQ} c) V_B
d) V_C e) V_{BC} f) α



2) Explain working of unijunction transistor. Also discuss its VI characteristics.

3) What is rectifier ? State its types. Explain operation of bridge rectifier.

SECTION – II

4. Solve **any three** : **(4×3=12)**

1) Draw general block diagram of op-amp and pin diagram of IC 741.

2) Explain op-amp as a integrator.

3) Explain peak detector using op-amp.

4) What are closed loop inverting and non-inverting amplifiers ?

5. Solve **any two** : **(2×8=16)**

1) Explain instrumentation amplifier using transducer bridge.

2) Explain with neat diagram and waveforms of IC 555 as astable multivibrator. Also derive expression for frequency of oscillation.

3) What are ideal characteristics of op-amp ? Explain following terms in op-amp.

a) CMRR b) PSRR c) Slew rate.

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SLR-TC – 478

Seat No.	

Set P

S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018
ELECTRICAL POWER GENERATION

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Out of the following which one is not a unconventional source of energy ?
   A) Tidal power B) Geothermal energy
   C) Nuclear energy D) Wind power

2) 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

3) Coal used in power plant is also known as
   A) Steam coal B) Charcoal C) Coke D) Soft coal

4) Live storage of coal in a power plant means
   A) Coal ready for combustion
   B) Preheated coal
   C) Storage of coal sufficient to meet 24 hour demand of the plant
   D) Coal in transit

5) In a power plant, coal is carried from storage place to boilers generally by means of
   A) Bucket B) V-belts C) Trolleys D) Manually

6) Advantage of hydro-electric power station is
   A) Low operating cost B) Free from pollution problems
   C) No fuel transportation problems D) All of the above

7) A two stroke engine may be identified by
   A) Piston size B) Absence of valves
   C) Cooling system D) Lubrication system

8) Most of the heat generated in internal combustion engine is lost in
   A) Cooling water B) Exhaust gases
   C) Lubricating oil D) Radiation

9) In a super-heater
   A) Pressure rises, temperature drops
   B) Pressure rises, temperature remains constant
   C) Pressure remains constant and temperature rises
   D) Both pressure and temperature remains constant

10) Photovoltaic solar energy conversion system makes use of
   A) Fuel cell B) Solar cell C) Solar pond D) None of the above

11) Batteries used for electrical energy storage are
   A) Laclanche cells B) Edison cells
   C) Lead acid cells D) Any of the above

12) Biogas consist of
   A) Only methane
   B) Methane and carbon dioxide with some impurities
   C) Only ethane
   D) A special organic gas

13) In thermal power plants the size of the coal after crushing
   A) 300 mm B) 200 – 205 mm
   C) 40 mm D) 20 – 25 mm

14) Uses of power station
   A) Peak load plant B) Emergency plants
   C) Stand by plants D) All of the above

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SLR-TC – 478

Seat No.	

S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018
ELECTRICAL POWER GENERATION

Day and Date : Tuesday, 8-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

2. Solve **any four** : **(4×4)**

   1) Explain fuels and their handling in thermal power plant.

   2) Explain the process of nuclear fission.

   3) Discuss factors to be considered for selection of site for thermal power plant.

   4) Explain pelton turbine with neat diagram.

   5) Write a short note on hydrology.

3. Solve **any two** : **(6×2)**

   1) Explain CANDU type reactor with neat diagram, also state its advantages and disadvantages.

   2) Explain single line diagram of typical AC power system.

   3) Draw typical layout of hydroelectric power plant and explain it briefly.

4. Solve **any four** : **(4×4)**

   1) Write a short note on load curve.

   2) State application of diesel power stations.

   3) Explain geo-thermal power plant with neat diagram also state its application.

   4) Define bio-gas and bio-mass energy.

   5) Explain wind power plant with block diagram also state its application.

5. Solve **any two** : **(6×2)**

   1) Define bio-gas and explain common circular digester with floating gas holder (KVIC digester) with neat diagram.

   2) Explain the working of diesel power plant with the help of block diagram.

   3) Explain the following :

      a) Load factor

      b) Plant capacity factor

      c) Diversity factor

      d) Demand factor.

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SLR-TC – 478

Seat No.	

Set Q

S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018
ELECTRICAL POWER GENERATION

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Most of the heat generated in internal combustion engine is lost in
A) Cooling water B) Exhaust gases
C) Lubricating oil D) Radiation

2) In a super-heater
A) Pressure rises, temperature drops
B) Pressure rises, temperature remains constant
C) Pressure remains constant and temperature rises
D) Both pressure and temperature remains constant

3) Photovoltaic solar energy conversion system makes use of
A) Fuel cell B) Solar cell C) Solar pond D) None of the above

4) Batteries used for electrical energy storage are
A) Laclanche cells B) Edison cells
C) Lead acid cells D) Any of the above

5) Biogas consist of
A) Only methane
B) Methane and carbon dioxide with some impurities
C) Only ethane
D) A special organic gas

P.T.O.

6) In thermal power plants the size of the coal after crushing
   A) 300 mm B) 200 – 205 mm
   C) 40 mm D) 20 – 25 mm

7) Uses of power station
   A) Peak load plant B) Emergency plants
   C) Stand by plants D) All of the above

8) Out of the following which one is not a unconventional source of energy ?
   A) Tidal power B) Geothermal energy
   C) Nuclear energy D) Wind power

9) 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

10) Coal used in power plant is also known as
   A) Steam coal B) Charcoal C) Coke D) Soft coal

11) Live storage of coal in a power plant means
   A) Coal ready for combustion
   B) Preheated coal
   C) Storage of coal sufficient to meet 24 hour demand of the plant
   D) Coal in transit

12) In a power plant, coal is carried from storage place to boilers generally by means of
   A) Bucket B) V-belts C) Trolleys D) Manually

13) Advantage of hydro-electric power station is
   A) Low operating cost B) Free from pollution problems
   C) No fuel transportation problems D) All of the above

14) A two stroke engine may be identified by
   A) Piston size B) Absence of valves
   C) Cooling system D) Lubrication system

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SLR-TC – 478

Seat No.	

S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018
ELECTRICAL POWER GENERATION

Day and Date : Tuesday, 8-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

2. Solve **any four** : **(4×4)**

   1) Explain fuels and their handling in thermal power plant.

   2) Explain the process of nuclear fission.

   3) Discuss factors to be considered for selection of site for thermal power plant.

   4) Explain pelton turbine with neat diagram.

   5) Write a short note on hydrology.

3. Solve **any two** : **(6×2)**

   1) Explain CANDU type reactor with neat diagram, also state its advantages and disadvantages.

   2) Explain single line diagram of typical AC power system.

   3) Draw typical layout of hydroelectric power plant and explain it briefly.

4. Solve **any four** : **(4×4)**

   1) Write a short note on load curve.

   2) State application of diesel power stations.

   3) Explain geo-thermal power plant with neat diagram also state its application.

   4) Define bio-gas and bio-mass energy.

   5) Explain wind power plant with block diagram also state its application.

5. Solve **any two** : **(6×2)**

   1) Define bio-gas and explain common circular digester with floating gas holder (KVIC digester) with neat diagram.

   2) Explain the working of diesel power plant with the help of block diagram.

   3) Explain the following :

      a) Load factor

      b) Plant capacity factor

      c) Diversity factor

      d) Demand factor.

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SLR-TC – 478

Seat No.	

Set **R**

S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018
ELECTRICAL POWER GENERATION

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In a power plant, coal is carried from storage place to boilers generally by means of
A) Bucket B) V-belts C) Trolleys D) Manually

2) Advantage of hydro-electric power station is
A) Low operating cost B) Free from pollution problems
C) No fuel transportation problems D) All of the above

3) A two stroke engine may be identified by
A) Piston size B) Absence of valves
C) Cooling system D) Lubrication system

4) Most of the heat generated in internal combustion engine is lost in
A) Cooling water B) Exhaust gases
C) Lubricating oil D) Radiation

5) In a super-heater
A) Pressure rises, temperature drops
B) Pressure rises, temperature remains constant
C) Pressure remains constant and temperature rises
D) Both pressure and temperature remains constant

6) Photovoltaic solar energy conversion system makes use of
A) Fuel cell B) Solar cell C) Solar pond D) None of the above

7) Batteries used for electrical energy storage are
A) Laclanche cells B) Edison cells
C) Lead acid cells D) Any of the above

8) Biogas consist of
A) Only methane
B) Methane and carbon dioxide with some impurities
C) Only ethane
D) A special organic gas

9) In thermal power plants the size of the coal after crushing
A) 300 mm B) 200 – 205 mm
C) 40 mm D) 20 – 25 mm

10) Uses of power station
A) Peak load plant B) Emergency plants
C) Stand by plants D) All of the above

11) Out of the following which one is not a unconventional source of energy ?
A) Tidal power B) Geothermal energy
C) Nuclear energy D) Wind power

12) 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

13) Coal used in power plant is also known as
A) Steam coal B) Charcoal C) Coke D) Soft coal

14) Live storage of coal in a power plant means
A) Coal ready for combustion
B) Preheated coal
C) Storage of coal sufficient to meet 24 hour demand of the plant
D) Coal in transit

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Seat No.	

S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018
ELECTRICAL POWER GENERATION

Day and Date : Tuesday, 8-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

2. Solve **any four** : **(4×4)**

   1) Explain fuels and their handling in thermal power plant.

   2) Explain the process of nuclear fission.

   3) Discuss factors to be considered for selection of site for thermal power plant.

   4) Explain pelton turbine with neat diagram.

   5) Write a short note on hydrology.

3. Solve **any two** : **(6×2)**

   1) Explain CANDU type reactor with neat diagram, also state its advantages and disadvantages.

   2) Explain single line diagram of typical AC power system.

   3) Draw typical layout of hydroelectric power plant and explain it briefly.

4. Solve **any four** : **(4×4)**

   1) Write a short note on load curve.

   2) State application of diesel power stations.

   3) Explain geo-thermal power plant with neat diagram also state its application.

   4) Define bio-gas and bio-mass energy.

   5) Explain wind power plant with block diagram also state its application.

5. Solve **any two** : **(6×2)**

   1) Define bio-gas and explain common circular digester with floating gas holder (KVIC digester) with neat diagram.

   2) Explain the working of diesel power plant with the help of block diagram.

   3) Explain the following :

      a) Load factor

      b) Plant capacity factor

      c) Diversity factor

      d) Demand factor.

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SLR-TC – 478

Seat No.	

Set S

S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018
ELECTRICAL POWER GENERATION

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Photovoltaic solar energy conversion system makes use of
A) Fuel cell B) Solar cell C) Solar pond D) None of the above

2) Batteries used for electrical energy storage are
A) Laclanche cells B) Edison cells
C) Lead acid cells D) Any of the above

3) Biogas consist of
A) Only methane
B) Methane and carbon dioxide with some impurities
C) Only ethane
D) A special organic gas

4) In thermal power plants the size of the coal after crushing
A) 300 mm B) 200 – 205 mm
C) 40 mm D) 20 – 25 mm

5) Uses of power station
A) Peak load plant B) Emergency plants
C) Stand by plants D) All of the above

P.T.O.

6) Out of the following which one is not a unconventional source of energy ?
   A) Tidal power B) Geothermal energy
   C) Nuclear energy D) Wind power

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   A) Coal free from ash B) Non-smoking coal
   C) Coal which bums for long time D) Coal broken into fine particles

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   A) Steam coal B) Charcoal C) Coke D) Soft coal

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   A) Coal ready for combustion
   B) Preheated coal
   C) Storage of coal sufficient to meet 24 hour demand of the plant
   D) Coal in transit

10) In a power plant, coal is carried from storage place to boilers generally by means of
   A) Bucket B) V-belts C) Trolleys D) Manually

11) Advantage of hydro-electric power station is
   A) Low operating cost B) Free from pollution problems
   C) No fuel transportation problems D) All of the above

12) A two stroke engine may be identified by
   A) Piston size B) Absence of valves
   C) Cooling system D) Lubrication system

13) Most of the heat generated in internal combustion engine is lost in
   A) Cooling water B) Exhaust gases
   C) Lubricating oil D) Radiation

14) In a super-heater
   A) Pressure rises, temperature drops
   B) Pressure rises, temperature remains constant
   C) Pressure remains constant and temperature rises
   D) Both pressure and temperature remains constant

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SLR-TC – 478

Seat No.	

S.E. (E and E) (Part – I) (Old CGPA) Examination, 2018
ELECTRICAL POWER GENERATION

Day and Date : Tuesday, 8-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

2. Solve **any four** : **(4×4)**

   1) Explain fuels and their handling in thermal power plant.

   2) Explain the process of nuclear fission.

   3) Discuss factors to be considered for selection of site for thermal power plant.

   4) Explain pelton turbine with neat diagram.

   5) Write a short note on hydrology.

3. Solve **any two** : **(6×2)**

   1) Explain CANDU type reactor with neat diagram, also state its advantages and disadvantages.

   2) Explain single line diagram of typical AC power system.

   3) Draw typical layout of hydroelectric power plant and explain it briefly.

4. Solve **any four** : **(4×4)**

   1) Write a short note on load curve.

   2) State application of diesel power stations.

   3) Explain geo-thermal power plant with neat diagram also state its application.

   4) Define bio-gas and bio-mass energy.

   5) Explain wind power plant with block diagram also state its application.

5. Solve **any two** : **(6×2)**

   1) Define bio-gas and explain common circular digester with floating gas holder (KVIC digester) with neat diagram.

   2) Explain the working of diesel power plant with the help of block diagram.

   3) Explain the following :

      a) Load factor

      b) Plant capacity factor

      c) Diversity factor

      d) Demand factor.

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SLR-TC – 479

Seat No.	

Set **P**

S.E. (Electrical and Electronics) (Part – I) Examination, 2018
DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) Recursive function can be implemented by using
a) Stack b) Queue c) Linked list d) None

2) Node of linked list consist of
a) Information field b) Pointer field
c) Both a) and b) d) None

3) The freenode() operation of Avail list uses _____ algorithm.
a) Delete first node b) Insert first node
c) Insert last node d) Delete last node

4) Queue elements are added at
a) Rear end b) Front end c) Top end d) None

5) Which operator has lowest priority ?
a) ++ b) % c) + d) ||

6) Polynomial manipulation is one of the applications of
a) Stack b) Structure c) Linked list d) Tree

7) Elements of stacks are called
a) Ordered b) Unordered c) Sequential d) None

P.T.O.

8) POP operation of stack pops
   a) 1st inserted element b) Last inserted element
   c) Any element d) None

9) Which is the correct form of infix notation ?
   a) A + B b) +AB c) AB+ d) None of these

10) This type of linked list does not have first and last node
   a) Circular linked list b) Singly linked list
   c) Doubly linked list d) Static list

11) Overflow condition of stack is
   a) Front = max – 1 b) Front = 0 c) Top = max – 1 d) None

12) The term “push” and “pop” is related to the
   a) Array b) Lists c) Stacks d) All of above

13) Which of the following data structure is linear data structure ?
   a) Trees b) Graphs
   c) Arrays d) None of above

14) 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

15) Tower of Hanoi can be solved by using
   a) Queue b) Tree c) Structure d) Recursion

16) The complexity of binary search algorithm is
   a) O(n) b) O (log n) c) O(n2) d) O(n log n)

17) An expression containing more than one operation are solved according to
   a) Priority of operators b) Priority of operands
   c) From left to right d) From right to left

18) Free function is used to
   a) Release memory for node b) To unlink the node
   c) To unlink first and last node d) None

19) The complexity of Bubble sort algorithm is
   a) O(n) b) O(log n) c) O(n2) d) O(n log n)

20) The complexity of linear search algorithm is
   a) O(n) b) O(log n) c) O(n2) d) O(n log n)

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SLR-TC – 479

Seat No.	

S.E. (Electrical and Electronics) (Part – I) Examination, 2018
DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Write and explain storage classes.
   b) Write a short note on data types in C.
   c) Write a short note on :
      i) Type conversion.
      ii) Structures and union.
   d) Evaluate the following postfix expressions :
      i) 98 + 382 / * 2 + –
      ii) 546 + * 493 / + *
   e) Write a short note on conversion of infix to prefix with example.

3. Solve **any one** : **(1×10=10)**
   i) Write and explain algorithm for evaluation postfix expression.
   ii) Explain implementation of stack using linked list.

4. Write a short note on : **(2×5=10)**
   i) Stack applications.
   ii) Pointer to structure.

SECTION – II

5. Solve **any four** : **(4×5=20)**

   a) Write a short note on priority queue.

   b) Explain selection sort with example.

   c) Explain Doubly linked list.

   d) Differentiate between linear and binary search.

   e) Explain merge sort with example.

6. Solve **any one** : **(1×10=10)**

   i) Explain in brief about bubble sort.

   ii) Write a program to add, delete, search, display and count number of node using singly linked list.

7. Explain the concept of static storage allocation and dynamic storage allocation in case of recursion. **(1×10=10)**

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Seat No.	

Set Q

S.E. (Electrical and Electronics) (Part – I) Examination, 2018
DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) The complexity of binary search algorithm is
a) O(n) b) O (log n) c) O(n2) d) O(n log n)

2) An expression containing more than one operation are solved according to
a) Priority of operators b) Priority of operands
c) From left to right d) From right to left

3) Free function is used to
a) Release memory for node b) To unlink the node
c) To unlink first and last node d) None

4) The complexity of Bubble sort algorithm is
a) O(n) b) O(log n) c) O(n2) d) O(n log n)

5) The complexity of linear search algorithm is
a) O(n) b) O(log n) c) O(n2) d) O(n log n)

6) Recursive function can be implemented by using
a) Stack b) Queue c) Linked list d) None

7) Node of linked list consist of
a) Information field b) Pointer field
c) Both a) and b) d) None

P.T.O.

8) The freenode() operation of Avail list uses _____ algorithm.
   a) Delete first node b) Insert first node
   c) Insert last node d) Delete last node

9) Queue elements are added at
   a) Rear end b) Front end c) Top end d) None

10) Which operator has lowest priority ?
   a) ++ b) % c) + d) ||

11) Polynomial manipulation is one of the applications of
   a) Stack b) Structure c) Linked list d) Tree

12) Elements of stacks are called
   a) Ordered b) Unordered c) Sequential d) None

13) POP operation of stack pops
   a) 1st inserted element b) Last inserted element
   c) Any element d) None

14) Which is the correct form of infix notation ?
   a) A + B b) +AB c) AB+ d) None of these

15) This type of linked list does not have first and last node
   a) Circular linked list b) Singly linked list
   c) Doubly linked list d) Static list

16) Overflow condition of stack is
   a) Front = max – 1 b) Front = 0 c) Top = max – 1 d) None

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   a) Trees b) Graphs
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19) 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

20) Tower of Hanoi can be solved by using
   a) Queue b) Tree c) Structure d) Recursion

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SLR-TC – 479

Seat No.	

S.E. (Electrical and Electronics) (Part – I) Examination, 2018
DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Write and explain storage classes.
   b) Write a short note on data types in C.
   c) Write a short note on :
      i) Type conversion.
      ii) Structures and union.
   d) Evaluate the following postfix expressions :
      i) 98 + 382 / * 2 + –
      ii) 546 + * 493 / + *
   e) Write a short note on conversion of infix to prefix with example.

3. Solve **any one** : **(1×10=10)**
   i) Write and explain algorithm for evaluation postfix expression.
   ii) Explain implementation of stack using linked list.

4. Write a short note on : **(2×5=10)**
   i) Stack applications.
   ii) Pointer to structure.

SECTION – II

5. Solve **any four** : **(4×5=20)**

   a) Write a short note on priority queue.

   b) Explain selection sort with example.

   c) Explain Doubly linked list.

   d) Differentiate between linear and binary search.

   e) Explain merge sort with example.

6. Solve **any one** : **(1×10=10)**

   i) Explain in brief about bubble sort.

   ii) Write a program to add, delete, search, display and count number of node using singly linked list.

7. Explain the concept of static storage allocation and dynamic storage allocation in case of recursion. **(1×10=10)**

SLR-TC – 479

Seat No.	

Set **R**

S.E. (Electrical and Electronics) (Part – I) Examination, 2018
DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) Overflow condition of stack is
a) Front = max – 1 b) Front = 0 c) Top = max – 1 d) None

2) The term "push" and "pop" is related to the
a) Array b) Lists c) Stacks d) All of above

3) Which of the following data structure is linear data structure ?
a) Trees b) Graphs
c) Arrays d) None of above

4) 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

5) Tower of Hanoi can be solved by using
a) Queue b) Tree c) Structure d) Recursion

6) The complexity of binary search algorithm is
a) O(n) b) O (log n) c) O(n2) d) O(n log n)

7) An expression containing more than one operation are solved according to
a) Priority of operators b) Priority of operands
c) From left to right d) From right to left

P.T.O.

8) Free function is used to
   a) Release memory for node b) To unlink the node
   c) To unlink first and last node d) None

9) The complexity of Bubble sort algorithm is
   a) O(n) b) O(log n) c) O(n2) d) O(n log n)

10) The complexity of linear search algorithm is
   a) O(n) b) O(log n) c) O(n2) d) O(n log n)

11) Recursive function can be implemented by using
   a) Stack b) Queue c) Linked list d) None

12) Node of linked list consist of
   a) Information field b) Pointer field
   c) Both a) and b) d) None

13) The freenode() operation of Avail list uses _____ algorithm.
   a) Delete first node b) Insert first node
   c) Insert last node d) Delete last node

14) Queue elements are added at
   a) Rear end b) Front end c) Top end d) None

15) Which operator has lowest priority ?
   a) ++ b) % c) + d) ||

16) Polynomial manipulation is one of the applications of
   a) Stack b) Structure c) Linked list d) Tree

17) Elements of stacks are called
   a) Ordered b) Unordered c) Sequential d) None

18) POP operation of stack pops
   a) 1st inserted element b) Last inserted element
   c) Any element d) None

19) Which is the correct form of infix notation ?
   a) A + B b) +AB c) AB+ d) None of these

20) This type of linked list does not have first and last node
   a) Circular linked list b) Singly linked list
   c) Doubly linked list d) Static list

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SLR-TC – 479

Seat No.	

S.E. (Electrical and Electronics) (Part – I) Examination, 2018
DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
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SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Write and explain storage classes.
   b) Write a short note on data types in C.
   c) Write a short note on :
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      ii) Structures and union.
   d) Evaluate the following postfix expressions :
      i) 98 + 382 / * 2 + –
      ii) 546 + * 493 / + *
   e) Write a short note on conversion of infix to prefix with example.

3. Solve **any one** : **(1×10=10)**
   i) Write and explain algorithm for evaluation postfix expression.
   ii) Explain implementation of stack using linked list.

4. Write a short note on : **(2×5=10)**
   i) Stack applications.
   ii) Pointer to structure.

SECTION – II

5. Solve **any four** : **(4×5=20)**

   a) Write a short note on priority queue.

   b) Explain selection sort with example.

   c) Explain Doubly linked list.

   d) Differentiate between linear and binary search.

   e) Explain merge sort with example.

6. Solve **any one** : **(1×10=10)**

   i) Explain in brief about bubble sort.

   ii) Write a program to add, delete, search, display and count number of node using singly linked list.

7. Explain the concept of static storage allocation and dynamic storage allocation in case of recursion. **(1×10=10)**

SLR-TC – 479

Seat No.	

Set **S**

S.E. (Electrical and Electronics) (Part – I) Examination, 2018
DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
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*3) Assume **suitable** data if necessary.*
*4) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*5) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1×20=20)**

1) Polynomial manipulation is one of the applications of
a) Stack b) Structure c) Linked list d) Tree

2) Elements of stacks are called
a) Ordered b) Unordered c) Sequential d) None

3) POP operation of stack pops
a) 1st inserted element b) Last inserted element
c) Any element d) None

4) Which is the correct form of infix notation ?
a) A + B b) +AB c) AB+ d) None of these

5) This type of linked list does not have first and last node
a) Circular linked list b) Singly linked list
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6) Overflow condition of stack is
a) Front = max – 1 b) Front = 0 c) Top = max – 1 d) None

7) The term "push" and "pop" is related to the
a) Array b) Lists c) Stacks d) All of above

P.T.O.

8) Which of the following data structure is linear data structure ?
   a) Trees b) Graphs
   c) Arrays d) None of above

9) The situation when queue is empty and still we are trying to delete elements from queue is called as
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10) Tower of Hanoi can be solved by using
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11) The complexity of binary search algorithm is
   a) O(n) b) O (log n) c) O(n2) d) O(n log n)

12) An expression containing more than one operation are solved according to
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15) The complexity of linear search algorithm is
   a) O(n) b) O(log n) c) O(n2) d) O(n log n)

16) Recursive function can be implemented by using
   a) Stack b) Queue c) Linked list d) None

17) Node of linked list consist of
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18) The freenode() operation of Avail list uses _____ algorithm.
   a) Delete first node b) Insert first node
   c) Insert last node d) Delete last node

19) Queue elements are added at
   a) Rear end b) Front end c) Top end d) None

20) Which operator has lowest priority ?
   a) ++ b) % c) + d) ||

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SLR-TC – 479

Seat No.	

S.E. (Electrical and Electronics) (Part – I) Examination, 2018
DATA STRUCTURES (Old)

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
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SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Write and explain storage classes.
   b) Write a short note on data types in C.
   c) Write a short note on :
      i) Type conversion.
      ii) Structures and union.
   d) Evaluate the following postfix expressions :
      i) 98 + 382 / * 2 + –
      ii) 546 + * 493 / + *
   e) Write a short note on conversion of infix to prefix with example.

3. Solve **any one** : **(1×10=10)**
   i) Write and explain algorithm for evaluation postfix expression.
   ii) Explain implementation of stack using linked list.

4. Write a short note on : **(2×5=10)**
   i) Stack applications.
   ii) Pointer to structure.

SECTION – II

5. Solve **any four** : **(4×5=20)**

   a) Write a short note on priority queue.

   b) Explain selection sort with example.

   c) Explain Doubly linked list.

   d) Differentiate between linear and binary search.

   e) Explain merge sort with example.

6. Solve **any one** : **(1×10=10)**

   i) Explain in brief about bubble sort.

   ii) Write a program to add, delete, search, display and count number of node using singly linked list.

7. Explain the concept of static storage allocation and dynamic storage allocation in case of recursion. **(1×10=10)**

SLR-TC – 485

Seat No.	

Set **P**

S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018
LINEAR ALGEBRA

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 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) Attempt ***any three*** *questions from* ***each*** *Section.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of calculator is* ***allowed****.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The system of non-homogeneous equations AX = B has infinitely many solutions if
a) r = n b) r > n c) r < n d) None of these

2) Rank of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ is
a) 1 b) 2 c) 3 d) None of these

3) Given a scalar r, the transformation T : $R^2 \rightarrow R^2$ defined by T(X) = rX when r > 1 is called
a) Dialation b) Translation c) Contraction d) Linear

4) The dimension of NulA is
a) The number of columns in A
b) The number of basic variables in the equation AX = 0
c) The number of rows in A
d) The number of free variables in the equation AX = 0

P.T.O.

5) If vector space V has a basis of n vectors then every basis of V must consist
   a) Less than n vectors b) 2n vectors
   c) Greater than n vectors d) Exactly n vectors

6) The eigen values of the matrix A are 2, 5, 8. Then eigen values of A^{-1} are
   a) $\sqrt{2}, \sqrt{5}, 2\sqrt{2}$ b) $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}$ c) 2, 5, 8 d) None of these

7) The eigen values of matrix $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$ are
   a) $1 \pm i$ b) $2 \pm i$ c) $\pm i$ d) $4 \pm 2i$

8) If u = [3 4 6] and v = [0 1 1] then u.v. = _____
   a) 1 0 b) 1 5 c) [0 4 6] d) None of these

9) Let $\phi(n) = x_1^2 - 8x_1x_2 - 5x_2^2$, then $\phi(n)$ = _____ for $x = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$.
   a) – 20 b) 16 c) 20 d) 28

10) Let u be a non-zero vector. Then a unit vector in the direction of u is
   a) $\|u\|$ b) $\|u\| \cdot u$ c) $\frac{u}{\|u\|}$ d) None of the above

11) The equations of lines of regression are x + 2y = 5 and 2x + 3y = 8. Then $\bar{x}$ and $\bar{y}$ are
   a) 1 and 3 b) 2 and 3 c) 2 and 5 d) 1 and 2

12) If $b_{yx} = \frac{6}{5}, b_{xy} = \frac{15}{8}$ then r = _____
   a) 2.5 b) 1.5 c) 0.5 d) 1

13) Which of the following equation is called Laplace equation ?
   a) $\frac{\partial^2\phi}{\partial x^2} - \frac{\partial^2\phi}{\partial y^2} = 0$ b) $\frac{\partial^2\phi}{\partial x^2} + \frac{\partial^2\phi}{\partial y^2} = 0$
   c) $\frac{\partial\phi}{\partial x} + \frac{\partial\phi}{\partial y} = 0$ d) $\frac{\partial\phi}{\partial x} - \frac{\partial\phi}{\partial y} = 0$

14) If an analytic function f(z) = u(x, y) + i v(x, y) then f′(z) = _____
   a) $u_x + v_x$ b) $u_y + u_y$ c) $u_x + i\, v_x$ d) $u_x - i\, v_x$

_____

SLR-TC – 485

Seat No.	

S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018
LINEAR ALGEBRA

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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** from the following : **9**

a) Solve the system :

$x_1 - 3x_2 = 5$,

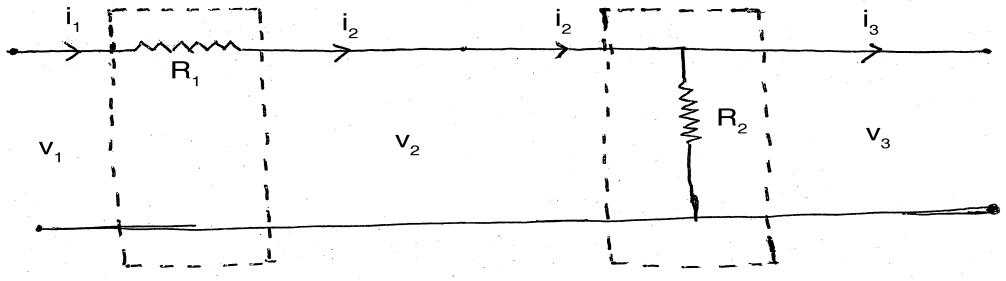
$-x_1 + x_2 + 5x_3 = 2$,

$x_2 + x_3 = 0$.

b) Let $a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}, a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$. Determine whether 'b' can be generated as a linear combination of a_1 and a_2.

c) Let $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$, and define transformation T : $R^2 \rightarrow R^2$ by T(X) = AX. Find the images under T of $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $v = \begin{bmatrix} a \\ b \end{bmatrix}$.

d)



Compute the transfer matrix of the ladder network.

3. a) Using LU factorization method, solve the equation AX = b where

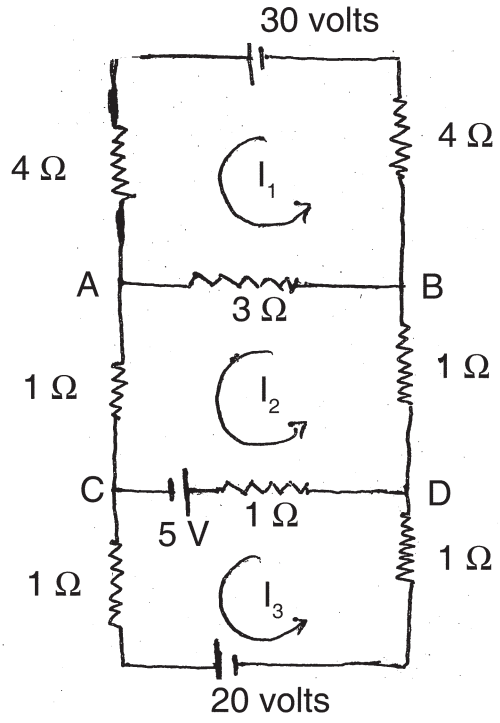
$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ \frac{3}{2} & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix} = \text{L.U.}$$

4

b) Show that T is linear transformation and find standard matrix of $T(x_1, x_2)$. Where $T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2)$. **3**

c) Write the matrix equation that determines the loop currents for the circuit. **3**



4. a) Assume that A is row equivalent to B. Find bases for NulA and ColA.

$$A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

3

b) Find basis and state the dimension of

$$\left\{\begin{bmatrix} s-2t \\ s+t \\ 3t \end{bmatrix} : s, t \text{ in } R\right\}$$ **3**

c) Consider a basis B = $\{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$, suppose an X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$, find X. **3**

5. a) Diagonalize the matrix if possible $A = \begin{bmatrix} -3 & 12 \\ -2 & 7 \end{bmatrix}$. **3**

b) Apply power method to $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ with $x_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ stop when K = 4 and estimate the dominant eigen value and corresponding eigen vector for A. **3**

c) Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$ **3**

SECTION – II

6. a) Write down the quadratic form corresponding to the following matrices : **3**

i) $\begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}$

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

b) Let $a = \begin{bmatrix} -2 \\ 1 \end{bmatrix}, b = \begin{bmatrix} -3 \\ 1 \end{bmatrix}, c = \begin{bmatrix} 4/3 \\ -1 \\ 2/3 \end{bmatrix}$ and $d = \begin{bmatrix} 5 \\ 6 \\ -1 \end{bmatrix}$. **3**

i) Compute $\frac{a \cdot b}{a \cdot a}$

ii) Find $\| c \|$.

iii) Show that d is orthogonal to c.

c) Show that $\{u_1, u_2, u_3\}$ is an orthogonal set where,

$u_1 = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, u_2 = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}, u_3 = \begin{bmatrix} -1/2 \\ -2 \\ 7/2 \end{bmatrix}$. **4**

OR

c) Let u = [1, 2, 4]′, v = [2, –3, 5]′, w = [4, 2, –3]′ be the vectors in R^3, find

i) $(u + v) \cdot w$

ii) $\| u + v \|$. **4**

7. a) Find the equations of the lines of regression from the following data, also find the coefficient of correlation r. **5**

x :	80	45	55	56	58	60	65	68	70	75	85
y :	82	56	50	48	60	62	64	65	70	74	90

b) Calculate the coefficient of correlation between height of father and height of son from the following data : **4**

Height of father (x) :	64	65	66	67	68	69	70
Height of son (y) :	66	67	65	68	70	68	71

8. a) The equations of the two lines of regression are 6y = 5x + 90 and 15x = 8y + 130. **3**

Find :

i) The means of x and y.

ii) The coefficient of correlation.

iii) If variance of x is 16, also find the standard deviation of y.

b) Given Mean of x = 50.07 Mean of y = 9.98

S.D. of x = 5.26 S.D. of y = 2.59

r = 0.898

Find the equations of the lines of regression. **3**

c) Is $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2 \cdot x_3$ positive definite ? **3**

9. a) Verify that the real and imaginary parts of $f(z) = e^{2z}$ are harmonic functions. **3**

b) Find the image of following under the transformation $W = \frac{1}{z}$.

i) $z = \frac{\sqrt{5}}{2} + i$

ii) $z = \frac{2\sqrt{5}}{9} + \frac{4}{9}i$. **3**

c) Find the bilinear transformation which maps the points z = 1, i, –1 into the points W = i, 0, –i. **3**

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Set P

SLR-TC – 485

Seat No.	

Set **Q**

S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018
LINEAR ALGEBRA

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
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4) ***Use*** *of calculator is* ***allowed****.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) If u = [3 4 6] and v = [0 1 1] then u.v. = _____
a) 1 0 b) 1 5 c) [0 4 6] d) None of these

2) Let $\phi(n) = x_1^2 - 8x_1x_2 - 5x_2^2$, then $\phi(n)$ = _____ for $x = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$.
a) – 20 b) 16 c) 20 d) 28

3) Let u be a non-zero vector. Then a unit vector in the direction of u is
a) $\|u\|$ b) $\|u\| \cdot u$ c) $\frac{u}{\|u\|}$ d) None of the above

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

5) If $b_{yx} = \frac{6}{5}, b_{xy} = \frac{15}{8}$ then r = _____
a) 2.5 b) 1.5 c) 0.5 d) 1

P.T.O.

6) Which of the following equation is called Laplace equation ?

a) $\frac{\partial^2\phi}{\partial x^2} - \frac{\partial^2\phi}{\partial y^2} = 0$ b) $\frac{\partial^2\phi}{\partial x^2} + \frac{\partial^2\phi}{\partial y^2} = 0$

c) $\frac{\partial\phi}{\partial x} + \frac{\partial\phi}{\partial y} = 0$ d) $\frac{\partial\phi}{\partial x} - \frac{\partial\phi}{\partial y} = 0$

7) If an analytic function f(z) = u(x, y) + i v(x, y) then f′(z) = _____

a) $u_x + v_x$ b) $u_y + u_y$ c) $u_x + i\, v_x$ d) $u_x - i\, v_x$

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a) r = n b) r > n c) r < n d) None of these

9) Rank of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ is

a) 1 b) 2 c) 3 d) None of these

10) Given a scalar r, the transformation T : $R^2 \to R^2$ defined by T(X) = rX when r > 1 is called

a) Dialation b) Translation c) Contraction d) Linear

11) The dimension of NulA is

a) The number of columns in A
b) The number of basic variables in the equation AX = 0
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d) The number of free variables in the equation AX = 0

12) If vector space V has a basis of n vectors then every basis of V must consist

a) Less than n vectors b) 2n vectors
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13) The eigen values of the matrix A are 2, 5, 8. Then eigen values of A^{-1} are

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

a) $1 \pm i$ b) $2 \pm i$ c) $\pm i$ d) $4 \pm 2i$

_____

SLR-TC – 485

Seat No.	

S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018
LINEAR ALGEBRA

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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** from the following : **9**

a) Solve the system :

$x_1 - 3x_2 = 5$,

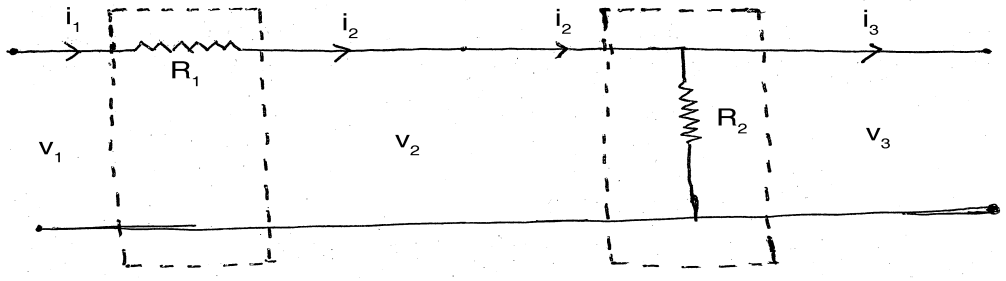
$-x_1 + x_2 + 5x_3 = 2$,

$x_2 + x_3 = 0$.

b) Let $a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}, a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$. Determine whether 'b' can be generated as a linear combination of a_1 and a_2.

c) Let $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$, and define transformation $T : R^2 \rightarrow R^2$ by $T(X) = AX$. Find the images under T of $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $v = \begin{bmatrix} a \\ b \end{bmatrix}$.

d)



Compute the transfer matrix of the ladder network.

Set Q

3. a) Using LU factorization method, solve the equation AX = b where

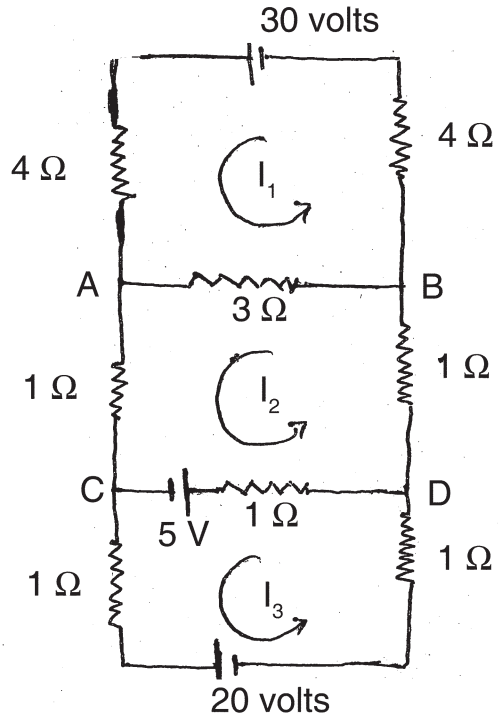
$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ \frac{3}{2} & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix} = \text{L.U.}$$

4

b) Show that T is linear transformation and find standard matrix of $T(x_1, x_2)$. Where $T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2)$. **3**

c) Write the matrix equation that determines the loop currents for the circuit. **3**



4. a) Assume that A is row equivalent to B. Find bases for NulA and ColA.

$$A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

3

b) Find basis and state the dimension of

$$\left\{\begin{bmatrix} s-2t \\ s+t \\ 3t \end{bmatrix} : s, t \text{ in } R\right\}$$ **3**

c) Consider a basis B = $\{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$, suppose an X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$, find X. **3**

5. a) Diagonalize the matrix if possible $A = \begin{bmatrix} -3 & 12 \\ -2 & 7 \end{bmatrix}$. **3**

b) Apply power method to $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ with $x_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ stop when K = 4 and estimate the dominant eigen value and corresponding eigen vector for A. **3**

c) Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$ **3**

SECTION – II

6. a) Write down the quadratic form corresponding to the following matrices : **3**

i) $\begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}$

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

b) Let $a = \begin{bmatrix} -2 \\ 1 \end{bmatrix}, b = \begin{bmatrix} -3 \\ 1 \end{bmatrix}, c = \begin{bmatrix} 4/3 \\ -1 \\ 2/3 \end{bmatrix}$ and $d = \begin{bmatrix} 5 \\ 6 \\ -1 \end{bmatrix}$. **3**

i) Compute $\frac{a \cdot b}{a \cdot a}$

ii) Find $\| c \|$.

iii) Show that d is orthogonal to c.

c) Show that $\{u_1, u_2, u_3\}$ is an orthogonal set where,

$u_1 = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, u_2 = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}, u_3 = \begin{bmatrix} -1/2 \\ -2 \\ 7/2 \end{bmatrix}$. **4**

OR

c) Let u = [1, 2, 4]′, v = [2, –3, 5]′, w = [4, 2, –3]′ be the vectors in R^3, find

i) $(u + v) \cdot w$

ii) $\| u + v \|$. **4**

7. a) Find the equations of the lines of regression from the following data, also find the coefficient of correlation r. **5**

x :	80	45	55	56	58	60	65	68	70	75	85
y :	82	56	50	48	60	62	64	65	70	74	90

b) Calculate the coefficient of correlation between height of father and height of son from the following data : **4**

Height of father (x) :	64	65	66	67	68	69	70
Height of son (y) :	66	67	65	68	70	68	71

8. a) The equations of the two lines of regression are 6y = 5x + 90 and 15x = 8y + 130. **3**

Find :

i) The means of x and y.

ii) The coefficient of correlation.

iii) If variance of x is 16, also find the standard deviation of y.

Set Q

b) Given Mean of x = 50.07 Mean of y = 9.98

S.D. of x = 5.26 S.D. of y = 2.59

r = 0.898

Find the equations of the lines of regression. **3**

c) Is $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2 \cdot x_3$ positive definite ? **3**

9. a) Verify that the real and imaginary parts of $f(z) = e^{2z}$ are harmonic functions. **3**

b) Find the image of following under the transformation $W = \frac{1}{z}$.

i) $z = \frac{\sqrt{5}}{2} + i$

ii) $z = \frac{2\sqrt{5}}{9} + \frac{4}{9}i$. **3**

c) Find the bilinear transformation which maps the points z = 1, i, –1 into the points W = i, 0, –i. **3**

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Set Q

SLR-TC – 485

Seat No.	

Set **R**

S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018
LINEAR ALGEBRA

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 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) Attempt ***any three*** *questions from* ***each*** *Section.*
3) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of calculator is* ***allowed****.*
5) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) If vector space V has a basis of n vectors then every basis of V must consist
a) Less than n vectors b) 2n vectors
c) Greater than n vectors d) Exactly n vectors

2) The eigen values of the matrix A are 2, 5, 8. Then eigen values of A^{-1} are
a) $\sqrt{2}, \sqrt{5}, 2\sqrt{2}$ b) $\frac{1}{2}, \frac{1}{5}, \frac{1}{8}$ c) 2, 5, 8 d) None of these

3) The eigen values of matrix $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$ are
a) $1 \pm i$ b) $2 \pm i$ c) $\pm i$ d) $4 \pm 2i$

4) If u = [3 4 6] and v = [0 1 1] then u.v. = _____
a) 1 0 b) 1 5 c) [0 4 6] d) None of these

5) Let $\phi(n) = x_1^2 - 8x_1x_2 - 5x_2^2$, then $\phi(n)$ = _____ for $x = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$.
a) – 20 b) 16 c) 20 d) 28

P.T.O.

6) Let u be a non-zero vector. Then a unit vector in the direction of u is

a) $\|u\|$ b) $\|u\| \cdot u$ c) $\frac{u}{\|u\|}$ d) None of the above

7) The equations of lines of regression are x + 2y = 5 and 2x + 3y = 8. Then $\bar{x}$ and $\bar{y}$ are

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

8) If $b_{yx} = \frac{6}{5}, b_{xy} = \frac{15}{8}$ then r = _____

a) 2.5 b) 1.5 c) 0.5 d) 1

9) Which of the following equation is called Laplace equation ?

a) $\frac{\partial^2\phi}{\partial x^2} - \frac{\partial^2\phi}{\partial y^2} = 0$ b) $\frac{\partial^2\phi}{\partial x^2} + \frac{\partial^2\phi}{\partial y^2} = 0$

c) $\frac{\partial\phi}{\partial x} + \frac{\partial\phi}{\partial y} = 0$ d) $\frac{\partial\phi}{\partial x} - \frac{\partial\phi}{\partial y} = 0$

10) If an analytic function f(z) = u(x, y) + i v(x, y) then f′(z) = _____

a) $u_x + v_x$ b) $u_y + u_y$ c) $u_x + i\, v_x$ d) $u_x - i\, v_x$

11) The system of non-homogeneous equations AX = B has infinitely many solutions if

a) r = n b) r > n c) r < n d) None of these

12) Rank of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ is

a) 1 b) 2 c) 3 d) None of these

13) Given a scalar r, the transformation T : $R^2 \to R^2$ defined by T(X) = rX when r > 1 is called

a) Dialation b) Translation c) Contraction d) Linear

14) The dimension of NulA is

a) The number of columns in A
b) The number of basic variables in the equation AX = 0
c) The number of rows in A
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_____

SLR-TC – 485

Seat No.	

S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018
LINEAR ALGEBRA

Day and Date : Tuesday, 15-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

N. B. *: 1) Attempt **any three** questions from **each** Section.*
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*3) **Use** of calculator is **allowed**.*

SECTION – I

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

a) Solve the system :

$x_1 - 3x_2 = 5$,
$-x_1 + x_2 + 5x_3 = 2$,
$x_2 + x_3 = 0$.

b) Let $a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}, a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$. Determine whether 'b' can be generated as a linear combination of a_1 and a_2.

c) Let $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$, and define transformation T : $R^2 \rightarrow R^2$ by T(X) = AX. Find the images under T of $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $v = \begin{bmatrix} a \\ b \end{bmatrix}$.

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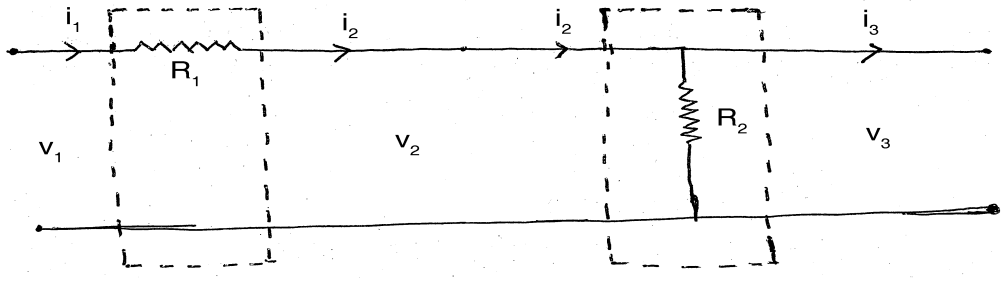


Compute the transfer matrix of the ladder network.

Set R

3. a) Using LU factorization method, solve the equation AX = b where

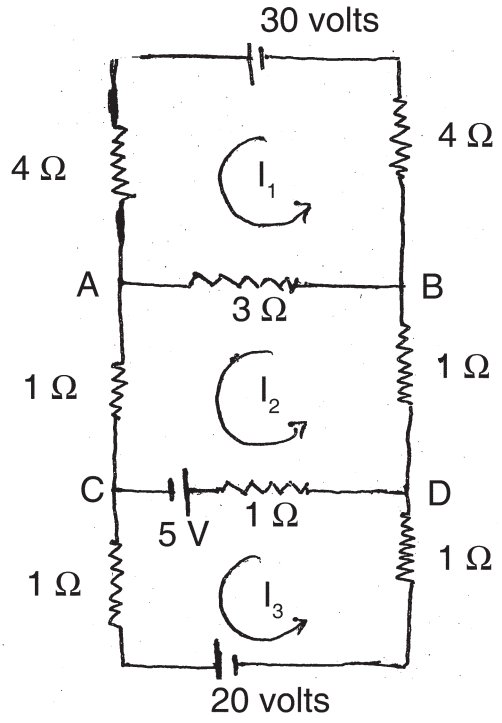
$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ \frac{3}{2} & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix} = \text{L.U.}$$

4

b) Show that T is linear transformation and find standard matrix of $T(x_1, x_2)$. Where $T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2)$. **3**

c) Write the matrix equation that determines the loop currents for the circuit. **3**



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3

b) Find basis and state the dimension of

$$\left\{\begin{bmatrix} s-2t \\ s+t \\ 3t \end{bmatrix} : s, t \text{ in } R\right\}$$ **3**

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c) Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$ **3**

SECTION – II

6. a) Write down the quadratic form corresponding to the following matrices : **3**

i) $\begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}$

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

b) Let $a = \begin{bmatrix} -2 \\ 1 \end{bmatrix}, b = \begin{bmatrix} -3 \\ 1 \end{bmatrix}, c = \begin{bmatrix} 4/3 \\ -1 \\ 2/3 \end{bmatrix}$ and $d = \begin{bmatrix} 5 \\ 6 \\ -1 \end{bmatrix}$. **3**

i) Compute $\frac{a \cdot b}{a \cdot a}$

ii) Find $\| c \|$.

iii) Show that d is orthogonal to c.

c) Show that $\{u_1, u_2, u_3\}$ is an orthogonal set where,

$u_1 = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, u_2 = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}, u_3 = \begin{bmatrix} -1/2 \\ -2 \\ 7/2 \end{bmatrix}$. **4**

OR

c) Let u = [1, 2, 4]′, v = [2, –3, 5]′, w = [4, 2, –3]′ be the vectors in R^3, find

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ii) $\| u + v \|$. **4**

7. a) Find the equations of the lines of regression from the following data, also find the coefficient of correlation r. **5**

x :	80	45	55	56	58	60	65	68	70	75	85
y :	82	56	50	48	60	62	64	65	70	74	90

b) Calculate the coefficient of correlation between height of father and height of son from the following data : **4**

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Height of son (y) :	66	67	65	68	70	68	71

8. a) The equations of the two lines of regression are 6y = 5x + 90 and 15x = 8y + 130. **3**

Find :

i) The means of x and y.

ii) The coefficient of correlation.

iii) If variance of x is 16, also find the standard deviation of y.

Set R

b) Given Mean of x = 50.07 Mean of y = 9.98

S.D. of x = 5.26 S.D. of y = 2.59

r = 0.898

Find the equations of the lines of regression. **3**

c) Is $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2 \cdot x_3$ positive definite ? **3**

9. a) Verify that the real and imaginary parts of $f(z) = e^{2z}$ are harmonic functions. **3**

b) Find the image of following under the transformation $W = \frac{1}{z}$.

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ii) $z = \frac{2\sqrt{5}}{9} + \frac{4}{9}i$. **3**

c) Find the bilinear transformation which maps the points z = 1, i, –1 into the points W = i, 0, –i. **3**

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Set R

SLR-TC – 485

Seat No.	

Set **S**

S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018
LINEAR ALGEBRA

Day and Date : Tuesday, 15-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Let u be a non-zero vector. Then a unit vector in the direction of u is

a) $\|u\|$ b) $\|u\| \cdot u$ c) $\frac{u}{\|u\|}$ d) None of the above

2) The equations of lines of regression are x + 2y = 5 and 2x + 3y = 8. Then $\bar{x}$ and $\bar{y}$ are

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

3) If $b_{yx} = \frac{6}{5}, b_{xy} = \frac{15}{8}$ then r = _____

a) 2.5 b) 1.5 c) 0.5 d) 1

4) Which of the following equation is called Laplace equation ?

a) $\frac{\partial^2\phi}{\partial x^2} - \frac{\partial^2\phi}{\partial y^2} = 0$ b) $\frac{\partial^2\phi}{\partial x^2} + \frac{\partial^2\phi}{\partial y^2} = 0$

c) $\frac{\partial\phi}{\partial x} + \frac{\partial\phi}{\partial y} = 0$ d) $\frac{\partial\phi}{\partial x} - \frac{\partial\phi}{\partial y} = 0$

5) If an analytic function f(z) = u(x, y) + i v(x, y) then f′(z) = _____
   a) $u_x + v_x$ b) $u_y + u_y$ c) $u_x + i\, v_x$ d) $u_x - i\, v_x$

6) The system of non-homogeneous equations AX = B has infinitely many solutions if
   a) r = n b) r > n c) r < n d) None of these

7) Rank of the matrix $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ is
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10) If vector space V has a basis of n vectors then every basis of V must consist
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12) The eigen values of matrix $A = \begin{bmatrix} 1 & -2 \\ 1 & 3 \end{bmatrix}$ are
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13) If u = [3 4 6] and v = [0 1 1] then u.v. = _____
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14) Let $\phi(n) = x_1^2 - 8x_1x_2 - 5x_2^2$, then $\phi(n)$ = _____ for $x = \begin{bmatrix} -3 \\ 1 \end{bmatrix}$.
   a) – 20 b) 16 c) 20 d) 28

_____

SLR-TC – 485

Seat No.	

S.E. (E&E) (Part – II) (Old CGPA) Examination, 2018
LINEAR ALGEBRA

Day and Date : Tuesday, 15-5-2018 Marks : 56
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SECTION – I

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

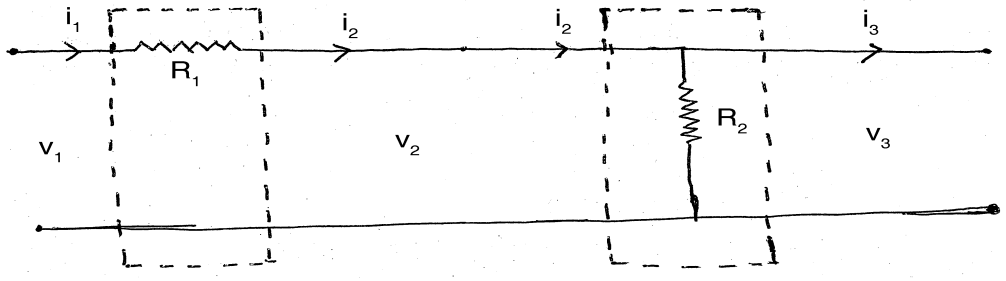
a) Solve the system :

$x_1 - 3x_2 = 5$,
$-x_1 + x_2 + 5x_3 = 2$,
$x_2 + x_3 = 0$.

b) Let $a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}, a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$. Determine whether 'b' can be generated as a linear combination of a_1 and a_2.

c) Let $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$, and define transformation T : $R^2 \rightarrow R^2$ by T(X) = AX. Find the images under T of $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $v = \begin{bmatrix} a \\ b \end{bmatrix}$.

d)



Compute the transfer matrix of the ladder network.

3. a) Using LU factorization method, solve the equation AX = b where

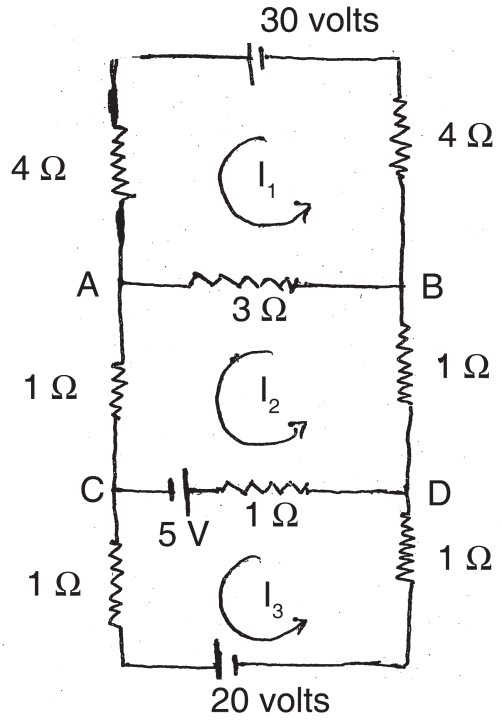
$$A = \begin{bmatrix} 2 & -2 & 4 \\ 1 & -3 & 1 \\ 3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} 0 \\ -5 \\ 7 \end{bmatrix}$$

$$A = \begin{bmatrix} 1 & 0 & 0 \\ \frac{1}{2} & 1 & 0 \\ \frac{3}{2} & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 2 & -2 & 4 \\ 0 & -2 & -1 \\ 0 & 0 & -6 \end{bmatrix} = \text{L.U.}$$

4

b) Show that T is linear transformation and find standard matrix of $T(x_1, x_2)$. Where $T(x_1, x_2) = (2x_2 - 3x_1, x_1 - 4x_2, 0, x_2)$. **3**

c) Write the matrix equation that determines the loop currents for the circuit. **3**



4. a) Assume that A is row equivalent to B. Find bases for NulA and ColA.

$$A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}, B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}.$$

3

b) Find basis and state the dimension of

$$\left\{\begin{bmatrix} s-2t \\ s+t \\ 3t \end{bmatrix} : s, t \text{ in } R\right\}$$ **3**

c) Consider a basis B = $\{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$, suppose an X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$, find X. **3**

5. a) Diagonalize the matrix if possible $A = \begin{bmatrix} -3 & 12 \\ -2 & 7 \end{bmatrix}$. **3**

b) Apply power method to $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ with $x_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ stop when K = 4 and estimate the dominant eigen value and corresponding eigen vector for A. **3**

c) Find the characteristic equation of

$$A = \begin{bmatrix} 5 & -2 & 6 & -1 \\ 0 & 3 & -8 & 0 \\ 0 & 0 & 5 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}.$$ **3**

SECTION – II

6. a) Write down the quadratic form corresponding to the following matrices : **3**

i) $\begin{bmatrix} 4 & 0 \\ 0 & 3 \end{bmatrix}$

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

b) Let $a = \begin{bmatrix} -2 \\ 1 \end{bmatrix}, b = \begin{bmatrix} -3 \\ 1 \end{bmatrix}, c = \begin{bmatrix} 4/3 \\ -1 \\ 2/3 \end{bmatrix}$ and $d = \begin{bmatrix} 5 \\ 6 \\ -1 \end{bmatrix}$. **3**

i) Compute $\frac{a \cdot b}{a \cdot a}$

ii) Find $\| c \|$.

iii) Show that d is orthogonal to c.

c) Show that $\{u_1, u_2, u_3\}$ is an orthogonal set where,

$u_1 = \begin{bmatrix} 3 \\ 1 \\ 1 \end{bmatrix}, u_2 = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}, u_3 = \begin{bmatrix} -1/2 \\ -2 \\ 7/2 \end{bmatrix}$. **4**

OR

c) Let u = [1, 2, 4]′, v = [2, –3, 5]′, w = [4, 2, –3]′ be the vectors in R^3, find

i) $(u + v) \cdot w$

ii) $\| u + v \|$. **4**

7. a) Find the equations of the lines of regression from the following data, also find the coefficient of correlation r. **5**

x :	80	45	55	56	58	60	65	68	70	75	85
y :	82	56	50	48	60	62	64	65	70	74	90

b) Calculate the coefficient of correlation between height of father and height of son from the following data : **4**

Height of father (x) :	64	65	66	67	68	69	70
Height of son (y) :	66	67	65	68	70	68	71

8. a) The equations of the two lines of regression are 6y = 5x + 90 and 15x = 8y + 130. **3**

Find :

i) The means of x and y.

ii) The coefficient of correlation.

iii) If variance of x is 16, also find the standard deviation of y.

b) Given Mean of x = 50.07 Mean of y = 9.98

S.D. of x = 5.26 S.D. of y = 2.59

r = 0.898

Find the equations of the lines of regression. **3**

c) Is $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2 \cdot x_3$ positive definite ? **3**

9. a) Verify that the real and imaginary parts of $f(z) = e^{2z}$ are harmonic functions. **3**

b) Find the image of following under the transformation $W = \frac{1}{z}$.

i) $z = \frac{\sqrt{5}}{2} + i$

ii) $z = \frac{2\sqrt{5}}{9} + \frac{4}{9}i$. **3**

c) Find the bilinear transformation which maps the points z = 1, i, –1 into the points W = i, 0, –i. **3**

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Set S

Seat No.	

SLR-TC – 486

Set **P**

S.E. (Part – II) (E&E) Old-CGPA Examination, 2018
AC MACHINES

Day and Date : Thursday 17-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The starting torque of a 3-phase induction motor can be increased by increasing
   a) The rotor reactance b) The rotor resistance
   c) The stator resistance d) None of the above

2) The 'cogging' of an induction motor can be avoided by
   a) Proper ventilation
   b) Using DOL starter
   c) Auto-transformer starter
   d) Having no. of rotor slots more or less than the no. of stator slots

3) In case of the induction motor the torque is
   a) Inversely proportional to V b) Directly proportional to S^2
   c) Inversely proportional to slip d) Directly proportional to slip

4) DOL starting of induction motor is usually restricted to
   a) Low horse power motors b) Variable speed motors
   c) High horse power motors d) High speed motors

5) The starting torque of a 3-phase squirrel cage induction motor is
   a) Twice the full load torque b) 1.5 times the full load torque
   c) Equal to full load torque d) None of the above

P.T.O.

6) Short–circuit test on an induction motor cannot be used to determine
   a) Windage losses b) Copper losses
   c) Transformer ratio d) Power scale of circle diagram

7) In 3-phase induction motors sometimes copper bars are placed deep in the rotor to
   a) Improve starting torque b) Reduce copper losses
   c) Improve efficiency d) Improve power factor

8) Which kind of rotor is most suitable for turbo alternators which are designed to run at high speed ?
   a) Salient pole type b) Non-salient pole type
   c) Both a) and b) above d) None of the above

9) The frequency of voltage generated by an alternator having 8 poles and rotating at 250 rpm is
   a) 60 Hz b) 50 Hz c) 25 Hz d) 16 2/3 Hz

10) If the input to the prime mover of an alternator is kept constant but the excitation is changed, then the
   a) Reactive component of the output is changed
   b) Active component of the output is changed
   c) Power factor of the load remains
   d) Power factor of the load reduces

11) For an alternator when the power factor of the load is unity
   a) The armature flux will have square waveform
   b) The armature flux will be demagnetizing
   c) The armature flux will be cross magnetizing
   d) The armature flux will reduce to zero

12) In order that two alternators be put in parallel, which of the following factors should be identical for both ?
   a) Voltage b) Frequency
   c) Phase sequence d) All of the above

13) A three phase alternator has a phase sequence of RYB for its three output voltages. In case the field current is reversed, the phase sequence will become.
   a) RBY b) RYB
   c) YRB d) None of the above

14) For the same power rating, a lower voltage alternator will be
   a) More efficient b) Larger in size
   c) Operating at high rpm d) More costly

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SLR-TC – 486

Seat No.	

S.E. (Part – II) (E&E) Old-CGPA Examination, 2018
AC MACHINES

Day and Date : Thursday 17-5-2018 Marks : 56

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

SECTION – I

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

a) Find the ratio of maximum torque to full load torque of a 4-pole, 50 Hz, 3-phase I.M : the data required is as follows :

Slip is 4%, Rotor impedance/phase = (0.3 + j 1.2) Ω at standstill.

b) What are the different types of 1-phase induction motors are there ? Explain the principle of operation of shaded pole induction motor.

c) Derive the expression for T_{st}/T_{max} and T_{fl}/T_{max} with neat explanation.

d) How the starting torque of squirrel cage induction motor can be improved ? Explain with neat sketch.

e) Explain the DOL starter with neat circuit diagram.

3. Attempt **any two** : **(2×6=12)**

a) Why single phase induction motor is not a self starting one ? Explain with double revolving field theory and show how that backward slip $S_B = (2\text{-}S)$ where S is forward slip.

b) Find the mechanical power output of 185-W, 4 pole, 110-V, 50-Hz single-phase induction motor, whose constants are given below at a slip of 0.05.

R1 = 1.86 Ω X1 = 2.56 Ω Xm = 53.5 Ω R2 = 3.56 Ω X2 = 2.56 Ω

Core loss = 3.5 W, Friction and Windage loss = 13.5 W.

c) Explain how rotating magnetic field is created when 3-ph supply voltage is given to the 3-ph stator winding.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Give the applications of synchronous motor.
   b) Explain why synchronous motor is not self starting.
   c) Derive EMF equation of alternator with short pitched coils and distributed winding.
   d) What is armature reaction ? What its effect when RL load is connected to alternators explain with phasor diagram ?
   e) Explain synchronous motor as synchronous condenser. Draw neat phasor diagram.

5. Attempt **any two** : **(2×6=12)**
   a) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs δ characteristics.
   b) Explain the operation of synchronous motor with constant load and following different type of excitation with phasor diagram.
      i) Normal excitation
      ii) Under excitation
      iii) Over excitation.
   c) A 208 V, star connected 3-phase synchronous motor has a synchronous reactance of 4 Ω/phase and negligible armature winding resistance. At a certain load, the motor takes 7.2 kW at 0.8 p.f lagging. If the power developed by the motor remains the same while the excitation voltage is increased by 50% by raising the field excitation, determine
      i) The new armature current and
      ii) The power factor.

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Seat No.	

SLR-TC – 486

Set Q

S.E. (Part – II) (E&E) Old-CGPA Examination, 2018
AC MACHINES

Day and Date : Thursday 17-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Which kind of rotor is most suitable for turbo alternators which are designed to run at high speed ?
   a) Salient pole type b) Non-salient pole type
   c) Both a) and b) above d) None of the above

2) The frequency of voltage generated by an alternator having 8 poles and rotating at 250 rpm is
   a) 60 Hz b) 50 Hz c) 25 Hz d) 16 2/3 Hz

3) If the input to the prime mover of an alternator is kept constant but the excitation is changed, then the
   a) Reactive component of the output is changed
   b) Active component of the output is changed
   c) Power factor of the load remains
   d) Power factor of the load reduces

4) For an alternator when the power factor of the load is unity
   a) The armature flux will have square waveform
   b) The armature flux will be demagnetizing
   c) The armature flux will be cross magnetizing
   d) The armature flux will reduce to zero

5) In order that two alternators be put in parallel, which of the following factors should be identical for both ?
   a) Voltage b) Frequency
   c) Phase sequence d) All of the above
6) A three phase alternator has a phase sequence of RYB for its three output voltages. In case the field current is reversed, the phase sequence will become.
   a) RBY b) RYB
   c) YRB d) None of the above
7) For the same power rating, a lower voltage alternator will be
   a) More efficient b) Larger in size
   c) Operating at high rpm d) More costly
8) The starting torque of a 3-phase induction motor can be increased by increasing
   a) The rotor reactance b) The rotor resistance
   c) The stator resistance d) None of the above
9) The 'cogging' of an induction motor can be avoided by
   a) Proper ventilation
   b) Using DOL starter
   c) Auto-transformer starter
   d) Having no. of rotor slots more or less than the no. of stator slots
10) In case of the induction motor the torque is
   a) Inversely proportional to V b) Directly proportional to S^2
   c) Inversely proportional to slip d) Directly proportional to slip
11) DOL starting of induction motor is usually restricted to
   a) Low horse power motors b) Variable speed motors
   c) High horse power motors d) High speed motors
12) The starting torque of a 3-phase squirrel cage induction motor is
   a) Twice the full load torque b) 1.5 times the full load torque
   c) Equal to full load torque d) None of the above
13) Short–circuit test on an induction motor cannot be used to determine
   a) Windage losses b) Copper losses
   c) Transformer ratio d) Power scale of circle diagram
14) In 3-phase induction motors sometimes copper bars are placed deep in the rotor to
   a) Improve starting torque b) Reduce copper losses
   c) Improve efficiency d) Improve power factor

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SLR-TC – 486

Seat No.	

S.E. (Part – II) (E&E) Old-CGPA Examination, 2018
AC MACHINES

Day and Date : Thursday 17-5-2018 Marks : 56

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

SECTION – I

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

a) Find the ratio of maximum torque to full load torque of a 4-pole, 50 Hz, 3-phase I.M : the data required is as follows :

Slip is 4%, Rotor impedance/phase = (0.3 + j 1.2) Ω at standstill.

b) What are the different types of 1-phase induction motors are there ? Explain the principle of operation of shaded pole induction motor.

c) Derive the expression for T_{st}/T_{max} and T_{fl}/T_{max} with neat explanation.

d) How the starting torque of squirrel cage induction motor can be improved ? Explain with neat sketch.

e) Explain the DOL starter with neat circuit diagram.

3. Attempt **any two** : **(2×6=12)**

a) Why single phase induction motor is not a self starting one ? Explain with double revolving field theory and show how that backward slip $S_B = (2\text{-}S)$ where S is forward slip.

b) Find the mechanical power output of 185-W, 4 pole, 110-V, 50-Hz single-phase induction motor, whose constants are given below at a slip of 0.05.

R1 = 1.86 Ω X1 = 2.56 Ω Xm = 53.5 Ω R2 = 3.56 Ω X2 = 2.56 Ω

Core loss = 3.5 W, Friction and Windage loss = 13.5 W.

c) Explain how rotating magnetic field is created when 3-ph supply voltage is given to the 3-ph stator winding.

Set Q

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Give the applications of synchronous motor.
   b) Explain why synchronous motor is not self starting.
   c) Derive EMF equation of alternator with short pitched coils and distributed winding.
   d) What is armature reaction ? What its effect when RL load is connected to alternators explain with phasor diagram ?
   e) Explain synchronous motor as synchronous condenser. Draw neat phasor diagram.

5. Attempt **any two** : **(2×6=12)**
   a) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs δ characteristics.
   b) Explain the operation of synchronous motor with constant load and following different type of excitation with phasor diagram.
      i) Normal excitation
      ii) Under excitation
      iii) Over excitation.
   c) A 208 V, star connected 3-phase synchronous motor has a synchronous reactance of 4 Ω/phase and negligible armature winding resistance. At a certain load, the motor takes 7.2 kW at 0.8 p.f lagging. If the power developed by the motor remains the same while the excitation voltage is increased by 50% by raising the field excitation, determine
      i) The new armature current and
      ii) The power factor.

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Seat No.	

SLR-TC – 486

Set **R**

S.E. (Part – II) (E&E) Old-CGPA Examination, 2018
AC MACHINES

Day and Date : Thursday 17-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The starting torque of a 3-phase squirrel cage induction motor is
   a) Twice the full load torque b) 1.5 times the full load torque
   c) Equal to full load torque d) None of the above

2) Short–circuit test on an induction motor cannot be used to determine
   a) Windage losses b) Copper losses
   c) Transformer ratio d) Power scale of circle diagram

3) In 3-phase induction motors sometimes copper bars are placed deep in the rotor to
   a) Improve starting torque b) Reduce copper losses
   c) Improve efficiency d) Improve power factor

4) Which kind of rotor is most suitable for turbo alternators which are designed to run at high speed ?
   a) Salient pole type b) Non-salient pole type
   c) Both a) and b) above d) None of the above

5) The frequency of voltage generated by an alternator having 8 poles and rotating at 250 rpm is
   a) 60 Hz b) 50 Hz c) 25 Hz d) 16 2/3 Hz

6) If the input to the prime mover of an alternator is kept constant but the excitation is changed, then the
   a) Reactive component of the output is changed
   b) Active component of the output is changed
   c) Power factor of the load remains
   d) Power factor of the load reduces

7) For an alternator when the power factor of the load is unity
   a) The armature flux will have square waveform
   b) The armature flux will be demagnetizing
   c) The armature flux will be cross magnetizing
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8) In order that two alternators be put in parallel, which of the following factors should be identical for both ?
   a) Voltage b) Frequency
   c) Phase sequence d) All of the above

9) A three phase alternator has a phase sequence of RYB for its three output voltages. In case the field current is reversed, the phase sequence will become.
   a) RBY b) RYB
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   a) More efficient b) Larger in size
   c) Operating at high rpm d) More costly

11) The starting torque of a 3-phase induction motor can be increased by increasing
   a) The rotor reactance b) The rotor resistance
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12) The 'cogging' of an induction motor can be avoided by
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   d) Having no. of rotor slots more or less than the no. of stator slots

13) In case of the induction motor the torque is
   a) Inversely proportional to V b) Directly proportional to S^2
   c) Inversely proportional to slip d) Directly proportional to slip

14) DOL starting of induction motor is usually restricted to
   a) Low horse power motors b) Variable speed motors
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SLR-TC – 486

Seat No.	

S.E. (Part – II) (E&E) Old-CGPA Examination, 2018
AC MACHINES

Day and Date : Thursday 17-5-2018 Marks : 56

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

SECTION – I

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

a) Find the ratio of maximum torque to full load torque of a 4-pole, 50 Hz, 3-phase I.M : the data required is as follows :

Slip is 4%, Rotor impedance/phase = (0.3 + j 1.2) Ω at standstill.

b) What are the different types of 1-phase induction motors are there ? Explain the principle of operation of shaded pole induction motor.

c) Derive the expression for T_{st}/T_{max} and T_{fl}/T_{max} with neat explanation.

d) How the starting torque of squirrel cage induction motor can be improved ? Explain with neat sketch.

e) Explain the DOL starter with neat circuit diagram.

3. Attempt **any two** : **(2×6=12)**

a) Why single phase induction motor is not a self starting one ? Explain with double revolving field theory and show how that backward slip $S_B = (2\text{-}S)$ where S is forward slip.

b) Find the mechanical power output of 185-W, 4 pole, 110-V, 50-Hz single-phase induction motor, whose constants are given below at a slip of 0.05.

R1 = 1.86 Ω X1 = 2.56 Ω Xm = 53.5 Ω R2 = 3.56 Ω X2 = 2.56 Ω

Core loss = 3.5 W, Friction and Windage loss = 13.5 W.

c) Explain how rotating magnetic field is created when 3-ph supply voltage is given to the 3-ph stator winding.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Give the applications of synchronous motor.
   b) Explain why synchronous motor is not self starting.
   c) Derive EMF equation of alternator with short pitched coils and distributed winding.
   d) What is armature reaction ? What its effect when RL load is connected to alternators explain with phasor diagram ?
   e) Explain synchronous motor as synchronous condenser. Draw neat phasor diagram.

5. Attempt **any two** : **(2×6=12)**
   a) Draw neat vector diagram of salient pole alternator and derive expression for power generated in alternator and draw P Vs δ characteristics.
   b) Explain the operation of synchronous motor with constant load and following different type of excitation with phasor diagram.
      i) Normal excitation
      ii) Under excitation
      iii) Over excitation.
   c) A 208 V, star connected 3-phase synchronous motor has a synchronous reactance of 4 Ω/phase and negligible armature winding resistance. At a certain load, the motor takes 7.2 kW at 0.8 p.f lagging. If the power developed by the motor remains the same while the excitation voltage is increased by 50% by raising the field excitation, determine
      i) The new armature current and
      ii) The power factor.

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Seat No.	

SLR-TC – 486

Set **S**

S.E. (Part – II) (E&E) Old-CGPA Examination, 2018
AC MACHINES

Day and Date : Thursday 17-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) If the input to the prime mover of an alternator is kept constant but the excitation is changed, then the
   a) Reactive component of the output is changed
   b) Active component of the output is changed
   c) Power factor of the load remains
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2) For an alternator when the power factor of the load is unity
   a) The armature flux will have square waveform
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   c) The armature flux will be cross magnetizing
   d) The armature flux will reduce to zero

3) In order that two alternators be put in parallel, which of the following factors should be identical for both ?
   a) Voltage b) Frequency
   c) Phase sequence d) All of the above

4) A three phase alternator has a phase sequence of RYB for its three output voltages. In case the field current is reversed, the phase sequence will become.
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5) For the same power rating, a lower voltage alternator will be
   a) More efficient b) Larger in size
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6) The starting torque of a 3-phase induction motor can be increased by increasing
   a) The rotor reactance b) The rotor resistance
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   a) Proper ventilation
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   a) 60 Hz b) 50 Hz c) 25 Hz d) 16 2/3 Hz

SLR-TC – 486

Seat No.	

S.E. (Part – II) (E&E) Old-CGPA Examination, 2018
AC MACHINES

Day and Date : Thursday 17-5-2018 Marks : 56

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

SECTION – I

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

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e) Explain the DOL starter with neat circuit diagram.

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c) Explain how rotating magnetic field is created when 3-ph supply voltage is given to the 3-ph stator winding.

SECTION – II

4. Attempt **any four** : **(4×4=16)**
   a) Give the applications of synchronous motor.
   b) Explain why synchronous motor is not self starting.
   c) Derive EMF equation of alternator with short pitched coils and distributed winding.
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5. Attempt **any two** : **(2×6=12)**
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      i) Normal excitation
      ii) Under excitation
      iii) Over excitation.
   c) A 208 V, star connected 3-phase synchronous motor has a synchronous reactance of 4 Ω/phase and negligible armature winding resistance. At a certain load, the motor takes 7.2 kW at 0.8 p.f lagging. If the power developed by the motor remains the same while the excitation voltage is increased by 50% by raising the field excitation, determine
      i) The new armature current and
      ii) The power factor.

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SLR-TC – 487

Seat No.	

Set P

S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018
ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date : Saturday, 19-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Which instruments has the highest frequency range with accuracy within reasonable limits ?
   a) PMMC
   b) Electrodynamometer
   c) Thermocouple
   d) Rectifier

2) The value of resistance of an earthing electrode depends upon
   a) Shape and material of electrode
   b) Depth to which electrode is driven into earth
   c) Specific resistance of soil
   d) All of the above

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

4) Which of the following are integrating instruments ?
   a) Ammeters
   b) Voltmeters
   c) Wattmeters
   d) Ampere-hour and watt-hour meters

5) The household energy meter is
   a) an indicating instrument
   b) a recording instrument
   c) an integrating instrument
   d) none of the above

6) In majority of instruments damping is provided by
   a) fluid friction
   b) spring
   c) eddy currents
   d) all of the above

7) 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

8) 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

9) An induction meter can handle current upto
   a) 10 A b) 30 A c) 60 A d) 100 A

10) For measurement of mutual inductance we can use
   a) Anderson bridge
   b) Maxwell's bridge
   c) Heaviside bridge
   d) Any of the above

11) A Lissajous patterns are used to measure
   a) Voltage and frequency
   b) Frequency and phase shift
   c) Frequency and amplitude distortion
   d) Amplitude and flux

12) Which meter is suitable for the measurement of 10 mV at 50 MHz ?
   a) Moving iron voltmeter
   b) VTVM
   c) Moving coil voltmeter
   d) CRO

13) Jewels are used in instruments for the purpose of
   a) Damping
   b) Torque control
   c) Suppressing noise
   d) Bearing

14) A galvanometer has
   a) Air friction damping
   b) Fluid friction damping
   c) Spring coil damping
   d) Eddy current damping

SLR-TC – 487

Seat No.	

S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018
ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date : Saturday, 19-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

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

a) Explain construction and operation of PMMC type instrument.

b) Explain construction and operation of current transformer in detail.

c) Explain the following terms related to instrument transformer :
   i) Transformation ratio
   ii) Nomial ratio
   iii) Turns ratio
   iv) Ratio correction factor

d) Explain shunts and multipliers.

e) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1 Ω is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm.

f) Explain induction type energy meter.

3. Attempt **any two** : **(6×2=12)**

a) Two wattmeters are connected to measure the input to a balanced 3-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit
   i) when both the readings are positive.
   ii) when the later reading is obtained after reversing the connections to the current coil of first instrument.

b) Explain Hays bridge with neat phasor diagram.

c) Draw the equivalent circuit diagram and typical phasor diagram of potential transformer. Write the actual transformation ratio error and phase angle error.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Explain LCD display with diagram also state its advantages.
   2) What are the front panel control details of dual trace oscilloscope ?
   3) Explain X-Y recorder with neat diagram.
   4) Explain the electrical pressure transducer with neat diagram.
   5) With neat sketch explain 1∅ electrodynamometer power factor meter.
   6) Explain working of Q-meter with neat diagram.

5. Solve **any two** : **(6×2=12)**
   1) Explain construction and operation of dual trace oscilloscope.
   2) Explain construction and working of LVDT also state its advantages and disadvantages.
   3) Explain different types of phase sequence indicator with neat diagram.

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SLR-TC – 487

Seat No.	

Set Q

S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018
ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date : Saturday, 19-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) 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

2) An induction meter can handle current upto
   a) 10 A b) 30 A c) 60 A d) 100 A

3) For measurement of mutual inductance we can use
   a) Anderson bridge b) Maxwell's bridge
   c) Heaviside bridge d) Any of the above

4) A Lissajous patterns are used to measure
   a) Voltage and frequency
   b) Frequency and phase shift
   c) Frequency and amplitude distortion
   d) Amplitude and flux

5) Which meter is suitable for the measurement of 10 mV at 50 MHz ?
   a) Moving iron voltmeter b) VTVM
   c) Moving coil voltmeter d) CRO

6) Jewels are used in instruments for the purpose of
   a) Damping
   b) Torque control
   c) Suppressing noise
   d) Bearing

7) A galvanometer has
   a) Air friction damping
   b) Fluid friction damping
   c) Spring coil damping
   d) Eddy current damping

8) Which instruments has the highest frequency range with accuracy within reasonable limits ?
   a) PMMC
   b) Electrodynamometer
   c) Thermocouple
   d) Rectifier

9) The value of resistance of an earthing electrode depends upon
   a) Shape and material of electrode
   b) Depth to which electrode is driven into earth
   c) Specific resistance of soil
   d) All of the above

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

11) Which of the following are integrating instruments ?
   a) Ammeters
   b) Voltmeters
   c) Wattmeters
   d) Ampere-hour and watt-hour meters

12) The household energy meter is
   a) an indicating instrument
   b) a recording instrument
   c) an integrating instrument
   d) none of the above

13) In majority of instruments damping is provided by
   a) fluid friction
   b) spring
   c) eddy currents
   d) all 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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SLR-TC – 487

Seat No.	

S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018
ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date : Saturday, 19-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

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

a) Explain construction and operation of PMMC type instrument.

b) Explain construction and operation of current transformer in detail.

c) Explain the following terms related to instrument transformer :
   i) Transformation ratio
   ii) Nomial ratio
   iii) Turns ratio
   iv) Ratio correction factor

d) Explain shunts and multipliers.

e) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1 Ω is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm.

f) Explain induction type energy meter.

3. Attempt **any two** : **(6×2=12)**

a) Two wattmeters are connected to measure the input to a balanced 3-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit
   i) when both the readings are positive.
   ii) when the later reading is obtained after reversing the connections to the current coil of first instrument.

b) Explain Hays bridge with neat phasor diagram.

c) Draw the equivalent circuit diagram and typical phasor diagram of potential transformer. Write the actual transformation ratio error and phase angle error.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Explain LCD display with diagram also state its advantages.
   2) What are the front panel control details of dual trace oscilloscope ?
   3) Explain X-Y recorder with neat diagram.
   4) Explain the electrical pressure transducer with neat diagram.
   5) With neat sketch explain 1∅ electrodynamometer power factor meter.
   6) Explain working of Q-meter with neat diagram.

5. Solve **any two** : **(6×2=12)**
   1) Explain construction and operation of dual trace oscilloscope.
   2) Explain construction and working of LVDT also state its advantages and disadvantages.
   3) Explain different types of phase sequence indicator with neat diagram.

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Seat No.	

Set R

S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018
ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date : Saturday, 19-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The household energy meter is
   a) an indicating instrument
   b) a recording instrument
   c) an integrating instrument
   d) none of the above

2) In majority of instruments damping is provided by
   a) fluid friction
   b) spring
   c) eddy currents
   d) all 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) 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) An induction meter can handle current upto
   a) 10 A b) 30 A c) 60 A d) 100 A

6) For measurement of mutual inductance we can use
   a) Anderson bridge
   b) Maxwell's bridge
   c) Heaviside bridge
   d) Any of the above

7) A Lissajous patterns are used to measure
   a) Voltage and frequency
   b) Frequency and phase shift
   c) Frequency and amplitude distortion
   d) Amplitude and flux

8) Which meter is suitable for the measurement of 10 mV at 50 MHz ?
   a) Moving iron voltmeter
   b) VTVM
   c) Moving coil voltmeter
   d) CRO

9) Jewels are used in instruments for the purpose of
   a) Damping
   b) Torque control
   c) Suppressing noise
   d) Bearing

10) A galvanometer has
   a) Air friction damping
   b) Fluid friction damping
   c) Spring coil damping
   d) Eddy current damping

11) Which instruments has the highest frequency range with accuracy within reasonable limits ?
   a) PMMC
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   c) Thermocouple
   d) Rectifier

12) The value of resistance of an earthing electrode depends upon
   a) Shape and material of electrode
   b) Depth to which electrode is driven into earth
   c) Specific resistance of soil
   d) All of the above

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

14) Which of the following are integrating instruments ?
   a) Ammeters
   b) Voltmeters
   c) Wattmeters
   d) Ampere-hour and watt-hour meters

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Seat No.	

S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018
ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date : Saturday, 19-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

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

a) Explain construction and operation of PMMC type instrument.

b) Explain construction and operation of current transformer in detail.

c) Explain the following terms related to instrument transformer :
   i) Transformation ratio
   ii) Nomial ratio
   iii) Turns ratio
   iv) Ratio correction factor

d) Explain shunts and multipliers.

e) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1 Ω is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm.

f) Explain induction type energy meter.

3. Attempt **any two** : **(6×2=12)**

a) Two wattmeters are connected to measure the input to a balanced 3-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit
   i) when both the readings are positive.
   ii) when the later reading is obtained after reversing the connections to the current coil of first instrument.

b) Explain Hays bridge with neat phasor diagram.

c) Draw the equivalent circuit diagram and typical phasor diagram of potential transformer. Write the actual transformation ratio error and phase angle error.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Explain LCD display with diagram also state its advantages.
   2) What are the front panel control details of dual trace oscilloscope ?
   3) Explain X-Y recorder with neat diagram.
   4) Explain the electrical pressure transducer with neat diagram.
   5) With neat sketch explain 1∅ electrodynamometer power factor meter.
   6) Explain working of Q-meter with neat diagram.

5. Solve **any two** : **(6×2=12)**
   1) Explain construction and operation of dual trace oscilloscope.
   2) Explain construction and working of LVDT also state its advantages and disadvantages.
   3) Explain different types of phase sequence indicator with neat diagram.

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Seat No.	

Set **S**

S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018
ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date : Saturday, 19-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) For measurement of mutual inductance we can use
   a) Anderson bridge b) Maxwell's bridge
   c) Heaviside bridge d) Any of the above

2) A Lissajous patterns are used to measure
   a) Voltage and frequency
   b) Frequency and phase shift
   c) Frequency and amplitude distortion
   d) Amplitude and flux

3) Which meter is suitable for the measurement of 10 mV at 50 MHz ?
   a) Moving iron voltmeter b) VTVM
   c) Moving coil voltmeter d) CRO

4) Jewels are used in instruments for the purpose of
   a) Damping b) Torque control
   c) Suppressing noise d) Bearing

5) A galvanometer has
   a) Air friction damping b) Fluid friction damping
   c) Spring coil damping d) Eddy current damping

6) Which instruments has the highest frequency range with accuracy within reasonable limits ?
   a) PMMC b) Electrodynamometer
   c) Thermocouple d) Rectifier

P.T.O.

7) The value of resistance of an earthing electrode depends upon
   a) Shape and material of electrode
   b) Depth to which electrode is driven into earth
   c) Specific resistance of soil
   d) All of the above

8) Time division multiplexing is used when
   a) Data to be transmitted is slow changing
   b) Data to be transmitted has small bandwidth
   c) Data to be transmitted is slow changing and low bandwidth
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9) Which of the following are integrating instruments ?
   a) Ammeters
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   c) Wattmeters
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10) The household energy meter is
   a) an indicating instrument
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   d) none of the above

11) In majority of instruments damping is provided by
   a) fluid friction
   b) spring
   c) eddy currents
   d) all 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) 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

14) An induction meter can handle current upto
   a) 10 A b) 30 A c) 60 A d) 100 A

SLR-TC – 487

Seat No.	

S.E. (E and E) (Part – II) (Old CGPA) Examination, 2018
ELECTRICAL AND ELECTRONICS MEASUREMENTS

Day and Date : Saturday, 19-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

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

a) Explain construction and operation of PMMC type instrument.

b) Explain construction and operation of current transformer in detail.

c) Explain the following terms related to instrument transformer :
   i) Transformation ratio
   ii) Nomial ratio
   iii) Turns ratio
   iv) Ratio correction factor

d) Explain shunts and multipliers.

e) A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1 Ω is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50 cm.

f) Explain induction type energy meter.

3. Attempt **any two** : **(6×2=12)**

a) Two wattmeters are connected to measure the input to a balanced 3-phase circuit indicate 2000 W and 500 W respectively. Find the power factor of the circuit
   i) when both the readings are positive.
   ii) when the later reading is obtained after reversing the connections to the current coil of first instrument.

b) Explain Hays bridge with neat phasor diagram.

c) Draw the equivalent circuit diagram and typical phasor diagram of potential transformer. Write the actual transformation ratio error and phase angle error.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Explain LCD display with diagram also state its advantages.
   2) What are the front panel control details of dual trace oscilloscope ?
   3) Explain X-Y recorder with neat diagram.
   4) Explain the electrical pressure transducer with neat diagram.
   5) With neat sketch explain 1∅ electrodynamometer power factor meter.
   6) Explain working of Q-meter with neat diagram.

5. Solve **any two** : **(6×2=12)**
   1) Explain construction and operation of dual trace oscilloscope.
   2) Explain construction and working of LVDT also state its advantages and disadvantages.
   3) Explain different types of phase sequence indicator with neat diagram.

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SLR-TC – 488

Seat No.	

Set P

S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 22-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

3) ***All*** *questions are* ***compulsory****.*

4) If ***necessary****, assume suitable data.*

5) Figure to ***right*** *indicates* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) z-transform converts convolution of time-signals to

A) addition B) subtraction

C) multiplication D) division

2) Convolution is the

A) Sum product B) Product sum

C) Sum product sum D) Product sum product

3) Regen of Conversion is the rang of

A) S B) $j\Omega$ C) Ω D) σ

4) X(n)*h(n) = h(n)*x(n)

A) Associative property B) Distributive property

C) Commutative property D) None of above

5) The function which has its Fourier transform, Laplace transform and Z transform unity is

A) Gaussian B) Impulse C) Sine D) Pulse

P.T.O.

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

A) 6 B) 4 C) 2 D) 0

7) The impulse response of a system is $h(n) = a^n u(n)$. The condition for the system to be BIBO stable is

A) a is real and positive B) a is real and negative

C) $|a| > 1$ D) $|a| < 1$

8) The Fourier transform (FT) of a function x (t) is X (f). The FT of dx (t)/dt will be

A) dX(f)/df B) j2pf X(f) C) jf X(f) D) X(f)/(jf)

9) If the Fourier series coefficients of a signal are periodic then the signal must be

A) continuous-time, periodic B) discrete-time, periodic

C) continuous-time, non-periodic D) discrete-time, non-periodic

10) The region of convergence of the z-transform of the signal $x(n) = \{2, \underset{\uparrow}{1}, 1, 2\}$ is
$n = 0$

A) all z, except z = 0 and $z = \infty$ B) all z, except z = 0

C) all z, except $z = \infty$ D) all z

11) The Laplace transform of u (t) is

A) $\frac{1}{s}$ B) s^2 C) $\frac{1}{s^2}$ D) s

12) Sampled frequency less than nyquist rate is called

A) under sampling B) over sampling

C) critical sampling D) nyquist sampling

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

A) Correlation B) Convolution

C) Fourier transform D) Fast Fourier transform

14) x(t) is the combination of

A) ramp and unit component B) sin and cos component

C) even and odd component D) similar and dissimilar component

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Seat No.	

S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 22-5-2018 Marks : 56

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

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)**

a) Find signal are energy, power signals

i) $x(t) = \cos^2\omega_0 t$

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

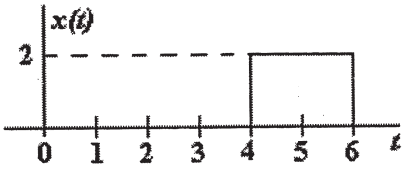
b) State and proof any one property of convolution.

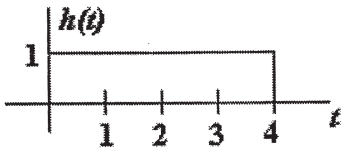
c) Laplace transform of $x(t) = \cos\Omega 0t$.

d) Find the convolution of two sequences. X (n) = {1, 4, 3, 2} ; h (n) = {1, 3, 2, 1}.

3. Solve **any two** : **(2×8=16)**

a) Find the convolution of two rectangular pulse signals shown below.





b) Find inverse Laplace transform of $\frac{3s^2 + 8s + 6}{(s+2)(s^2+2s+1)}$.

c) Find convolution of sequence x (n) = u (n) – u (n – 7) ; h (n) = u (n – 1) – u (n – 4).

SECTION – II

4. Solve **any three** : **(4×3=12)**

a) Give the application of signal and system.

b) Explain short time Fourier transforms.

c) Find Fourier transform if m (t) = e^{-at} u (t).

d) Find z transform and ROC $x(n) = \frac{2^n}{3} u(n) + \left(-\frac{1}{2}\right)^n u(n)$.

5. Solve **any two** : **(2×8=16)**

a) The signal x(t) = 10cos(10πt) is sampled at rate 8 samples per second. Plot the amplitude spectrum for $|\Omega| \leq 30\ \pi$. Can the original signal can be recovered from samples ? Explain.

b) Find inverse z-transform of $\frac{z+4}{z^2-4z+3}$.

c) Prove that convolution in time domain is equivalent with multiplication in frequency domain.

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Seat No.	

Set **Q**

S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 22-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) If ***necessary****, assume suitable data.*
5) Figure to ***right*** *indicates* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The Fourier transform (FT) of a function x (t) is X (f). The FT of dx (t)/dt will be
A) dX(f)/df B) j2pf X(f) C) jf X(f) D) X(f)/(jf)

2) If the Fourier series coefficients of a signal are periodic then the signal must be
A) continuous-time, periodic B) discrete-time, periodic
C) continuous-time, non-periodic D) discrete-time, non-periodic

3) The region of convergence of the z-transform of the signal $x(n) = \{2, \underset{\uparrow}{1}, 1, 2\}$ is
$n = 0$
A) all z, except z = 0 and z = ∞ B) all z, except z = 0
C) all z, except z = ∞ D) all z

4) The Laplace transform of u (t) is
A) $\frac{1}{s}$ B) s^2 C) $\frac{1}{s^2}$ D) s

P.T.O.

5) Sampled frequency less than nyquist rate is called
   A) under sampling B) over sampling
   C) critical sampling D) nyquist sampling

6) Product of two functions in spatial domain is what, in frequency domain
   A) Correlation B) Convolution
   C) Fourier transform D) Fast Fourier transform

7) x(t) is the combination of
   A) ramp and unit component B) sin and cos component
   C) even and odd component D) similar and dissimilar component

8) z-transform converts convolution of time-signals to
   A) addition B) subtraction
   C) multiplication D) division

9) Convolution is the
   A) Sum product B) Product sum
   C) Sum product sum D) Product sum product

10) Regen of Conversion is the rang of
   A) S B) $j\Omega$ C) Ω D) σ

11) X(n)*h(n) = h(n)*x(n)
   A) Associative property B) Distributive property
   C) Commutative property D) None of above

12) The function which has its Fourier transform, Laplace transform and Z transform unity is
   A) Gaussian B) Impulse C) Sine D) Pulse

13) The discrete-time signal x (n) = $(-1)^n$ is periodic with fundamental period
   A) 6 B) 4 C) 2 D) 0

14) The impulse response of a system is h(n) = a^n u(n). The condition for the system to be BIBO stable is
   A) a is real and positive B) a is real and negative
   C) |a| > 1 D) |a| < 1

SLR-TC – 488

Seat No.	

S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 22-5-2018 Marks : 56

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

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)**

a) Find signal are energy, power signals

i) $x(t) = \cos^2\omega_0 t$

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

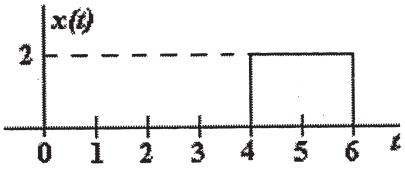
b) State and proof any one property of convolution.

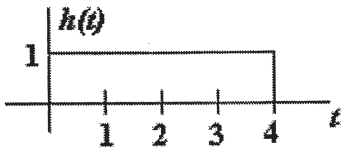
c) Laplace transform of $x(t) = \cos\Omega 0t$.

d) Find the convolution of two sequences. X (n) = {1, 4, 3, 2} ; h (n) = {1, 3, 2, 1}.

3. Solve **any two** : **(2×8=16)**

a) Find the convolution of two rectangular pulse signals shown below.





b) Find inverse Laplace transform of $\frac{3s^2 + 8s + 6}{(s+2)(s^2+2s+1)}$.

c) Find convolution of sequence x (n) = u (n) – u (n – 7) ; h (n) = u (n – 1) – u (n – 4).

Set Q

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Give the application of signal and system.

   b) Explain short time Fourier transforms.

   c) Find Fourier transform if m (t) = e^{-at} u (t).

   d) Find z transform and ROC $x(n) = \frac{2^n}{3} u(n) + \left(-\frac{1}{2}\right)^n u(n)$.

5. Solve **any two** : **(2×8=16)**

   a) The signal x(t) = 10cos(10πt) is sampled at rate 8 samples per second. Plot the amplitude spectrum for $|\Omega| \leq 30\ \pi$. Can the original signal can be recovered from samples ? Explain.

   b) Find inverse z-transform of $\frac{z+4}{z^2-4z+3}$.

   c) Prove that convolution in time domain is equivalent with multiplication in frequency domain.

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SLR-TC – 488

Seat No.	

Set **R**

S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 22-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

3) ***All*** *questions are* ***compulsory****.*

4) If ***necessary****, assume suitable data.*

5) Figure to ***right*** *indicates* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The function which has its Fourier transform, Laplace transform and Z transform unity is

A) Gaussian B) Impulse C) Sine D) Pulse

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

A) 6 B) 4 C) 2 D) 0

3) The impulse response of a system is $h(n) = a^n u(n)$. The condition for the system to be BIBO stable is

A) a is real and positive B) a is real and negative

C) $|a| > 1$ D) $|a| < 1$

4) The Fourier transform (FT) of a function x (t) is X (f). The FT of dx (t)/dt will be

A) dX(f)/df B) j2pf X(f) C) jf X(f) D) X(f)/(jf)

5) If the Fourier series coefficients of a signal are periodic then the signal must be

A) continuous-time, periodic B) discrete-time, periodic

C) continuous-time, non-periodic D) discrete-time, non-periodic

P.T.O.

6) The region of convergence of the z-transform of the signal $x(n) = \{2, \underset{\uparrow}{1}, 1, 2\}$ is
$n = 0$

A) all z, except z = 0 and z = ∞ B) all z, except z = 0
C) all z, except z = ∞ D) all z

7) The Laplace transform of u (t) is

A) $\frac{1}{s}$ B) s^2 C) $\frac{1}{s^2}$ D) s

8) Sampled frequency less than nyquist rate is called
A) under sampling B) over sampling
C) critical sampling D) nyquist sampling

9) Product of two functions in spatial domain is what, in frequency domain
A) Correlation B) Convolution
C) Fourier transform D) Fast Fourier transform

10) x(t) is the combination of
A) ramp and unit component B) sin and cos component
C) even and odd component D) similar and dissimilar component

11) z-transform converts convolution of time-signals to
A) addition B) subtraction
C) multiplication D) division

12) Convolution is the
A) Sum product B) Product sum
C) Sum product sum D) Product sum product

13) Regen of Conversion is the rang of
A) S B) jΩ C) Ω D) σ

14) X(n)*h(n) = h(n)*x(n)
A) Associative property B) Distributive property
C) Commutative property D) None of above

SLR-TC – 488

Seat No.	

S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 22-5-2018 Marks : 56

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

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)**

a) Find signal are energy, power signals

i) $x(t) = \cos^2\omega_0 t$

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

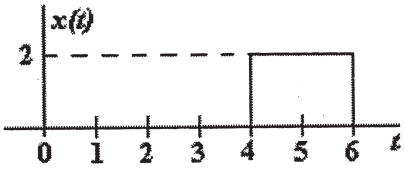
b) State and proof any one property of convolution.

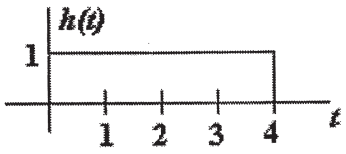
c) Laplace transform of $x(t) = \cos\Omega 0t$.

d) Find the convolution of two sequences. X (n) = {1, 4, 3, 2} ; h (n) = {1, 3, 2, 1}.

3. Solve **any two** : **(2×8=16)**

a) Find the convolution of two rectangular pulse signals shown below.





b) Find inverse Laplace transform of $\frac{3s^2 + 8s + 6}{(s+2)(s^2+2s+1)}$.

c) Find convolution of sequence x (n) = u (n) – u (n – 7) ; h (n) = u (n – 1) – u (n – 4).

Set R

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Give the application of signal and system.

   b) Explain short time Fourier transforms.

   c) Find Fourier transform if m (t) = e^{-at} u (t).

   d) Find z transform and ROC $x(n) = \frac{2^n}{3} u(n) + \left(-\frac{1}{2}\right)^n u(n)$.

5. Solve **any two** : **(2×8=16)**

   a) The signal x(t) = 10cos(10πt) is sampled at rate 8 samples per second. Plot the amplitude spectrum for $|\Omega| \leq 30\ \pi$. Can the original signal can be recovered from samples ? Explain.

   b) Find inverse z-transform of $\frac{z+4}{z^2-4z+3}$.

   c) Prove that convolution in time domain is equivalent with multiplication in frequency domain.

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SLR-TC – 488

Seat No.	

Set **S**

S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 22-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) If ***necessary****, assume suitable data.*
5) Figure to ***right*** *indicates* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The region of convergence of the z-transform of the signal $x(n) = \{2, \underset{\uparrow}{1}, 1, 2\}$ is
$n = 0$

A) all z, except z = 0 and z = ∞ B) all z, except z = 0
C) all z, except z = ∞ D) all z

2) The Laplace transform of u (t) is

A) $\frac{1}{s}$ B) s^2 C) $\frac{1}{s^2}$ D) s

3) Sampled frequency less than nyquist rate is called

A) under sampling B) over sampling
C) critical sampling D) nyquist sampling

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

A) Correlation B) Convolution
C) Fourier transform D) Fast Fourier transform

P.T.O.

5) x(t) is the combination of
   A) ramp and unit component
   B) sin and cos component
   C) even and odd component
   D) similar and dissimilar component

6) z-transform converts convolution of time-signals to
   A) addition
   B) subtraction
   C) multiplication
   D) division

7) Convolution is the
   A) Sum product
   B) Product sum
   C) Sum product sum
   D) Product sum product

8) Regen of Conversion is the rang of
   A) S
   B) $j\Omega$
   C) Ω
   D) σ

9) X(n)*h(n) = h(n)*x(n)
   A) Associative property
   B) Distributive property
   C) Commutative property
   D) None of above

10) The function which has its Fourier transform, Laplace transform and Z transform unity is
   A) Gaussian
   B) Impulse
   C) Sine
   D) Pulse

11) The discrete-time signal x (n) = $(-1)^n$ is periodic with fundamental period
   A) 6
   B) 4
   C) 2
   D) 0

12) The impulse response of a system is h(n) = a^n u(n). The condition for the system to be BIBO stable is
   A) a is real and positive
   B) a is real and negative
   C) |a| > 1
   D) |a| < 1

13) The Fourier transform (FT) of a function x (t) is X (f). The FT of dx (t)/dt will be
   A) dX(f)/df
   B) j2pf X(f)
   C) jf X(f)
   D) X(f)/(jf)

14) If the Fourier series coefficients of a signal are periodic then the signal must be
   A) continuous-time, periodic
   B) discrete-time, periodic
   C) continuous-time, non-periodic
   D) discrete-time, non-periodic

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SLR-TC – 488

Seat No.	

S.E. (Electrical & Electronics Engineering) (Part – II) (Old CGPA) Examination, 2018
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 22-5-2018 Marks : 56

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

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)**

a) Find signal are energy, power signals

i) $x(t) = \cos^2\omega_0 t$

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

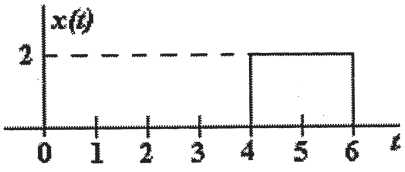
b) State and proof any one property of convolution.

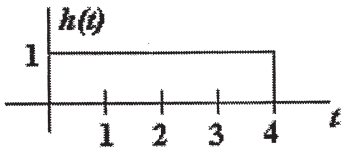
c) Laplace transform of $x(t) = \cos\Omega 0t$.

d) Find the convolution of two sequences. X (n) = {1, 4, 3, 2} ; h (n) = {1, 3, 2, 1}.

3. Solve **any two** : **(2×8=16)**

a) Find the convolution of two rectangular pulse signals shown below.





b) Find inverse Laplace transform of $\frac{3s^2 + 8s + 6}{(s+2)(s^2+2s+1)}$.

c) Find convolution of sequence x (n) = u (n) – u (n – 7) ; h (n) = u (n – 1) – u (n – 4).

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Give the application of signal and system.

   b) Explain short time Fourier transforms.

   c) Find Fourier transform if m (t) = e^{-at} u (t).

   d) Find z transform and ROC $x(n) = \frac{2^n}{3} u(n) + \left(-\frac{1}{2}\right)^n u(n)$.

5. Solve **any two** : **(2×8=16)**

   a) The signal x(t) = 10cos(10πt) is sampled at rate 8 samples per second. Plot the amplitude spectrum for $|\Omega| \leq 30\ \pi$. Can the original signal can be recovered from samples ? Explain.

   b) Find inverse z-transform of $\frac{z+4}{z^2-4z+3}$.

   c) Prove that convolution in time domain is equivalent with multiplication in frequency domain.

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SLR-TC – 489

Seat No.	

Set P

S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018
DIGITAL TECHNIQUES

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The code used for K-Map is
   a) 8-4-2-1 Binary code b) Gray code
   c) Octal d) Hexadecimal

2) Which of the following is Universal Gate ?
   a) AND b) NAND c) OR d) XNOR

3) Multiplexer is also called
   a) Decoder b) Encoder
   c) Data Selector d) None of the above

4) While obtaining minimal SOP expression
   a) All don't cares are ignored
   b) All don't cares are treated as logic ones
   c) All don't cares are treated as logic Zeros
   d) Only such don't cares that help minimisation are treated as logic Ones

P.T.O.

5) How many inputs and outputs does full adder have ?
   a) 2 i/p, 2 o/p b) 2 i/p, 1 o/p c) 3 i/p, 2 o/p d) 2 i/p, 3 o/p

6) Which of the following IC is used as comparator ?
   a) IC7483 b) IC7490 c) IC74181 d) IC7485

7) An example of Canonical SOP is
   a) ABC + BC + AB b) AB c) ABC + AB d) AB'C + AB''C

8) A MOD-6 synchronous counter is designed by 3 JK flip-flop, the number of counts skipped by it is _____
   a) 6 b) 5 c) 3 d) 2

9) A sequential circuit is one, whose output depends on
   a) Present input b) Past output
   c) Both a) and b) d) None

10) In _____ type of shift register, we have access only to leftmost and rightmost flip-flops.
   a) SISO b) PIPO c) SIPO d) PISO

11) The output frequency of decade counter, when it is clocked by 100 KHz signal is
   a) 10 KHz b) 20 KHz c) 1 KHz d) 50 KHz

12) The maximum count that can be obtained by a counter which is having 5 flip-flops is _____
   a) 32 b) 31 c) 5 d) None

13) Flip-flop is _____ multivibrator.
   a) Monostable b) Bistable
   c) Both a) and b) d) None

14) A BCD counter has _____ different states.
   a) 3 b) 4 c) 10 d) 9

_____

SLR-TC – 489

Seat No.	

S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018
DIGITAL TECHNIQUES

Day and Date : Thursday, 24-5-2018 Marks : 56

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

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*

SECTION – I

2. Solve the following : **(3×4=12)**
   1) Explain Demorgan's and Duality Theorem in detail.
   2) Minimise using k-map and realise using Basic gates.
      $F(ABCD) = \pi M (0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6)$.
   3) Explain full subtractor in detail. Using Boolean Expression show that
      $AB + AC + \overline{B}C = AB + \overline{B}C$.

3. Solve **any two** : **(2×8=16)**
   1) Implement following using :
      a) 16 : 1 Multiplexer b) 8 : 1 Multiplexer.
      $F = €m(0, 1, 2, 3, 7, 8, 9, 11, 14)$.
   2) Explain 2-bit digital comparator in detail.
   3) Design a combinational circuit for Binary to Gray Code conversion.

SECTION – II

4. Attempt **any three** : **(3×4=12)**
   1) Explain the characteristics of flip-flop.
   2) What is excitation table ? Draw excitation table of JK, T flip-flop, D flip-flop.

3) Determine the number of flip-flops required to construct a register capable of storing :
   a) 6 bit binary no.
   b) Decimal number upto 31
   c) Hexadecimal number up to F
   d) Octal number up to 10.
4) Design MOD-6 counter using IC 7490.
5) Explain any one type of shift register in detail.

5. Attempt **any two** of the following : **(2×8=16)**
   1) Explain the following flip-flop with circuit diagram, truth table, characteristic table, characteristic equation.
      a) D flip-flop b) JK flip-flop.
   2) Design asynchronous 4-bit up/down counter with waveforms.
   3) Draw internal architecture of IC 7490. Design a asynchronous counter which counts from 000 to 100.

SLR-TC – 489

Seat No.	

Set Q

S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018
DIGITAL TECHNIQUES

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A MOD-6 synchronous counter is designed by 3 JK flip-flop, the number of counts skipped by it is _____

a) 6 b) 5 c) 3 d) 2

2) A sequential circuit is one, whose output depends on

a) Present input b) Past output
c) Both a) and b) d) None

3) In _____ type of shift register, we have access only to leftmost and rightmost flip-flops.

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4) The output frequency of decade counter, when it is clocked by 100 KHz signal is

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8) The code used for K-Map is
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12) How many inputs and outputs does full adder have ?
   a) 2 i/p, 2 o/p b) 2 i/p, 1 o/p c) 3 i/p, 2 o/p d) 2 i/p, 3 o/p

13) Which of the following IC is used as comparator ?
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14) An example of Canonical SOP is
   a) ABC + BC + AB b) AB c) ABC + AB d) AB'C + AB''C

_____

SLR-TC – 489

Seat No.	

S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018
DIGITAL TECHNIQUES

Day and Date : Thursday, 24-5-2018 Marks : 56

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

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*

SECTION – I

2. Solve the following : **(3×4=12)**
   1) Explain Demorgan's and Duality Theorem in detail.
   2) Minimise using k-map and realise using Basic gates.
      $F(ABCD) = \pi M (0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6)$.
   3) Explain full subtractor in detail. Using Boolean Expression show that
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   1) Implement following using :
      a) 16 : 1 Multiplexer b) 8 : 1 Multiplexer.
      $F = €m(0, 1, 2, 3, 7, 8, 9, 11, 14)$.
   2) Explain 2-bit digital comparator in detail.
   3) Design a combinational circuit for Binary to Gray Code conversion.

SECTION – II

4. Attempt **any three** : **(3×4=12)**
   1) Explain the characteristics of flip-flop.
   2) What is excitation table ? Draw excitation table of JK, T flip-flop, D flip-flop.

Set Q

3) Determine the number of flip-flops required to construct a register capable of storing :
   a) 6 bit binary no.
   b) Decimal number upto 31
   c) Hexadecimal number up to F
   d) Octal number up to 10.
4) Design MOD-6 counter using IC 7490.
5) Explain any one type of shift register in detail.

5. Attempt **any two** of the following : **(2×8=16)**
   1) Explain the following flip-flop with circuit diagram, truth table, characteristic table, characteristic equation.
      a) D flip-flop b) JK flip-flop.
   2) Design asynchronous 4-bit up/down counter with waveforms.
   3) Draw internal architecture of IC 7490. Design a asynchronous counter which counts from 000 to 100.

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SLR-TC – 489

Seat No.	

Set R

S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018
DIGITAL TECHNIQUES

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) How many inputs and outputs does full adder have ?
a) 2 i/p, 2 o/p b) 2 i/p, 1 o/p c) 3 i/p, 2 o/p d) 2 i/p, 3 o/p

2) Which of the following IC is used as comparator ?
a) IC7483 b) IC7490 c) IC74181 d) IC7485

3) An example of Canonical SOP is
a) ABC + BC + AB b) AB c) ABC + AB d) AB'C + AB''C

4) A MOD-6 synchronous counter is designed by 3 JK flip-flop, the number of counts skipped by it is _____
a) 6 b) 5 c) 3 d) 2

5) A sequential circuit is one, whose output depends on
a) Present input b) Past output
c) Both a) and b) d) None

P.T.O.

6) In _____ type of shift register, we have access only to leftmost and rightmost flip-flops.
   a) SISO b) PIPO c) SIPO d) PISO

7) The output frequency of decade counter, when it is clocked by 100 KHz signal is
   a) 10 KHz b) 20 KHz c) 1 KHz d) 50 KHz

8) The maximum count that can be obtained by a counter which is having 5 flip-flops is _____
   a) 32 b) 31 c) 5 d) None

9) Flip-flop is _____ multivibrator.
   a) Monostable b) Bistable
   c) Both a) and b) d) None

10) A BCD counter has _____ different states.
   a) 3 b) 4 c) 10 d) 9

11) The code used for K-Map is
   a) 8-4-2-1 Binary code b) Gray code
   c) Octal d) Hexadecimal

12) Which of the following is Universal Gate ?
   a) AND b) NAND c) OR d) XNOR

13) Multiplexer is also called
   a) Decoder b) Encoder
   c) Data Selector d) None of the above

14) While obtaining minimal SOP expression
   a) All don't cares are ignored
   b) All don't cares are treated as logic ones
   c) All don't cares are treated as logic Zeros
   d) Only such don't cares that help minimisation are treated as logic Ones

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SLR-TC – 489

Seat No.	

S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018
DIGITAL TECHNIQUES

Day and Date : Thursday, 24-5-2018 Marks : 56

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

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*

SECTION – I

2. Solve the following : **(3×4=12)**
   1) Explain Demorgan's and Duality Theorem in detail.
   2) Minimise using k-map and realise using Basic gates.
      $F(ABCD) = \pi M (0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6)$.
   3) Explain full subtractor in detail. Using Boolean Expression show that
      $AB + AC + \overline{B}C = AB + \overline{B}C$.

3. Solve **any two** : **(2×8=16)**
   1) Implement following using :
      a) 16 : 1 Multiplexer b) 8 : 1 Multiplexer.
      $F = €m(0, 1, 2, 3, 7, 8, 9, 11, 14)$.
   2) Explain 2-bit digital comparator in detail.
   3) Design a combinational circuit for Binary to Gray Code conversion.

SECTION – II

4. Attempt **any three** : **(3×4=12)**
   1) Explain the characteristics of flip-flop.
   2) What is excitation table ? Draw excitation table of JK, T flip-flop, D flip-flop.

Set R

3) Determine the number of flip-flops required to construct a register capable of storing :
   a) 6 bit binary no.
   b) Decimal number upto 31
   c) Hexadecimal number up to F
   d) Octal number up to 10.
4) Design MOD-6 counter using IC 7490.
5) Explain any one type of shift register in detail.

5. Attempt **any two** of the following : **(2×8=16)**
   1) Explain the following flip-flop with circuit diagram, truth table, characteristic table, characteristic equation.
      a) D flip-flop b) JK flip-flop.
   2) Design asynchronous 4-bit up/down counter with waveforms.
   3) Draw internal architecture of IC 7490. Design a asynchronous counter which counts from 000 to 100.

SLR-TC – 489

Seat No.	

Set **S**

S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018
DIGITAL TECHNIQUES

Day and Date : Thursday, 24-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In _____ type of shift register, we have access only to leftmost and rightmost flip-flops.
a) SISO b) PIPO c) SIPO d) PISO

2) The output frequency of decade counter, when it is clocked by 100 KHz signal is
a) 10 KHz b) 20 KHz c) 1 KHz d) 50 KHz

3) The maximum count that can be obtained by a counter which is having 5 flip-flops is _____
a) 32 b) 31 c) 5 d) None

4) Flip-flop is _____ multivibrator.
a) Monostable b) Bistable
c) Both a) and b) d) None

5) A BCD counter has _____ different states.
   a) 3 b) 4 c) 10 d) 9

6) The code used for K-Map is
   a) 8-4-2-1 Binary code b) Gray code
   c) Octal d) Hexadecimal

7) Which of the following is Universal Gate ?
   a) AND b) NAND c) OR d) XNOR

8) Multiplexer is also called
   a) Decoder b) Encoder
   c) Data Selector d) None of the above

9) While obtaining minimal SOP expression
   a) All don't cares are ignored
   b) All don't cares are treated as logic ones
   c) All don't cares are treated as logic Zeros
   d) Only such don't cares that help minimisation are treated as logic Ones

10) How many inputs and outputs does full adder have ?
   a) 2 i/p, 2 o/p b) 2 i/p, 1 o/p c) 3 i/p, 2 o/p d) 2 i/p, 3 o/p

11) Which of the following IC is used as comparator ?
   a) IC7483 b) IC7490 c) IC74181 d) IC7485

12) An example of Canonical SOP is
   a) ABC + BC + AB b) AB c) ABC + AB d) AB'C + AB''C

13) A MOD-6 synchronous counter is designed by 3 JK flip-flop, the number of counts skipped by it is _____
   a) 6 b) 5 c) 3 d) 2

14) A sequential circuit is one, whose output depends on
   a) Present input b) Past output
   c) Both a) and b) d) None

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SLR-TC – 489

Seat No.	

S.E. (Part – II) (Electrical and Electronics Engg.) (Old-CGPA) Examination, 2018
DIGITAL TECHNIQUES

Day and Date : Thursday, 24-5-2018 Marks : 56

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

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*

SECTION – I

2. Solve the following : **(3×4=12)**
   1) Explain Demorgan's and Duality Theorem in detail.
   2) Minimise using k-map and realise using Basic gates.
      $F(ABCD) = \pi M (0, 3, 4, 7, 8, 10, 12, 14) + d(2, 6)$.
   3) Explain full subtractor in detail. Using Boolean Expression show that
      $AB + AC + \overline{B}C = AB + \overline{B}C$.

3. Solve **any two** : **(2×8=16)**
   1) Implement following using :
      a) 16 : 1 Multiplexer b) 8 : 1 Multiplexer.
      $F = €m(0, 1, 2, 3, 7, 8, 9, 11, 14)$.
   2) Explain 2-bit digital comparator in detail.
   3) Design a combinational circuit for Binary to Gray Code conversion.

SECTION – II

4. Attempt **any three** : **(3×4=12)**
   1) Explain the characteristics of flip-flop.
   2) What is excitation table ? Draw excitation table of JK, T flip-flop, D flip-flop.

3) Determine the number of flip-flops required to construct a register capable of storing :
   a) 6 bit binary no.
   b) Decimal number upto 31
   c) Hexadecimal number up to F
   d) Octal number up to 10.
4) Design MOD-6 counter using IC 7490.
5) Explain any one type of shift register in detail.

5. Attempt **any two** of the following : **(2×8=16)**
   1) Explain the following flip-flop with circuit diagram, truth table, characteristic table, characteristic equation.
      a) D flip-flop b) JK flip-flop.
   2) Design asynchronous 4-bit up/down counter with waveforms.
   3) Draw internal architecture of IC 7490. Design a asynchronous counter which counts from 000 to 100.

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SLR-TC – 490

Seat No.	

Set **P**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) The value of the unit vector is
a) 0 b) –1 c) 1 d) 2

2) Unit of potential difference is
a) Coulomb b) Joules
c) Coulomb/Joules d) Joules/Coulomb

3) If dot product of two vectors is zero, the vectors are
a) Perpendicular b) Parallel
c) Oblique d) None of these

4) Which of the following are not vector functions in Electromagnetics ?
a) Gradient
b) Divergence
c) Curl
d) There is no non-vector functions in Electromagnetics

5) Vector is the quantity which is completely defined by its
a) Magnitude b) Direction
c) Both a) and b) d) None of these

6) ax.ay =
   a) az b) ax c) ay d) zero

7) For the volume density ρ_v the divergence of the E will be equal to
   a) $\frac{\rho v}{\varepsilon}$ b) $\rho_v \varepsilon$ c) $\varepsilon^2 \rho_v$ d) $\frac{\rho v}{\varepsilon^2}$

8) For free space α value is
   a) 1.5 b) 0 c) 2.5 d) 5.6

9) A charge of 2×10^{-7} C is acted upon by a force of 0.1N. Determine the distance to the other charge of 4.5×10^{-7}C; both the charges are in vacuum.
   a) 0.03 b) 0.05 c) 0.07 d) 0.09

10) The velocity of EM wave in free space is
   a) 3×10^8 cm/s b) 3×10^8 m/hou
   c) 3×10^8 m/s d) 3×10^{12} m/s

11) $\nabla \times \bar{E} = -\mu \frac{\partial H}{\partial t}$ is
   a) Coulomb's law b) Gauss law
   c) Faradays law d) Ohm's law

12) 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) $F = Q [B + V \times B]$

13) The electric flux density is the
   a) Product of permittivity and electric field intensity
   b) Product of number of flux lines and permittivity
   c) Product of permeability and electric field intensity
   d) Product of number of flux lines and permeability

14) For static magnetic field
   a) $\nabla \times B = \rho$ b) $\nabla \times \bar{B} = \mu \bar{J}$
   c) $\nabla . B = \mu.J$ d) $\nabla \times B = 0$

SLR-TC – 490

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if*** *necessary.*

SECTION – I

2. Solve **any three** : **(3×4=12)**
   1) State and prove divergence theorem.
   2) Show that $E = -\nabla V$.
   3) Derive the continuity equation for current in integral form and point form.
   4) Explain various charge configurations in electrostatic field.
   5) Find the force on a 100 μC charge at (0, 0, 3) m if four like charges of 20 μC are located on the x and y axis at ± 4m.

3. Solve **any two** : **(2×8=16)**
   1) Given that $D = (10 \times 3/3)\,\overline{ax}$ (c/m^2), evaluate both sides of the divergence theorem for the volume of a cube 2 m on the edge, centered at origin and with edges parallel to the axis.
   2) Derive the expression for electric field intensity due to infinitely long line charge.
   3) Derive point form of the Gauss's law.

SECTION – II

4. Solve **any three** : **(3×4=12)**
   1) Derive the expression on the axis of a circular loop.
   2) A current filament of $3\overline{a_x}$ amp. Lies along the x-axis. Find H components at P(–1, 3, 2).

Set P

3) What is Lorentz force ?

4) Write Maxwell's equations for static fields.

5) A circular loop located on $x^2 + y^2 = 9$, $z = 0$ carries a direct current of 10 A along $\overline{a_\phi}$ .Determine H at (0, 0, 4).

5. Solve **any two** : **(2×8=16)**

1) Derive an expression for magnetic field intensity due to finite long straight current filament.

2) Derive expression for point form of Ampere's law.

3) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = \left(\frac{y^2 z}{x}\right)\overline{a_x} + \left(\frac{0.5y^2 z^2}{x^2}\right)\overline{a_z}$$

And find current in the $\overline{a_y}$ direction crossing the square surface in the plane $y = 2$ bounded by $x = z = 1$ and $x = z = 2$.

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Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

3) Make suitable assumptions if ***necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) For free space α value is
a) 1.5 b) 0 c) 2.5 d) 5.6

2) A charge of 2×10^{-7} C is acted upon by a force of 0.1N. Determine the distance to the other charge of 4.5×10^{-7}C; both the charges are in vacuum.
a) 0.03 b) 0.05 c) 0.07 d) 0.09

3) The velocity of EM wave in free space is
a) 3×10^8 cm/s b) 3×10^8 m/hou
c) 3×10^8 m/s d) 3×10^{12} m/s

4) $\nabla \times \bar{E} = -\mu \frac{\partial H}{\partial t}$ is
a) Coulomb's law b) Gauss law
c) Faradays law d) Ohm's law

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 electric flux density is the
   a) Product of permittivity and electric field intensity
   b) Product of number of flux lines and permittivity
   c) Product of permeability and electric field intensity
   d) Product of number of flux lines and permeability

7) For static magnetic field
   a) $\nabla \times B = \rho$ b) $\nabla \times \bar{B} = \mu \bar{J}$
   c) $\nabla \, . \, B = \mu . J$ d) $\nabla \times B = 0$

8) The value of the unit vector is
   a) 0 b) –1 c) 1 d) 2

9) Unit of potential difference is
   a) Coulomb b) Joules
   c) Coulomb/Joules d) Joules/Coulomb

10) If dot product of two vectors is zero, the vectors are
   a) Perpendicular b) Parallel
   c) Oblique d) None of these

11) Which of the following are not vector functions in Electromagnetics ?
   a) Gradient
   b) Divergence
   c) Curl
   d) There is no non-vector functions in Electromagnetics

12) Vector is the quantity which is completely defined by its
   a) Magnitude b) Direction
   c) Both a) and b) d) None of these

13) ax.ay =
   a) az b) ax c) ay d) zero

14) For the volume density ρ_v the divergence of the E will be equal to
   a) $\frac{\rho v}{\varepsilon}$ b) $\rho_v \varepsilon$ c) $\varepsilon^2 \rho_v$ d) $\frac{\rho v}{\varepsilon^2}$

SLR-TC – 490

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if*** *necessary.*

SECTION – I

2. Solve **any three** : **(3×4=12)**
   1) State and prove divergence theorem.
   2) Show that $E = -\nabla V$.
   3) Derive the continuity equation for current in integral form and point form.
   4) Explain various charge configurations in electrostatic field.
   5) Find the force on a 100 μC charge at (0, 0, 3) m if four like charges of 20 μC are located on the x and y axis at ± 4m.

3. Solve **any two** : **(2×8=16)**
   1) Given that $D = (10 \times 3/3)\,\overline{ax}$ (c/m^2), evaluate both sides of the divergence theorem for the volume of a cube 2 m on the edge, centered at origin and with edges parallel to the axis.
   2) Derive the expression for electric field intensity due to infinitely long line charge.
   3) Derive point form of the Gauss's law.

SECTION – II

4. Solve **any three** : **(3×4=12)**
   1) Derive the expression on the axis of a circular loop.
   2) A current filament of $3\overline{a_x}$ amp. Lies along the x-axis. Find H components at P(–1, 3, 2).

Set Q

3) What is Lorentz force ?

4) Write Maxwell's equations for static fields.

5) A circular loop located on $x^2 + y^2 = 9$, $z = 0$ carries a direct current of 10 A along $\overline{a_\phi}$ .Determine H at (0, 0, 4).

5. Solve **any two** : **(2×8=16)**

1) Derive an expression for magnetic field intensity due to finite long straight current filament.

2) Derive expression for point form of Ampere's law.

3) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = \left(\frac{y^2 z}{x}\right)\overline{a_x} + \left(\frac{0.5y^2 z^2}{x^2}\right)\overline{a_z}$$

And find current in the $\overline{a_y}$ direction crossing the square surface in the plane $y = 2$ bounded by $x = z = 1$ and $x = z = 2$.

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Seat No.	

Set R

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

3) Make suitable assumptions if ***necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Vector is the quantity which is completely defined by its
   a) Magnitude b) Direction
   c) Both a) and b) d) None of these

2) ax.ay =
   a) az b) ax c) ay d) zero

3) For the volume density ρ_v the divergence of the E will be equal to
   a) $\frac{\rho v}{\varepsilon}$ b) $\rho_v \varepsilon$ c) $\varepsilon^2 \rho_v$ d) $\frac{\rho v}{\varepsilon^2}$

4) For free space α value is
   a) 1.5 b) 0 c) 2.5 d) 5.6

5) A charge of 2×10^{-7} C is acted upon by a force of 0.1N. Determine the distance to the other charge of 4.5×10^{-7}C; both the charges are in vacuum.
   a) 0.03 b) 0.05 c) 0.07 d) 0.09

6) The velocity of EM wave in free space is
   a) 3×10^8 cm/s b) 3×10^8 m/hou
   c) 3×10^8 m/s d) 3×10^{12} m/s

P.T.O.

7) $\nabla \times \bar{E} = -\mu \frac{\partial H}{\partial t}$ is

a) Coulomb's law
b) Gauss law
c) Faradays law
d) Ohm's law

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 electric flux density is the

a) Product of permittivity and electric field intensity
b) Product of number of flux lines and permittivity
c) Product of permeability and electric field intensity
d) Product of number of flux lines and permeability

10) For static magnetic field

a) $\nabla \times B = \rho$
b) $\nabla \times \bar{B} = \mu \bar{J}$
c) $\nabla . B = \mu.J$
d) $\nabla \times B = 0$

11) The value of the unit vector is

a) 0 b) –1 c) 1 d) 2

12) Unit of potential difference is

a) Coulomb
b) Joules
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13) If dot product of two vectors is zero, the vectors are

a) Perpendicular
b) Parallel
c) Oblique
d) None of these

14) Which of the following are not vector functions in Electromagnetics ?

a) Gradient
b) Divergence
c) Curl
d) There is no non-vector functions in Electromagnetics

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SLR-TC – 490

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if*** *necessary.*

SECTION – I

2. Solve **any three** : **(3×4=12)**
   1) State and prove divergence theorem.
   2) Show that $E = -\nabla V$.
   3) Derive the continuity equation for current in integral form and point form.
   4) Explain various charge configurations in electrostatic field.
   5) Find the force on a 100 μC charge at (0, 0, 3) m if four like charges of 20 μC are located on the x and y axis at ± 4m.

3. Solve **any two** : **(2×8=16)**
   1) Given that $D = (10 \times 3/3)\,\overline{ax}$ (c/m^2), evaluate both sides of the divergence theorem for the volume of a cube 2 m on the edge, centered at origin and with edges parallel to the axis.
   2) Derive the expression for electric field intensity due to infinitely long line charge.
   3) Derive point form of the Gauss's law.

SECTION – II

4. Solve **any three** : **(3×4=12)**
   1) Derive the expression on the axis of a circular loop.
   2) A current filament of $3\overline{a_x}$ amp. Lies along the x-axis. Find H components at P(–1, 3, 2).

Set R

3) What is Lorentz force ?

4) Write Maxwell's equations for static fields.

5) A circular loop located on $x^2 + y^2 = 9$, $z = 0$ carries a direct current of 10 A along $\overline{a_\phi}$ .Determine H at (0, 0, 4).

5. Solve **any two** : **(2×8=16)**

1) Derive an expression for magnetic field intensity due to finite long straight current filament.

2) Derive expression for point form of Ampere's law.

3) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = \left(\frac{y^2 z}{x}\right)\overline{a_x} + \left(\frac{0.5y^2 z^2}{x^2}\right)\overline{a_z}$$

And find current in the $\overline{a_y}$ direction crossing the square surface in the plane $y = 2$ bounded by $x = z = 1$ and $x = z = 2$.

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SLR-TC – 490

Seat No.	

Set **S**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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

3) Make suitable assumptions if ***necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) The velocity of EM wave in free space is
   a) 3×10^8 cm/s
   b) 3×10^8 m/hou
   c) 3×10^8 m/s
   d) 3×10^{12} m/s

2) $\nabla \times \bar{E} = -\mu \frac{\partial H}{\partial t}$ is
   a) Coulomb's law
   b) Gauss law
   c) Faradays law
   d) Ohm's law

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 electric flux density is the
   a) Product of permittivity and electric field intensity
   b) Product of number of flux lines and permittivity
   c) Product of permeability and electric field intensity
   d) Product of number of flux lines and permeability

5) For static magnetic field
   a) $\nabla \times B = \rho$ b) $\nabla \times \bar{B} = \mu \bar{J}$
   c) $\nabla . B = \mu.J$ d) $\nabla \times B = 0$

6) The value of the unit vector is
   a) 0 b) –1 c) 1 d) 2

7) Unit of potential difference is
   a) Coulomb b) Joules
   c) Coulomb/Joules d) Joules/Coulomb

8) If dot product of two vectors is zero, the vectors are
   a) Perpendicular b) Parallel
   c) Oblique d) None of these

9) Which of the following are not vector functions in Electromagnetics ?
   a) Gradient
   b) Divergence
   c) Curl
   d) There is no non-vector functions in Electromagnetics

10) Vector is the quantity which is completely defined by its
   a) Magnitude b) Direction
   c) Both a) and b) d) None of these

11) ax.ay =
   a) az b) ax c) ay d) zero

12) For the volume density ρ_v the divergence of the E will be equal to
   a) $\frac{\rho v}{\varepsilon}$ b) $\rho_v \varepsilon$ c) $\varepsilon^2 \rho_v$ d) $\frac{\rho v}{\varepsilon^2}$

13) For free space α value is
   a) 1.5 b) 0 c) 2.5 d) 5.6

14) A charge of 2×10^{-7} C is acted upon by a force of 0.1N. Determine the distance to the other charge of 4.5×10^{-7}C; both the charges are in vacuum.
   a) 0.03 b) 0.05 c) 0.07 d) 0.09

SLR-TC – 490

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if*** *necessary.*

SECTION – I

2. Solve **any three** : **(3×4=12)**
   1) State and prove divergence theorem.
   2) Show that $E = -\nabla V$.
   3) Derive the continuity equation for current in integral form and point form.
   4) Explain various charge configurations in electrostatic field.
   5) Find the force on a 100 μC charge at (0, 0, 3) m if four like charges of 20 μC are located on the x and y axis at ± 4m.

3. Solve **any two** : **(2×8=16)**
   1) Given that $D = (10 \times 3/3)\,\overline{ax}$ (c/m^2), evaluate both sides of the divergence theorem for the volume of a cube 2 m on the edge, centered at origin and with edges parallel to the axis.
   2) Derive the expression for electric field intensity due to infinitely long line charge.
   3) Derive point form of the Gauss's law.

SECTION – II

4. Solve **any three** : **(3×4=12)**
   1) Derive the expression on the axis of a circular loop.
   2) A current filament of $3\overline{a_x}$ amp. Lies along the x-axis. Find H components at P(–1, 3, 2).

3) What is Lorentz force ?

4) Write Maxwell's equations for static fields.

5) A circular loop located on $x^2 + y^2 = 9$, $z = 0$ carries a direct current of 10 A along $\overline{a_\phi}$ .Determine H at (0, 0, 4).

5. Solve **any two** : **(2×8=16)**

1) Derive an expression for magnetic field intensity due to finite long straight current filament.

2) Derive expression for point form of Ampere's law.

3) Evaluate both sides of Stroke's theorem for the field

$$\overline{H} = \left(\frac{y^2 z}{x}\right)\overline{a_x} + \left(\frac{0.5y^2 z^2}{x^2}\right)\overline{a_z}$$

And find current in the $\overline{a_y}$ direction crossing the square surface in the plane $y = 2$ bounded by $x = z = 1$ and $x = z = 2$.

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SLR-TC – 491

Seat No.	

Set P

T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 4-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *:*
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) *Assume suitable data* ***wherever*** *necessary.*
4) *Non-programmable calculators are* ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Solve the following : **(14×1=14)**

1) 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

2) 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

3) 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

4) Piezo-elecric transducers are
   a) Passive transducers b) Active transducers
   c) Inverse transducers d) b and c

5) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

P.T.O.

6) Time division multiplexing requires
   a) Constant data transmission
   b) Transmission of data sample
   c) Transmission of data at random
   d) Transmission of data of only one measured

7) Modem is an acronym of
   a) Modulation
   b) Demodulation
   c) Modulation and demodulation
   d) All of these

8) If an information is required to be stored over a short interval of time
   a) A single number/devices should be used
   b) A storage type oscilloscope should be used
   c) A CRO with photographic equipment should be used
   d) A direct writing recorder or a magnetic tape recorder should be used

9) The machine interpretable output from an analog transducer can be had from
   a) Magnetic tapes
   b) Punched cards and tapes
   c) Teletypewriter
   d) All of these

10) 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

11) 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 to D converter is
   a) Successive approximation converter
   b) Digital ramp converter
   c) Digital slope converter
   d) All of these

12) 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

13) 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

14) 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 dynamics strains are being measured
   d) None of these

SLR-TC – 491

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any three** : **(3×4=12)**

a) State the errors occurring in the instrumentation system and discuss the methods to minimise them.

b) What is mean transducer ? State types of transducer. Explain any one.

c) Explain comparator with necessary diagram.

d) Draw block diagram of instrumentation system and explain the function of each block.

3. Solve **any two** : **(2×8=16)**

a) Short note on :

I) Modulator

II) Demodulator

b) Explain the passive filter with its frequency graph.

c) Explain the working principle and construction of LVDT and thermocouple.

SECTION – II

4. Solve **any three** : **(3×4=12)**

a) Explain seven segment displays with necessary diagram.

b) Explain Radio frequency telemetry system.

c) Describe the oscilloscope with suitable diagram.

d) Draw and explain architecture of PLC.

5. Solve **any two** : **(2×8=16)**

a) Short note on :

I) Function Generator

II) Spectrum analyser.

b) Explain the working of Tape recorder and give classification of recorders. State the advantages of recorder.

c) Draw Ladder diagram of PLC. What is the role of PLC in automation ?

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SLR-TC – 491

Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 4-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *:*
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) *Assume suitable data* ***wherever*** *necessary.*
4) *Non-programmable calculators are* ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Solve the following : **(14×1=14)**

1) If an information is required to be stored over a short interval of time
   a) A single number/devices should be used
   b) A storage type oscilloscope should be used
   c) A CRO with photographic equipment should be used
   d) A direct writing recorder or a magnetic tape recorder should be used

2) The machine interpretable output from an analog transducer can be had from
   a) Magnetic tapes b) Punched cards and tapes
   c) Teletypewriter d) All of these

3) 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

4) 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 to D converter is
   a) Successive approximation converter b) Digital ramp converter
   c) Digital slope converter d) All of these

5) 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

P.T.O.

6) 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

7) 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 dynamics strains are being measured
   d) None of these

8) 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

9) 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

10) 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

11) Piezo-elecric transducers are
   a) Passive transducers b) Active transducers
   c) Inverse transducers d) b and c

12) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

13) Time division multiplexing requires
   a) Constant data transmission b) Transmission of data sample
   c) Transmission of data at random d) Transmission of data of only one measured

14) Modem is an acronym of
   a) Modulation b) Demodulation
   c) Modulation and demodulation d) All of these

SLR-TC – 491

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any three** : **(3×4=12)**

a) State the errors occurring in the instrumentation system and discuss the methods to minimise them.

b) What is mean transducer ? State types of transducer. Explain any one.

c) Explain comparator with necessary diagram.

d) Draw block diagram of instrumentation system and explain the function of each block.

3. Solve **any two** : **(2×8=16)**

a) Short note on :

I) Modulator

II) Demodulator

b) Explain the passive filter with its frequency graph.

c) Explain the working principle and construction of LVDT and thermocouple.

SECTION – II

4. Solve **any three** : **(3×4=12)**

a) Explain seven segment displays with necessary diagram.

b) Explain Radio frequency telemetry system.

c) Describe the oscilloscope with suitable diagram.

d) Draw and explain architecture of PLC.

Set Q

5. Solve **any two** : **(2×8=16)**

a) Short note on :

I) Function Generator

II) Spectrum analyser.

b) Explain the working of Tape recorder and give classification of recorders. State the advantages of recorder.

c) Draw Ladder diagram of PLC. What is the role of PLC in automation ?

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SLR-TC – 491

Seat No.	

Set R

T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 4-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *:*
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) *Assume suitable data* ***wherever*** *necessary.*
4) *Non-programmable calculators are* ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Solve the following : **(14×1=14)**

1) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

2) Time division multiplexing requires
   a) Constant data transmission b) Transmission of data sample
   c) Transmission of data at random d) Transmission of data of only one measured

3) Modem is an acronym of
   a) Modulation b) Demodulation
   c) Modulation and demodulation d) All of these

4) If an information is required to be stored over a short interval of time
   a) A single number/devices should be used
   b) A storage type oscilloscope should be used
   c) A CRO with photographic equipment should be used
   d) A direct writing recorder or a magnetic tape recorder should be used

5) The machine interpretable output from an analog transducer can be had from
   a) Magnetic tapes b) Punched cards and tapes
   c) Teletypewriter d) All of these

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

P.T.O.

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 to 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
   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

10) 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 dynamics strains are being measured
   d) None of these

11) 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

12) 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

13) 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

14) Piezo-elecric transducers are
   a) Passive transducers
   b) Active transducers
   c) Inverse transducers
   d) b and c

SLR-TC – 491

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any three** : **(3×4=12)**

a) State the errors occurring in the instrumentation system and discuss the methods to minimise them.

b) What is mean transducer ? State types of transducer. Explain any one.

c) Explain comparator with necessary diagram.

d) Draw block diagram of instrumentation system and explain the function of each block.

3. Solve **any two** : **(2×8=16)**

a) Short note on :

I) Modulator

II) Demodulator

b) Explain the passive filter with its frequency graph.

c) Explain the working principle and construction of LVDT and thermocouple.

SECTION – II

4. Solve **any three** : **(3×4=12)**

a) Explain seven segment displays with necessary diagram.

b) Explain Radio frequency telemetry system.

c) Describe the oscilloscope with suitable diagram.

d) Draw and explain architecture of PLC.

Set R

5. Solve **any two** : **(2×8=16)**

a) Short note on :

I) Function Generator

II) Spectrum analyser.

b) Explain the working of Tape recorder and give classification of recorders. State the advantages of recorder.

c) Draw Ladder diagram of PLC. What is the role of PLC in automation ?

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SLR-TC – 491

Seat No.	

Set S

T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 4-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *:*
1) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) *Assume suitable data* ***wherever*** *necessary.*
4) *Non-programmable calculators are* ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Solve the following : **(14×1=14)**

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 to 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

P.T.O.

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 dynamics strains are being measured
   d) None of these

6) 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

7) 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

8) 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

9) Piezo-elecric transducers are
   a) Passive transducers b) Active transducers
   c) Inverse transducers d) b and c

10) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

11) Time division multiplexing requires
   a) Constant data transmission b) Transmission of data sample
   c) Transmission of data at random d) Transmission of data of only one measured

12) Modem is an acronym of
   a) Modulation b) Demodulation
   c) Modulation and demodulation d) All of these

13) If an information is required to be stored over a short interval of time
   a) A single number/devices should be used
   b) A storage type oscilloscope should be used
   c) A CRO with photographic equipment should be used
   d) A direct writing recorder or a magnetic tape recorder should be used

14) The machine interpretable output from an analog transducer can be had from
   a) Magnetic tapes b) Punched cards and tapes
   c) Teletypewriter d) All of these

SLR-TC – 491

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 4-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any three** : **(3×4=12)**

a) State the errors occurring in the instrumentation system and discuss the methods to minimise them.

b) What is mean transducer ? State types of transducer. Explain any one.

c) Explain comparator with necessary diagram.

d) Draw block diagram of instrumentation system and explain the function of each block.

3. Solve **any two** : **(2×8=16)**

a) Short note on :

I) Modulator

II) Demodulator

b) Explain the passive filter with its frequency graph.

c) Explain the working principle and construction of LVDT and thermocouple.

SECTION – II

4. Solve **any three** : **(3×4=12)**

a) Explain seven segment displays with necessary diagram.

b) Explain Radio frequency telemetry system.

c) Describe the oscilloscope with suitable diagram.

d) Draw and explain architecture of PLC.

5. Solve **any two** : **(2×8=16)**

a) Short note on :

I) Function Generator

II) Spectrum analyser.

b) Explain the working of Tape recorder and give classification of recorders. State the advantages of recorder.

c) Draw Ladder diagram of PLC. What is the role of PLC in automation ?

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SLR-TC – 492

Seat No.	

Set **P**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSOR AND ITS APPLICATIONS

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumption ***if necessary****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Minimum clock frequency of 8085 microprocessors is
   a) 300 kHz b) 100 kHz
   c) 500 kHz d) 400 kHz

2) Which one is the bi-directional ?
   a) Address bus b) Data bus
   c) Both a) and b) d) None of the above

3) Which one is the not special purpose resister ?
   a) Stack pointer b) Program counter
   c) Increment/Decrement latch d) Accumulator

4) LHLD address is a
   a) Direct addressing b) Indirect addressing
   c) Resister addressing d) None of the above addressing

5) LDA address is a
   a) 1 byte instruction b) 2 byte instruction
   c) 3 byte instruction d) 4 byte instruction
6) Take odd man out : TRAP, INTR, S_0, RST 7.5.
   a) TRAP b) INTR c) RST 7.5 d) S_0
7) Signal required for demultiplexing of address and data bus
   a) ALE b) S_0 and S_1 c) IO/M d) All of these
8) Which of below is a functional block of 8255 ?
   a) Modem control b) Receive buffer
   c) Group A control d) Transmit buffer
9) Control word necessary only in cascade mode of 8259 PIC
   a) ICW1 b) ICW2 c) ICW3 d) ICW4
10) Which of below is not a functional block of 8251 ?
   a) Read/write control logic b) Modem control
   c) Group A control d) Data bus buffer
11) Which of below is not a functional block of 8259 ?
   a) In service register b) Modem control
   c) Priority resolver d) Data bus buffer
12) RIM instruction format bit D4 is
   a) SID b) IE c) I 5.5 d) M 7.5
13) SIM instruction format bit D4 is
   a) SID b) SOD c) R 7.5 d) None of these
14) 8259 is a
   a) USART b) PPI
   c) PIT d) PIC

SLR-TC – 492

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSOR AND ITS APPLICATIONS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

1) Draw the timing diagram of memory read cycle.

2) Explain following instructions :

a) Accumulator

b) ALE

c) ALU

d) General purpose resister.

3) Classify memory and explain one of them.

4) Write a program to multiply two 8 bit numbers. Also give the result.

5) List out the features of 8085 microprocessor.

3. Solve **any two** : **(8×2=16)**

1) Draw and explain internal architecture of 8085.

2) Write a program of arranging 10 numbers in descending order. Assume suitable data and addresses.

3) Explain the different types of memory in detail.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   1) What is ICW2 of 8259 PIC ?

   2) List out the features of 8251.

   3) Comparison between synchronous and asynchronous I/O.

   4) Draw the block diagram of 8255.

   5) Explain dual slope ADC.

5. Solve **any two** : **(8×2=16)**

   1) What is DAC ? Explain weighted register DAC.

   2) Draw and explain detailed interfacing of 8254 with 8085. Assume suitable addresses.

   3) Explain with block diagram, frequency measurement using 8085.

SLR-TC – 492

Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSOR AND ITS APPLICATIONS

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumption ***if necessary****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Which of below is a functional block of 8255 ?
   a) Modem control b) Receive buffer
   c) Group A control d) Transmit buffer

2) Control word necessary only in cascade mode of 8259 PIC
   a) ICW1 b) ICW2 c) ICW3 d) ICW4

3) Which of below is not a functional block of 8251 ?
   a) Read/write control logic b) Modem control
   c) Group A control d) Data bus buffer

4) Which of below is not a functional block of 8259 ?
   a) In service register b) Modem control
   c) Priority resolver d) Data bus buffer

5) RIM instruction format bit D4 is
   a) SID b) IE c) I 5.5 d) M 7.5

P.T.O.

6) SIM instruction format bit D4 is

a) SID b) SOD c) R 7.5 d) None of these

7) 8259 is a

a) USART b) PPI

c) PIT d) PIC

8) Minimum clock frequency of 8085 microprocessors is

a) 300 kHz b) 100 kHz

c) 500 kHz d) 400 kHz

9) Which one is the bi-directional ?

a) Address bus b) Data bus

c) Both a) and b) d) None of the above

10) Which one is the not special purpose resister ?

a) Stack pointer b) Program counter

c) Increment/Decrement latch d) Accumulator

11) LHLD address is a

a) Direct addressing b) Indirect addressing

c) Resister addressing d) None of the above addressing

12) LDA address is a

a) 1 byte instruction b) 2 byte instruction

c) 3 byte instruction d) 4 byte instruction

13) Take odd man out : TRAP, INTR, S_0, RST 7.5.

a) TRAP b) INTR c) RST 7.5 d) S_0

14) Signal required for demultiplexing of address and data bus

a) ALE b) S_0 and S_1 c) IO/M d) All of these

SLR-TC – 492

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSOR AND ITS APPLICATIONS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

1) Draw the timing diagram of memory read cycle.

2) Explain following instructions :

a) Accumulator

b) ALE

c) ALU

d) General purpose resister.

3) Classify memory and explain one of them.

4) Write a program to multiply two 8 bit numbers. Also give the result.

5) List out the features of 8085 microprocessor.

3. Solve **any two** : **(8×2=16)**

1) Draw and explain internal architecture of 8085.

2) Write a program of arranging 10 numbers in descending order. Assume suitable data and addresses.

3) Explain the different types of memory in detail.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   1) What is ICW2 of 8259 PIC ?

   2) List out the features of 8251.

   3) Comparison between synchronous and asynchronous I/O.

   4) Draw the block diagram of 8255.

   5) Explain dual slope ADC.

5. Solve **any two** : **(8×2=16)**

   1) What is DAC ? Explain weighted register DAC.

   2) Draw and explain detailed interfacing of 8254 with 8085. Assume suitable addresses.

   3) Explain with block diagram, frequency measurement using 8085.

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Seat No.	

Set **R**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSOR AND ITS APPLICATIONS

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*
*3) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer book Page No. **3**. **Each** question carries **one** mark.*
*4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) LDA address is a
   a) 1 byte instruction b) 2 byte instruction
   c) 3 byte instruction d) 4 byte instruction

2) Take odd man out : TRAP, INTR, S_0, RST 7.5.
   a) TRAP b) INTR c) RST 7.5 d) S_0

3) Signal required for demultiplexing of address and data bus
   a) ALE b) S_0 and S_1 c) IO/M d) All of these

4) Which of below is a functional block of 8255 ?
   a) Modem control b) Receive buffer
   c) Group A control d) Transmit buffer

5) Control word necessary only in cascade mode of 8259 PIC
   a) ICW1 b) ICW2 c) ICW3 d) ICW4

6) Which of below is not a functional block of 8251 ?
   a) Read/write control logic
   b) Modem control
   c) Group A control
   d) Data bus buffer

7) Which of below is not a functional block of 8259 ?
   a) In service register
   b) Modem control
   c) Priority resolver
   d) Data bus buffer

8) RIM instruction format bit D4 is
   a) SID
   b) IE
   c) I 5.5
   d) M 7.5

9) SIM instruction format bit D4 is
   a) SID
   b) SOD
   c) R 7.5
   d) None of these

10) 8259 is a
   a) USART
   b) PPI
   c) PIT
   d) PIC

11) Minimum clock frequency of 8085 microprocessors is
   a) 300 kHz
   b) 100 kHz
   c) 500 kHz
   d) 400 kHz

12) Which one is the bi-directional ?
   a) Address bus
   b) Data bus
   c) Both a) and b)
   d) None of the above

13) Which one is the not special purpose resister ?
   a) Stack pointer
   b) Program counter
   c) Increment/Decrement latch
   d) Accumulator

14) LHLD address is a
   a) Direct addressing
   b) Indirect addressing
   c) Resister addressing
   d) None of the above addressing

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Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSOR AND ITS APPLICATIONS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

1) Draw the timing diagram of memory read cycle.

2) Explain following instructions :

a) Accumulator

b) ALE

c) ALU

d) General purpose resister.

3) Classify memory and explain one of them.

4) Write a program to multiply two 8 bit numbers. Also give the result.

5) List out the features of 8085 microprocessor.

3. Solve **any two** : **(8×2=16)**

1) Draw and explain internal architecture of 8085.

2) Write a program of arranging 10 numbers in descending order. Assume suitable data and addresses.

3) Explain the different types of memory in detail.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   1) What is ICW2 of 8259 PIC ?

   2) List out the features of 8251.

   3) Comparison between synchronous and asynchronous I/O.

   4) Draw the block diagram of 8255.

   5) Explain dual slope ADC.

5. Solve **any two** : **(8×2=16)**

   1) What is DAC ? Explain weighted register DAC.

   2) Draw and explain detailed interfacing of 8254 with 8085. Assume suitable addresses.

   3) Explain with block diagram, frequency measurement using 8085.

SLR-TC – 492

Seat No.	

Set **S**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSOR AND ITS APPLICATIONS

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumption ***if necessary****.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Which of below is not a functional block of 8251 ?
   a) Read/write control logic b) Modem control
   c) Group A control d) Data bus buffer

2) Which of below is not a functional block of 8259 ?
   a) In service register b) Modem control
   c) Priority resolver d) Data bus buffer

3) RIM instruction format bit D4 is
   a) SID b) IE c) I 5.5 d) M 7.5

4) SIM instruction format bit D4 is
   a) SID b) SOD c) R 7.5 d) None of these

5) 8259 is a
   a) USART b) PPI
   c) PIT d) PIC

P.T.O.

6) Minimum clock frequency of 8085 microprocessors is
   a) 300 kHz b) 100 kHz
   c) 500 kHz d) 400 kHz

7) Which one is the bi-directional ?
   a) Address bus b) Data bus
   c) Both a) and b) d) None of the above

8) Which one is the not special purpose resister ?
   a) Stack pointer b) Program counter
   c) Increment/Decrement latch d) Accumulator

9) LHLD address is a
   a) Direct addressing b) Indirect addressing
   c) Resister addressing d) None of the above addressing

10) LDA address is a
   a) 1 byte instruction b) 2 byte instruction
   c) 3 byte instruction d) 4 byte instruction

11) Take odd man out : TRAP, INTR, S_0, RST 7.5.
   a) TRAP b) INTR c) RST 7.5 d) S_0

12) Signal required for demultiplexing of address and data bus
   a) ALE b) S_0 and S_1 c) IO/M d) All of these

13) Which of below is a functional block of 8255 ?
   a) Modem control b) Receive buffer
   c) Group A control d) Transmit buffer

14) Control word necessary only in cascade mode of 8259 PIC
   a) ICW1 b) ICW2 c) ICW3 d) ICW4

SLR-TC – 492

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
MICROPROCESSOR AND ITS APPLICATIONS

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Make suitable assumption **if necessary**.*

SECTION – I

2. Solve **any three** : **(4×3=12)**

1) Draw the timing diagram of memory read cycle.

2) Explain following instructions :

a) Accumulator

b) ALE

c) ALU

d) General purpose resister.

3) Classify memory and explain one of them.

4) Write a program to multiply two 8 bit numbers. Also give the result.

5) List out the features of 8085 microprocessor.

3. Solve **any two** : **(8×2=16)**

1) Draw and explain internal architecture of 8085.

2) Write a program of arranging 10 numbers in descending order. Assume suitable data and addresses.

3) Explain the different types of memory in detail.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   1) What is ICW2 of 8259 PIC ?

   2) List out the features of 8251.

   3) Comparison between synchronous and asynchronous I/O.

   4) Draw the block diagram of 8255.

   5) Explain dual slope ADC.

5. Solve **any two** : **(8×2=16)**

   1) What is DAC ? Explain weighted register DAC.

   2) Draw and explain detailed interfacing of 8254 with 8085. Assume suitable addresses.

   3) Explain with block diagram, frequency measurement using 8085.

SLR-TC – 493

Seat No.	

Set **P**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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 answer : **14**

1) In a cable immediately above metallic sheath _____ is provided.
   a) Earthing connection b) Bedding
   c) Armoring d) None of these

2) In order to improve the power factor which device should be connected to the power system.
   a) Series capacitor b) Shunt capacitor
   c) Series inductor d) Shunt inductor

3) Varnished cambric is also known as
   a) Empire tape b) Rubber tape c) Paper tape d) PVC tape

4) Corona usually occurs when the electrostatic stress in the air around the conductor succeeds
   a) 30 kV (maximum value)/cm b) 22 kV (maximum value)/cm
   c) 11 kV (rms value)/cm d) 6.6 kV (rms value)/cm

5) The effect of ice deposition on conductor is
   a) Increased skin effect b) Reduced corona losses
   c) Increased weight d) Reduced sag

6) Which of the following statements is incorrect ?
   a) As the temperature raises the tension in the transmission line decreases
   b) As temperature rises the sag in transmission lines reduces
   c) Tension and sag in transmission lines are complementary to each other
   d) None of the above

7) In transmission system a feeder feeds power to
   a) Service mains b) Generating stations
   c) Distributors d) All of the above

8) The characteristic 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) In any transmission line, AD – BC = _____
   a) 1 b) 2 c) 4 d) 5

10) The disadvantage with paper as insulating material is
   a) It is hygroscopic b) It has high capacitance
   c) It is an organic material d) None of the above

11) The bundling of conductors is done primarily to
   a) Reduce reactance b) Increase reactance
   c) Increase ratio interference d) Reduce radio interference

12) The thickness of the layer of insulation on the conductor, in cables, depends upon
   a) Reactive power b) Power factor
   c) Voltage d) Current carrying capacity

13) SAG depends on what factors in transmission lines
   a) Span length
   b) Tension in the conductors
   c) Weight of the conductor per unit length
   d) All the above

14) In transmission system between two supports, due to SAG the conductors take the shape of
   a) Catenary b) Semi-circule c) Parabola d) Hyperbola

_____

SLR-TC – 493

Seat No.	

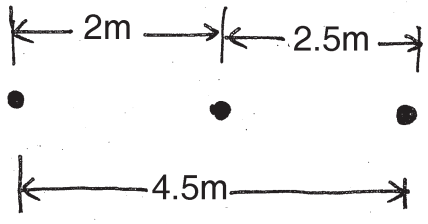
T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figure to the **right** indicates **maximum** marks.*
*3) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Explain the concept of self GMD.
   2) Criteria for choosing conductor material. Describe ACSR conductors.
   3) Write short note on skin effect.
   4) Draw and describe suspension type insulators along with its advantages.
   5) Explain inductance of single phase two wire line.
   6) A 3 phase, 50 Hz, 66 KV overhead line conductors are placed in horizontal plane as shown in figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate :
      i) Capacitance per phase
      ii) Charging current per phase.



3. Solve **any two** : **(6×2=12)**
   1) Derive expression of voltage distribution in 3 insulators in a string.
   2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively. Calculate :
      i) The ratio of capacitance between pin and earth to the self-capacitance of each unit.
      ii) The line voltage.
      iii) String efficiency.
   3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical 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-$\prod$ method along with the equivalent circuit and phasor diagram.

2) Draw and describe both types of pressure cables.

3) 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.

4) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.

5) Derive the generalized circuit constants for medium line using nominal T-method.

6) Explain economics of power factor improvement.

5. Solve **any two :** **(6×2=12)**

1) Explain the capacitance of 3-core belted type cables.

2) A 100 km long 3-phase, 50 Hz transmission line has following constants :
Resistance/phase/km = 0.1Ω
Reactance/phase/km = 0.5Ω
Susceptance/phase/km = 10×10^{-6} S
If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal-$\prod$ 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-TC – 493

Seat No.	

Set Q

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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 answer : **14**

1) The characteristic 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

2) In any transmission line, AD – BC = _____
   a) 1 b) 2 c) 4 d) 5

3) The disadvantage with paper as insulating material is
   a) It is hygroscopic b) It has high capacitance
   c) It is an organic material d) None of the above

4) The bundling of conductors is done primarily to
   a) Reduce reactance b) Increase reactance
   c) Increase ratio interference d) Reduce radio interference

5) The thickness of the layer of insulation on the conductor, in cables, depends upon
   a) Reactive power b) Power factor
   c) Voltage d) Current carrying capacity

P.T.O.

6) SAG depends on what factors in transmission lines
   a) Span length
   b) Tension in the conductors
   c) Weight of the conductor per unit length
   d) All the above

7) In transmission system between two supports, due to SAG the conductors take the shape of
   a) Catenary b) Semi-circule c) Parabola d) Hyperbola

8) In a cable immediately above metallic sheath _____ is provided.
   a) Earthing connection b) Bedding
   c) Armoring d) None of these

9) In order to improve the power factor which device should be connected to the power system.
   a) Series capacitor b) Shunt capacitor
   c) Series inductor d) Shunt inductor

10) Varnished cambric is also known as
   a) Empire tape b) Rubber tape c) Paper tape d) PVC tape

11) Corona usually occurs when the electrostatic stress in the air around the conductor succeeds
   a) 30 kV (maximum value)/cm b) 22 kV (maximum value)/cm
   c) 11 kV (rms value)/cm d) 6.6 kV (rms value)/cm

12) The effect of ice deposition on conductor is
   a) Increased skin effect b) Reduced corona losses
   c) Increased weight d) Reduced sag

13) Which of the following statements is incorrect ?
   a) As the temperature raises the tension in the transmission line decreases
   b) As temperature rises the sag in transmission lines reduces
   c) Tension and sag in transmission lines are complementary to each other
   d) None of the above

14) In transmission system a feeder feeds power to
   a) Service mains b) Generating stations
   c) Distributors d) All of the above

_____

SLR-TC – 493

Seat No.	

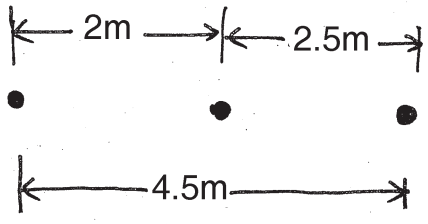
T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figure to the **right** indicates **maximum** marks.*
*3) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Explain the concept of self GMD.
   2) Criteria for choosing conductor material. Describe ACSR conductors.
   3) Write short note on skin effect.
   4) Draw and describe suspension type insulators along with its advantages.
   5) Explain inductance of single phase two wire line.
   6) A 3 phase, 50 Hz, 66 KV overhead line conductors are placed in horizontal plane as shown in figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate :
      i) Capacitance per phase
      ii) Charging current per phase.



3. Solve **any two** : **(6×2=12)**
   1) Derive expression of voltage distribution in 3 insulators in a string.
   2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively. Calculate :
      i) The ratio of capacitance between pin and earth to the self-capacitance of each unit.
      ii) The line voltage.
      iii) String efficiency.
   3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical 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-$\prod$ method along with the equivalent circuit and phasor diagram.

2) Draw and describe both types of pressure cables.

3) 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.

4) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.

5) Derive the generalized circuit constants for medium line using nominal T-method.

6) Explain economics of power factor improvement.

5. Solve **any two :** **(6×2=12)**

1) Explain the capacitance of 3-core belted type cables.

2) A 100 km long 3-phase, 50 Hz transmission line has following constants :
Resistance/phase/km = 0.1Ω
Reactance/phase/km = 0.5Ω
Susceptance/phase/km = 10×10^{-6} S
If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal-$\prod$ 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).

Seat No.	

SLR-TC – 493

Set **R**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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 answer : **14**

1) The effect of ice deposition on conductor is
   a) Increased skin effect b) Reduced corona losses
   c) Increased weight d) Reduced sag

2) Which of the following statements is incorrect ?
   a) As the temperature raises the tension in the transmission line decreases
   b) As temperature rises the sag in transmission lines reduces
   c) Tension and sag in transmission lines are complementary to each other
   d) None of the above

3) In transmission system a feeder feeds power to
   a) Service mains b) Generating stations
   c) Distributors d) All of the above

4) The characteristic 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

5) In any transmission line, AD – BC = _____
   a) 1 b) 2 c) 4 d) 5
6) The disadvantage with paper as insulating material is
   a) It is hygroscopic
   b) It has high capacitance
   c) It is an organic material
   d) None of the above
7) The bundling of conductors is done primarily to
   a) Reduce reactance
   b) Increase reactance
   c) Increase ratio interference
   d) Reduce radio interference
8) The thickness of the layer of insulation on the conductor, in cables, depends upon
   a) Reactive power
   b) Power factor
   c) Voltage
   d) Current carrying capacity
9) SAG depends on what factors in transmission lines
   a) Span length
   b) Tension in the conductors
   c) Weight of the conductor per unit length
   d) All the above
10) In transmission system between two supports, due to SAG the conductors take the shape of
   a) Catenary b) Semi-circule c) Parabola d) Hyperbola
11) In a cable immediately above metallic sheath _____ is provided.
   a) Earthing connection
   b) Bedding
   c) Armoring
   d) None of these
12) In order to improve the power factor which device should be connected to the power system.
   a) Series capacitor
   b) Shunt capacitor
   c) Series inductor
   d) Shunt inductor
13) Varnished cambric is also known as
   a) Empire tape b) Rubber tape c) Paper tape d) PVC tape
14) Corona usually occurs when the electrostatic stress in the air around the conductor succeeds
   a) 30 kV (maximum value)/cm
   b) 22 kV (maximum value)/cm
   c) 11 kV (rms value)/cm
   d) 6.6 kV (rms value)/cm

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SLR-TC – 493

Seat No.	

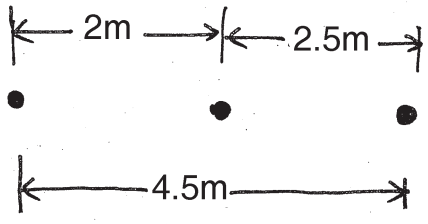
T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figure to the **right** indicates **maximum** marks.*
*3) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Explain the concept of self GMD.
   2) Criteria for choosing conductor material. Describe ACSR conductors.
   3) Write short note on skin effect.
   4) Draw and describe suspension type insulators along with its advantages.
   5) Explain inductance of single phase two wire line.
   6) A 3 phase, 50 Hz, 66 KV overhead line conductors are placed in horizontal plane as shown in figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate :
      i) Capacitance per phase
      ii) Charging current per phase.



3. Solve **any two** : **(6×2=12)**
   1) Derive expression of voltage distribution in 3 insulators in a string.
   2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively. Calculate :
      i) The ratio of capacitance between pin and earth to the self-capacitance of each unit.
      ii) The line voltage.
      iii) String efficiency.
   3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical 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-$\prod$ method along with the equivalent circuit and phasor diagram.

2) Draw and describe both types of pressure cables.

3) 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.

4) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.

5) Derive the generalized circuit constants for medium line using nominal T-method.

6) Explain economics of power factor improvement.

5. Solve **any two :** **(6×2=12)**

1) Explain the capacitance of 3-core belted type cables.

2) A 100 km long 3-phase, 50 Hz transmission line has following constants :
Resistance/phase/km = 0.1Ω
Reactance/phase/km = 0.5Ω
Susceptance/phase/km = 10×10^{-6} S
If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal-$\prod$ 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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Seat No.	

SLR-TC – 493

Set **S**

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 7-5-2018 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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 answer : **14**

1) The disadvantage with paper as insulating material is
   a) It is hygroscopic
   b) It has high capacitance
   c) It is an organic material
   d) None of the above

2) The bundling of conductors is done primarily to
   a) Reduce reactance
   b) Increase reactance
   c) Increase ratio interference
   d) Reduce radio interference

3) The thickness of the layer of insulation on the conductor, in cables, depends upon
   a) Reactive power
   b) Power factor
   c) Voltage
   d) Current carrying capacity

4) SAG depends on what factors in transmission lines
   a) Span length
   b) Tension in the conductors
   c) Weight of the conductor per unit length
   d) All the above

5) In transmission system between two supports, due to SAG the conductors take the shape of
   a) Catenary b) Semi-circule c) Parabola d) Hyperbola
6) In a cable immediately above metallic sheath _____ is provided.
   a) Earthing connection b) Bedding
   c) Armoring d) None of these
7) In order to improve the power factor which device should be connected to the power system.
   a) Series capacitor b) Shunt capacitor
   c) Series inductor d) Shunt inductor
8) Varnished cambric is also known as
   a) Empire tape b) Rubber tape c) Paper tape d) PVC tape
9) Corona usually occurs when the electrostatic stress in the air around the conductor succeeds
   a) 30 kV (maximum value)/cm b) 22 kV (maximum value)/cm
   c) 11 kV (rms value)/cm d) 6.6 kV (rms value)/cm
10) The effect of ice deposition on conductor is
   a) Increased skin effect b) Reduced corona losses
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11) Which of the following statements is incorrect ?
   a) As the temperature raises the tension in the transmission line decreases
   b) As temperature rises the sag in transmission lines reduces
   c) Tension and sag in transmission lines are complementary to each other
   d) None of the above
12) In transmission system a feeder feeds power to
   a) Service mains b) Generating stations
   c) Distributors d) All of the above
13) The characteristic 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) In any transmission line, AD – BC = _____
   a) 1 b) 2 c) 4 d) 5

_____

SLR-TC – 493

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1) **All** questions are **compulsory**.*
*2) Figure to the **right** indicates **maximum** marks.*
*3) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Explain the concept of self GMD.
   2) Criteria for choosing conductor material. Describe ACSR conductors.
   3) Write short note on skin effect.
   4) Draw and describe suspension type insulators along with its advantages.
   5) Explain inductance of single phase two wire line.
   6) A 3 phase, 50 Hz, 66 KV overhead line conductors are placed in horizontal plane as shown in figure. The conductor diameter is 1.25 cm. If the line length is 100 km, calculate :
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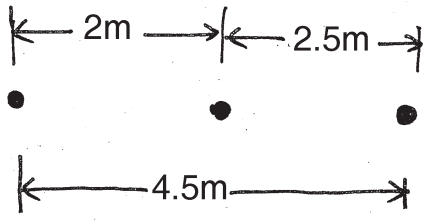
      ii) Charging current per phase.



3. Solve **any two** : **(6×2=12)**
   1) Derive expression of voltage distribution in 3 insulators in a string.
   2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively. Calculate :
      i) The ratio of capacitance between pin and earth to the self-capacitance of each unit.
      ii) The line voltage.
      iii) String efficiency.
   3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical 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-$\prod$ method along with the equivalent circuit and phasor diagram.

2) Draw and describe both types of pressure cables.

3) 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.

4) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.

5) Derive the generalized circuit constants for medium line using nominal T-method.

6) Explain economics of power factor improvement.

5. Solve **any two :** **(6×2=12)**

1) Explain the capacitance of 3-core belted type cables.

2) A 100 km long 3-phase, 50 Hz transmission line has following constants :
Resistance/phase/km = 0.1Ω
Reactance/phase/km = 0.5Ω
Susceptance/phase/km = 10×10^{-6} S
If line supplies load of 20 MW at 0.9 p.f. lagging at 66 KV at the receiving end, calculate by nominal-$\prod$ 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-TC – 494

Seat No.	

Set **P**

T.E. (E&E) (Part – I) (CGPA) Examination, 2018
CONTROL SYSTEMS – I

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Two blocks $G_1(s)$ and $G_2(s)$ can be cascaded to get resultant transfer function as
a) $G_1(s) + G_2(s)$ b) $G_1(s)/G_2(s)$ c) $G_1(s)\,G_2(s)$ d) $1 + G_1(s)\,G_2(s)$

2) As a root moves further away from imaginary axis the stability
a) increase b) decreases c) not affected d) none of these

3) 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

4) _____ has the tendency to oscillate.
a) Open loop control system b) Closed loop control system
c) Both (a) and (b) d) Neither (a) nor (b)

5) When damping factor decreases the per unit overshoot ?
a) increases b) decreases
c) remains unaffected d) none of the above

P.T.O.

6) For a type one system, the steady – state error due to step input is equal to
   a) infinite b) zero c) 0.25 d) 0.5

7) For a system if the initial conditions are zero, it means that the system is
   a) Working with zero reference input
   b) Working but does not store energy
   c) At rest but store energy
   d) At rest and has no energy stored in any part

8) The bode plot is applicable to _____ phase network.
   a) all b) maximum c) minimum d) none of these

9) Addition of zeros in transfer function causes _____ compensation.
   a) lag b) lead c) lag – lead d) none of these

10) 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

11) 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

12) For an n^{th} order system state equations will be
   a) n b) 1 c) $\frac{n}{2}$ d) $\frac{n+1}{2}$

13) 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) $\alpha_1 < \beta_1$

14) The transfer function of a multi-input multi-output system, with the state-space representation of 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) – 1B b) C (sI – A) – 1B + D
   c) (sI – A) – 1B d) (sI – A) – 1B + D

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SLR-TC – 494

Seat No.	

T.E. (E&E) (Part – I) (CGPA) Examination, 2018
CONTROL SYSTEMS – I

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain the classification of control systems.

2) A second order system is given by $C(s)/R(s) = \frac{25}{s^2 + 6s + 25}$. Find its rise time, peak time, peak overshoot and settling time.

3) Explain terminologies used in signal flow graph.

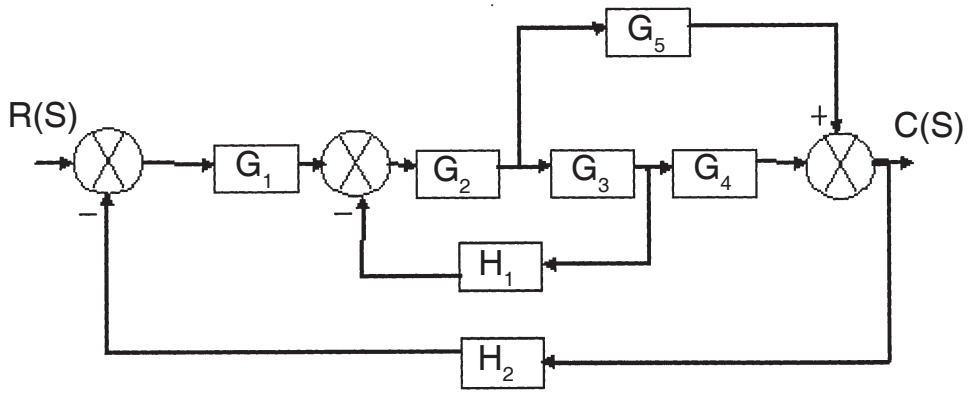
4) What is root locus ? Explain angle condition and magnitude condition.

5) What is the difference between steady state response and transient response of a control system ?

3. Solve **any two** : **(6×2=12)**

1) Explain step response of second order system.

2) Reduce the block diagram using reduction rules and obtain C(s)/R(s).



Set P

3) For a unity feedback system, $G(s) = \dfrac{K}{s(s+1)(s+2)(s+3)}$. Sketch the complete root locus showing all details on it.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Derive transfer function from state model given as below.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

b) Explain PD controller.

c) Explain phase lead compensator.

d) Check the observability of system below

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

e) Explain correlation between time and frequency domain.

f) Define Gain margin and Phase margin.

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

$$G(s)\,H(s) = \frac{50}{s(1+0.25s)(1+0.1s)}$$

b) Sketch the polar plot for G(S) = 1/S (S + 1).

c) Explain programmable logic controller in detail.

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SLR-TC – 494

Seat No.	

Set Q

T.E. (E&E) (Part – I) (CGPA) Examination, 2018
CONTROL SYSTEMS – I

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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*3) **All** questions are **compulsory**.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The bode plot is applicable to _____ phase network.
a) all b) maximum c) minimum d) none of these

2) Addition of zeros in transfer function causes _____ compensation.
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a) stability problems b) multiple input disturbances
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5) For an n^{th} order system state equations will be
a) n b) 1 c) $\frac{n}{2}$ d) $\frac{n+1}{2}$

P.T.O.

6) 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 ?

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7) The transfer function of a multi-input multi-output system, with the state-space representation of 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) – 1B b) C (sI – A) – 1B + D

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8) Two blocks $G_1(s)$ and $G_2(s)$ can be cascaded to get resultant transfer function as

a) $G_1(s) + G_2(s)$ b) $G_1(s)/G_2(s)$ c) $G_1(s)\ G_2(s)$ d) $1 + G_1(s)\ G_2(s)$

9) As a root moves further away from imaginary axis the stability

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10) The initial response when the output is not equal to the input is termed _____ response.

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11) _____ has the tendency to oscillate.

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14) For a system if the initial conditions are zero, it means that the system is

a) Working with zero reference input

b) Working but does not store energy

c) At rest but store energy

d) At rest and has no energy stored in any part

_____

SLR-TC – 494

Seat No.	

T.E. (E&E) (Part – I) (CGPA) Examination, 2018
CONTROL SYSTEMS – I

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
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SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain the classification of control systems.

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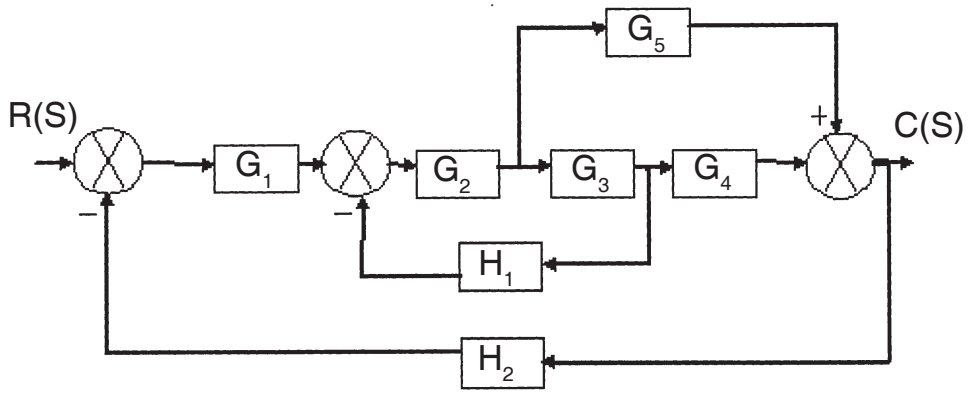
5) What is the difference between steady state response and transient response of a control system ?

3. Solve **any two** : **(6×2=12)**

1) Explain step response of second order system.

2) Reduce the block diagram using reduction rules and obtain C(s)/R(s).



Set Q

3) For a unity feedback system, $G(s) = \dfrac{K}{s(s+1)(s+2)(s+3)}$. Sketch the complete root locus showing all details on it.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Derive transfer function from state model given as below.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

b) Explain PD controller.

c) Explain phase lead compensator.

d) Check the observability of system below

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

e) Explain correlation between time and frequency domain.

f) Define Gain margin and Phase margin.

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

$$G(s)\,H(s) = \frac{50}{s(1+0.25s)(1+0.1s)}$$

b) Sketch the polar plot for G(S) = 1/S (S + 1).

c) Explain programmable logic controller in detail.

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Set Q

SLR-TC – 494

Seat No.	

Set **R**

T.E. (E&E) (Part – I) (CGPA) Examination, 2018
CONTROL SYSTEMS – I

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) When damping factor decreases the per unit overshoot ?
   a) increases b) decreases
   c) remains unaffected d) none of the above

2) For a type one system, the steady – state error due to step input is equal to
   a) infinite b) zero c) 0.25 d) 0.5

3) For a system if the initial conditions are zero, it means that the system is
   a) Working with zero reference input
   b) Working but does not store energy
   c) At rest but store energy
   d) At rest and has no energy stored in any part

4) The bode plot is applicable to _____ phase network.
   a) all b) maximum
   c) minimum d) none of these

P.T.O.

5) Addition of zeros in transfer function causes _____ compensation.
   a) lag b) lead c) lag – lead d) none of these

6) 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

7) 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

8) For an n^{th} order system state equations will be
   a) n b) 1 c) $\frac{n}{2}$ d) $\frac{n+1}{2}$

9) 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) $\alpha_1 < \beta_1$

10) The transfer function of a multi-input multi-output system, with the state-space representation of 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) – 1B b) C (sI – A) – 1B + D
   c) (sI – A) – 1B d) (sI – A) – 1B + D

11) Two blocks $G_1(s)$ and $G_2(s)$ can be cascaded to get resultant transfer function as
   a) $G_1(s) + G_2(s)$ b) $G_1(s)/G_2(s)$ c) $G_1(s)\, G_2(s)$ d) $1 + G_1(s)\, G_2(s)$

12) As a root moves further away from imaginary axis the stability
   a) increase b) decreases c) not affected d) none of these

13) 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

14) _____ has the tendency to oscillate.
   a) Open loop control system b) Closed loop control system
   c) Both (a) and (b) d) Neither (a) nor (b)

_____

SLR-TC – 494

Seat No.	

T.E. (E&E) (Part – I) (CGPA) Examination, 2018
CONTROL SYSTEMS – I

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain the classification of control systems.

2) A second order system is given by $C(s)/R(s) = \frac{25}{s^2 + 6s + 25}$. Find its rise time, peak time, peak overshoot and settling time.

3) Explain terminologies used in signal flow graph.

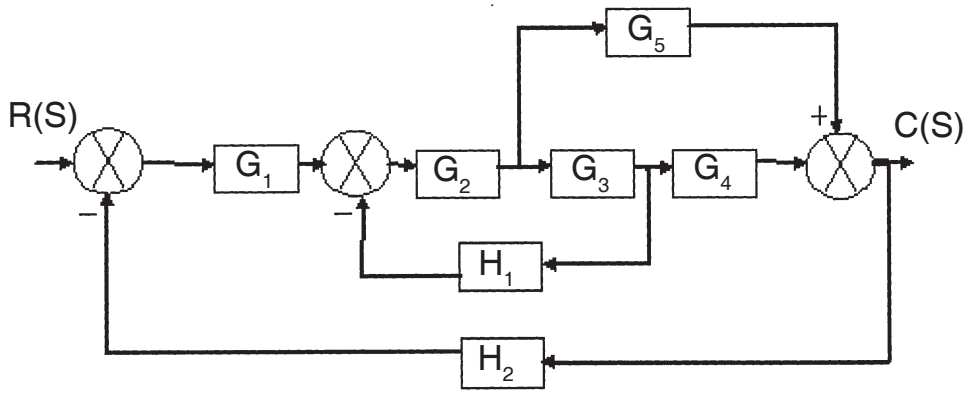
4) What is root locus ? Explain angle condition and magnitude condition.

5) What is the difference between steady state response and transient response of a control system ?

3. Solve **any two** : **(6×2=12)**

1) Explain step response of second order system.

2) Reduce the block diagram using reduction rules and obtain C(s)/R(s).



Set R

3) For a unity feedback system, $G(s) = \dfrac{K}{s(s+1)(s+2)(s+3)}$. Sketch the complete root locus showing all details on it.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Derive transfer function from state model given as below.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

b) Explain PD controller.

c) Explain phase lead compensator.

d) Check the observability of system below

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

e) Explain correlation between time and frequency domain.

f) Define Gain margin and Phase margin.

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

$$G(s)\,H(s) = \frac{50}{s(1+0.25s)(1+0.1s)}$$

b) Sketch the polar plot for G(S) = 1/S (S + 1).

c) Explain programmable logic controller in detail.

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Set R

SLR-TC – 494

Seat No.	

Set S

T.E. (E&E) (Part – I) (CGPA) Examination, 2018
CONTROL SYSTEMS – I

Day and Date : Tuesday, 8-5-2018 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) 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

2) 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

3) For an n^{th} order system state equations will be
   a) n b) 1 c) $\frac{n}{2}$ d) $\frac{n+1}{2}$

4) 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) $\alpha_1 < \beta_1$

5) The transfer function of a multi-input multi-output system, with the state-space representation of 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) – 1B b) C (sI – A) – 1B + D

c) (sI – A) – 1B d) (sI – A) – 1B + D

6) Two blocks $G_1(s)$ and $G_2(s)$ can be cascaded to get resultant transfer function as

a) $G_1(s) + G_2(s)$ b) $G_1(s)/G_2(s)$ c) $G_1(s)\, G_2(s)$ d) $1 + G_1(s)\, G_2(s)$

7) As a root moves further away from imaginary axis the stability

a) increase b) decreases c) not affected d) none of these

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) _____ has the tendency to oscillate.

a) Open loop control system b) Closed loop control system

c) Both (a) and (b) d) Neither (a) nor (b)

10) When damping factor decreases the per unit overshoot ?

a) increases b) decreases

c) remains unaffected d) none of the above

11) For a type one system, the steady – state error due to step input is equal to

a) infinite b) zero c) 0.25 d) 0.5

12) For a system if the initial conditions are zero, it means that the system is

a) Working with zero reference input

b) Working but does not store energy

c) At rest but store energy

d) At rest and has no energy stored in any part

13) The bode plot is applicable to _____ phase network.

a) all b) maximum c) minimum d) none of these

14) Addition of zeros in transfer function causes _____ compensation.

a) lag b) lead c) lag – lead d) none of these

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SLR-TC – 494

Seat No.	

T.E. (E&E) (Part – I) (CGPA) Examination, 2018
CONTROL SYSTEMS – I

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain the classification of control systems.

2) A second order system is given by $C(s)/R(s) = \frac{25}{s^2 + 6s + 25}$. Find its rise time, peak time, peak overshoot and settling time.

3) Explain terminologies used in signal flow graph.

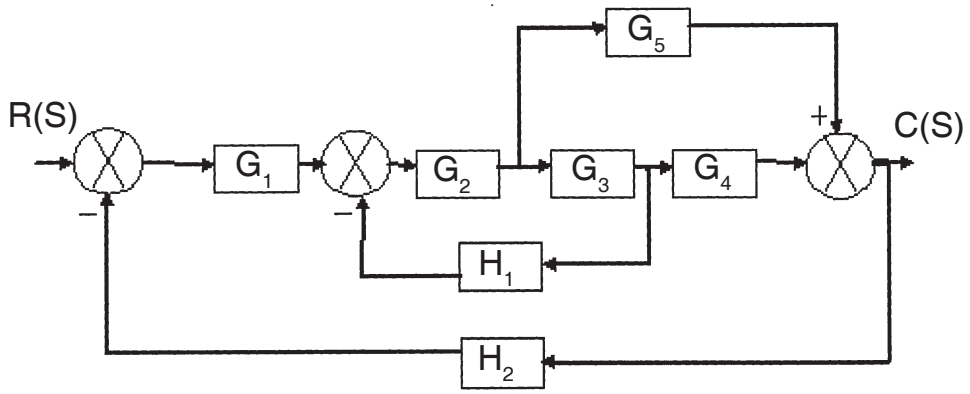
4) What is root locus ? Explain angle condition and magnitude condition.

5) What is the difference between steady state response and transient response of a control system ?

3. Solve **any two** : **(6×2=12)**

1) Explain step response of second order system.

2) Reduce the block diagram using reduction rules and obtain C(s)/R(s).



3) For a unity feedback system, $G(s) = \dfrac{K}{s(s+1)(s+2)(s+3)}$. Sketch the complete root locus showing all details on it.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Derive transfer function from state model given as below.

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

b) Explain PD controller.

c) Explain phase lead compensator.

d) Check the observability of system below

$$\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -0.5 & 0 \\ 0 & -2 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t)$$

$$Y(t) = \begin{bmatrix} 0 & 1 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

e) Explain correlation between time and frequency domain.

f) Define Gain margin and Phase margin.

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

$$G(s)\,H(s) = \frac{50}{s(1+0.25s)(1+0.1s)}$$

b) Sketch the polar plot for G(S) = 1/S (S + 1).

c) Explain programmable logic controller in detail.

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Set S

SLR-TC – 496

Seat No.	

Set **P**

T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018
POWER ELECTRONICS

Day and Date : Monday, 14-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) As the breakdown voltage reached, the DIAC exhibits
   a) Negative resistance characteristics
   b) Goes into avalanche condition
   c) Voltage drop snaps back
   d) All of these

2) The angle at which SCR turns off is called
   a) On angle b) Conduction angle
   c) Firing angle d) Extinction angle

3) For power output higher than 15 kW, the suitable rectifier is
   a) Single phase b) 3-phase
   c) Poly phase d) Both b) and c)

4) IGBT possess
   a) Low input impedance b) High input impedance
   c) High on state resistance d) Second break down problems

5) In phase controlled rectification Power Factor (PF)
   a) Remains unaffected
   b) Improves with increase of firing angle
   c) Deteriorates with increase of α
   d) Is unrelated to α

P.T.O.

6) Which circuit gives inherent freewheeling action ?
   a) Half wave converter
   b) Semi converter
   c) Full converter
   d) None

7) The cycloconverter require natural or forced commutation as under
   a) Natural commutation in both step-up and step down cycloconverter
   b) Forced commutation in both step-up and step-down cycloconverter
   c) Forced commutation in step-up cycloconverter
   d) Forced commutation in step-down cycloconverter

8) If the chopper switching frequency is 200 Hz and Ton time is 2 ms, the duty cycle is
   a) 0.4
   b) 0.8
   c) 0.6
   d) None of these

9) A class D chopper
   a) Can operate in first quadrant only
   b) Can operate in second quadrant only
   c) Can operate in first or fourth quadrant
   d) Can operate in all quadrant

10) In pulse width modulation of chopper
   a) T is kept constant and T_{ON} is varied
   b) T_{ON} is kept constant and T is varied
   c) Both T and T_{ON} is varied
   d) None of these

11) The commutation method, in an inverter is
   a) Line commutation
   b) Forced commutation
   c) Both a) and b)
   d) None of the above

12) For a duty cycle of 40%, the output DC for step down chopper is if input dc is 200 V
   a) 80 V
   b) 800 V
   c) 8 V
   d) 0.8 V

13) Power electronics converters used to
   a) Control the speed
   b) Control the power
   c) Control the current
   d) None

14) The rms value of output voltage in a 1-phase half bridge inverter is
   a) V/2
   b) V
   c) 2 V
   d) V/3

SLR-TC – 496

Seat No.	

T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018
POWER ELECTRONICS

Day and Date : Monday, 14-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   a) Explain the two transistor analogy of SCR. Explain regenerative current process to conduct the SCR.
   b) Explain the working principle of Depletion p-channel MOSFET with V-I and transfer characteristics.
   c) What is meant by commutation ? Explain Class-D commutation with proper wave form.
   d) Write the application of thyristor in SMPS.
   e) Write the comparison between SCR, DIAC and TRIAC.

3. Attempt **any two** questions : **(2×6=12)**
   a) Draw and explain the dynamic turn on and turn off characteristics of SCR.
   b) Explain the two quadrant operation of 1-phase fully controlled bridge rectifier with RL load. Draw the output voltage and current wave form for α = 0 degrees, α = 90 degrees and α = 120 degrees. Derive the V_L and I_L.
   c) The load commutation (class-A) circuitry is initially at relaxed. The thyristors T is turned on at t = 0. Determine i) Conduction time of SCR. ii) Voltage across SCR and capacitor after SCR is turned off by taking L = 5 mH, C = 20μF and input voltage for circuit is 200 V.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   a) Explain principle of operation of Morgan Chopper.
   b) Explain the voltage control and harmonics analysis of inverter.
   c) Explain principle of operation of single phase to single phase cycloconverter with R.

d) A single phase half bridge inverter feeds a resistive load of R = 7.5Ω. The dc voltage of the inverter is given as 220 V. determine

i) RMS value of output voltage.

ii) Output power.

e) Explain the principle of operation of class-D chopper.

5. Attempt **any two** questions : **(2×6=12)**

a) Draw a neat sketch and explain the 180 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 up chopper and derive the expressions for output voltage, current and RMS output voltage.

c) Explain principle of operation of 3 phase to 3 phase 6 pulse cycloconverter with wave forms.

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SLR-TC – 496

Seat No.	

Set **Q**

T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018
POWER ELECTRONICS

Day and Date : Monday, 14-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) If the chopper switching frequency is 200 Hz and Ton time is 2 ms, the duty cycle is
   a) 0.4 b) 0.8 c) 0.6 d) None of these

2) A class D chopper
   a) Can operate in first quadrant only
   b) Can operate in second quadrant only
   c) Can operate in first or fourth quadrant
   d) Can operate in all quadrant

3) In pulse width modulation of chopper
   a) T is kept constant and T_{ON} is varied
   b) T_{ON} is kept constant and T is varied
   c) Both T and T_{ON} is varied
   d) None of these

4) The commutation method, in an inverter is
   a) Line commutation b) Forced commutation
   c) Both a) and b) d) None of the above

5) For a duty cycle of 40%, the output DC for step down chopper is if input dc is 200 V
   a) 80 V b) 800 V
   c) 8 V d) 0.8 V

P.T.O.

6) Power electronics converters used to
   a) Control the speed
   b) Control the power
   c) Control the current
   d) None

7) The rms value of output voltage in a 1-phase half bridge inverter is
   a) V/2
   b) V
   c) 2 V
   d) V/3

8) As the breakdown voltage reached, the DIAC exhibits
   a) Negative resistance characteristics
   b) Goes into avalanche condition
   c) Voltage drop snaps back
   d) All of these

9) The angle at which SCR turns off is called
   a) On angle
   b) Conduction angle
   c) Firing angle
   d) Extinction angle

10) For power output higher than 15 kW, the suitable rectifier is
   a) Single phase
   b) 3-phase
   c) Poly phase
   d) Both b) and c)

11) IGBT possess
   a) Low input impedance
   b) High input impedance
   c) High on state resistance
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12) In phase controlled rectification Power Factor (PF)
   a) Remains unaffected
   b) Improves with increase of firing angle
   c) Deteriorates with increase of α
   d) Is unrelated to α

13) Which circuit gives inherent freewheeling action ?
   a) Half wave converter
   b) Semi converter
   c) Full converter
   d) None

14) The cycloconverter require natural or forced commutation as under
   a) Natural commutation in both step-up and step down cycloconverter
   b) Forced commutation in both step-up and step-down cycloconverter
   c) Forced commutation in step-up cycloconverter
   d) Forced commutation in step-down cycloconverter

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SLR-TC – 496

Seat No.	

T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018
POWER ELECTRONICS

Day and Date : Monday, 14-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   a) Explain the two transistor analogy of SCR. Explain regenerative current process to conduct the SCR.
   b) Explain the working principle of Depletion p-channel MOSFET with V-I and transfer characteristics.
   c) What is meant by commutation ? Explain Class-D commutation with proper wave form.
   d) Write the application of thyristor in SMPS.
   e) Write the comparison between SCR, DIAC and TRIAC.

3. Attempt **any two** questions : **(2×6=12)**
   a) Draw and explain the dynamic turn on and turn off characteristics of SCR.
   b) Explain the two quadrant operation of 1-phase fully controlled bridge rectifier with RL load. Draw the output voltage and current wave form for α = 0 degrees, α = 90 degrees and α = 120 degrees. Derive the V_L and I_L.
   c) The load commutation (class-A) circuitry is initially at relaxed. The thyristors T is turned on at t = 0. Determine i) Conduction time of SCR. ii) Voltage across SCR and capacitor after SCR is turned off by taking L = 5 mH, C = 20μF and input voltage for circuit is 200 V.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   a) Explain principle of operation of Morgan Chopper.
   b) Explain the voltage control and harmonics analysis of inverter.
   c) Explain principle of operation of single phase to single phase cycloconverter with R.

Set Q

d) A single phase half bridge inverter feeds a resistive load of R = 7.5Ω. The dc voltage of the inverter is given as 220 V. determine

i) RMS value of output voltage.

ii) Output power.

e) Explain the principle of operation of class-D chopper.

5. Attempt **any two** questions : **(2×6=12)**

a) Draw a neat sketch and explain the 180 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 up chopper and derive the expressions for output voltage, current and RMS output voltage.

c) Explain principle of operation of 3 phase to 3 phase 6 pulse cycloconverter with wave forms.

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SLR-TC – 496

Seat No.	

Set **R**

T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018
POWER ELECTRONICS

Day and Date : Monday, 14-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In phase controlled rectification Power Factor (PF)
   a) Remains unaffected
   b) Improves with increase of firing angle
   c) Deteriorates with increase of α
   d) Is unrelated to α

2) Which circuit gives inherent freewheeling action ?
   a) Half wave converter b) Semi converter
   c) Full converter d) None

3) The cycloconverter require natural or forced commutation as under
   a) Natural commutation in both step-up and step down cycloconverter
   b) Forced commutation in both step-up and step-down cycloconverter
   c) Forced commutation in step-up cycloconverter
   d) Forced commutation in step-down cycloconverter

4) If the chopper switching frequency is 200 Hz and Ton time is 2 ms, the duty cycle is
   a) 0.4 b) 0.8
   c) 0.6 d) None of these

5) A class D chopper
   a) Can operate in first quadrant only
   b) Can operate in second quadrant only
   c) Can operate in first or fourth quadrant
   d) Can operate in all quadrant

6) In pulse width modulation of chopper
   a) T is kept constant and T_{ON} is varied
   b) T_{ON} is kept constant and T is varied
   c) Both T and T_{ON} is varied
   d) None of these

7) The commutation method, in an inverter is
   a) Line commutation b) Forced commutation
   c) Both a) and b) d) None of the above

8) For a duty cycle of 40%, the output DC for step down chopper is if input dc is 200 V
   a) 80 V b) 800 V c) 8 V d) 0.8 V

9) Power electronics converters used to
   a) Control the speed b) Control the power
   c) Control the current d) None

10) The rms value of output voltage in a 1-phase half bridge inverter is
   a) V/2 b) V c) 2 V d) V/3

11) As the breakdown voltage reached, the DIAC exhibits
   a) Negative resistance characteristics
   b) Goes into avalanche condition
   c) Voltage drop snaps back
   d) All of these

12) The angle at which SCR turns off is called
   a) On angle b) Conduction angle
   c) Firing angle d) Extinction angle

13) For power output higher than 15 kW, the suitable rectifier is
   a) Single phase b) 3-phase
   c) Poly phase d) Both b) and c)

14) IGBT possess
   a) Low input impedance b) High input impedance
   c) High on state resistance d) Second break down problems

SLR-TC – 496

Seat No.	

T.E. (Part – II) Electrical and Electronics Engg. (CGPA) Examination, 2018
POWER ELECTRONICS

Day and Date : Monday, 14-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   a) Explain the two transistor analogy of SCR. Explain regenerative current process to conduct the SCR.
   b) Explain the working principle of Depletion p-channel MOSFET with V-I and transfer characteristics.
   c) What is meant by commutation ? Explain Class-D commutation with proper wave form.
   d) Write the application of thyristor in SMPS.
   e) Write the comparison between SCR, DIAC and TRIAC.

3. Attempt **any two** questions : **(2×6=12)**
   a) Draw and explain the dynamic turn on and turn off characteristics of SCR.
   b) Explain the two quadrant operation of 1-phase fully controlled bridge rectifier with RL load. Draw the output voltage and current wave form for α = 0 degrees, α = 90 degrees and α = 120 degrees. Derive the V_L and I_L.
   c) The load commutation (class-A) circuitry is initially at relaxed. The thyristors T is turned on at t = 0. Determine i) Conduction time of SCR. ii) Voltage across SCR and capacitor after SCR is turned off by taking L = 5 mH, C = 20μF and input voltage for circuit is 200 V.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   a) Explain principle of operation of Morgan Chopper.
   b) Explain the voltage control and harmonics analysis of inverter.
   c) Explain principle of operation of single phase to single phase cycloconverter with R.

d) A single phase half bridge inverter feeds a resistive load of R = 7.5Ω. The dc voltage of the inverter is given as 220 V. determine

i) RMS value of output voltage.

ii) Output power.

e) Explain the principle of operation of class-D chopper.

5. Attempt **any two** questions : **(2×6=12)**

a) Draw a neat sketch and explain the 180 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 up chopper and derive the expressions for output voltage, current and RMS output voltage.

c) Explain principle of operation of 3 phase to 3 phase 6 pulse cycloconverter with wave forms.

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SLR-TC – 496

Seat No.	

Set **S**

T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018
POWER ELECTRONICS

Day and Date : Monday, 14-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In pulse width modulation of chopper
   a) T is kept constant and T_{ON} is varied
   b) T_{ON} is kept constant and T is varied
   c) Both T and T_{ON} is varied
   d) None of these

2) The commutation method, in an inverter is
   a) Line commutation
   b) Forced commutation
   c) Both a) and b)
   d) None of the above

3) For a duty cycle of 40%, the output DC for step down chopper is if input dc is 200 V
   a) 80 V b) 800 V
   c) 8 V d) 0.8 V

4) Power electronics converters used to
   a) Control the speed b) Control the power
   c) Control the current d) None

5) The rms value of output voltage in a 1-phase half bridge inverter is
   a) V/2 b) V
   c) 2 V d) V/3

P.T.O.

6) As the breakdown voltage reached, the DIAC exhibits
   a) Negative resistance characteristics
   b) Goes into avalanche condition
   c) Voltage drop snaps back
   d) All of these

7) The angle at which SCR turns off is called
   a) On angle b) Conduction angle
   c) Firing angle d) Extinction angle

8) For power output higher than 15 kW, the suitable rectifier is
   a) Single phase b) 3-phase
   c) Poly phase d) Both b) and c)

9) IGBT possess
   a) Low input impedance b) High input impedance
   c) High on state resistance d) Second break down problems

10) In phase controlled rectification Power Factor (PF)
   a) Remains unaffected
   b) Improves with increase of firing angle
   c) Deteriorates with increase of α
   d) Is unrelated to α

11) Which circuit gives inherent freewheeling action ?
   a) Half wave converter b) Semi converter
   c) Full converter d) None

12) The cycloconverter require natural or forced commutation as under
   a) Natural commutation in both step-up and step down cycloconverter
   b) Forced commutation in both step-up and step-down cycloconverter
   c) Forced commutation in step-up cycloconverter
   d) Forced commutation in step-down cycloconverter

13) If the chopper switching frequency is 200 Hz and Ton time is 2 ms, the duty cycle is
   a) 0.4 b) 0.8 c) 0.6 d) None of these

14) A class D chopper
   a) Can operate in first quadrant only
   b) Can operate in second quadrant only
   c) Can operate in first or fourth quadrant
   d) Can operate in all quadrant

SLR-TC – 496

Seat No.	

T.E. (Part – II) (Electrical and Electronics Engg.) (CGPA) Examination, 2018
POWER ELECTRONICS

Day and Date : Monday, 14-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×4=16)**
   a) Explain the two transistor analogy of SCR. Explain regenerative current process to conduct the SCR.
   b) Explain the working principle of Depletion p-channel MOSFET with V-I and transfer characteristics.
   c) What is meant by commutation ? Explain Class-D commutation with proper wave form.
   d) Write the application of thyristor in SMPS.
   e) Write the comparison between SCR, DIAC and TRIAC.

3. Attempt **any two** questions : **(2×6=12)**
   a) Draw and explain the dynamic turn on and turn off characteristics of SCR.
   b) Explain the two quadrant operation of 1-phase fully controlled bridge rectifier with RL load. Draw the output voltage and current wave form for α = 0 degrees, α = 90 degrees and α = 120 degrees. Derive the V_L and I_L.
   c) The load commutation (class-A) circuitry is initially at relaxed. The thyristors T is turned on at t = 0. Determine i) Conduction time of SCR. ii) Voltage across SCR and capacitor after SCR is turned off by taking L = 5 mH, C = 20μF and input voltage for circuit is 200 V.

SECTION – II

4. Attempt **any four** questions : **(4×4=16)**
   a) Explain principle of operation of Morgan Chopper.
   b) Explain the voltage control and harmonics analysis of inverter.
   c) Explain principle of operation of single phase to single phase cycloconverter with R.

d) A single phase half bridge inverter feeds a resistive load of R = 7.5Ω. The dc voltage of the inverter is given as 220 V. determine

i) RMS value of output voltage.

ii) Output power.

e) Explain the principle of operation of class-D chopper.

5. Attempt **any two** questions : **(2×6=12)**

a) Draw a neat sketch and explain the 180 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 up chopper and derive the expressions for output voltage, current and RMS output voltage.

c) Explain principle of operation of 3 phase to 3 phase 6 pulse cycloconverter with wave forms.

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SLR-TC – 497

Seat No.	

Set P

T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 16-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) FM produced by PM is called
a) FM b) PM c) Direct FM d) Indirect FM

2) An impulse function consists of
a) entire frequency range with same relative phase
b) infinite bandwidth with linear phase variation
c) pure DC
d) large DC along with weak harmonics

3) A positive RF peak of an AM voltage rise to maximum value of 12 V and drop to a minimum value 4 V. The modulation index assuming single tone modulation is
a) 3 b) 1/3 c) $1/4$ d) $1/2$

4) A DSB-SC signal can be demodulated using
a) low pass filter b) a synchronous detector
c) a phase shift discriminator d) an envelope detector

P.T.O.

5) The modulating frequency in FM is increased from 10 KHz to 20 KHz. The bandwidth is

a) doubled b) halved

c) increased by 20 KHz d) increased tremendously

6) The output V_R of the ratio detector with the output of V_F of Foster-Seeley discriminator as follows

a) $V_F = V_R$ b) $V_F < V_R$ c) $V_F = 0.51V_R$ d) $V_F = 2V_R$

7) Base band signal is

a) Information signal b) Carrier signal

c) High frequency signal d) Band pass signal

8) Companding is used in PCM to

a) reduce bandwidth b) reduce power

c) increase S/N ratio d) get almost uniform S/N ratio

9) The standard data rate PCM voice channel is

a) 8kbps b) 8bps c) 16bps d) 64kbps

10) The coding efficiency is given by

a) 1 – Redundancy b) 1 + Redundancy

c) 1/ Redundancy d) None

11) Which one is second generation of mobile communication system ?

a) AMPS b) IMT-2000 c) GSM d) None

12) State True or False : “A code with hamming distance 2 is not capable of error detection”.

a) True b) False

13) The probability density function of a random variable X is ae^{-bx} u(x). Then

a) a and b can be arbitrary b) a = b/2

c) a = b d) a = 2b

14) The audio frequency range is

a) 10 Hz to 1 KHz b) 80 MHz to 108 MHz

c) 20 Hz to 20 KHz d) 1 KHz to 1 MHz

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SLR-TC – 497

Seat No.	

T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 16-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**

1) Define the term Autocorrelation and explain significance of correlation coefficient.

2) Explain with block diagram phase shift method of SSB generation. State advantages and disadvantages.

3) Distinguish between wide band and narrow band FM.

4) Explain preemphasis and deemphasis in FM broadcasting.

5) Show that during maximum modulation only 33.33 % of total power is used in AM for information transmission.

3. Solve **any two** of the following : **(6×2=12)**

1) A 75 MHz carrier signal having amplitude of 50 V is modulated by 3 KHz audio signal having amplitude 20 V.

a) Determine modulation index and percentage modulation.

b) What frequencies are expected in spectrum of modulated wave ?

c) Write the equation of modulating, carrier and modulated signal in terms of LSB and USB.

2) Draw and explain slope detector in detail. Discuss its advantages and drawbacks.

3) What is heterodyne principle ? With the block diagram explain super heterodyne receiver.

SECTION – II

4. Solve **any four** of the following : **(4×4=16)**

   1) State and explain sampling theorem.

   2) How correlation is exploited in delta modulation ? Draw and explain delta modulation.

   3) What are the types of random variables ? Explain with examples.

   4) What is linear block coding ? How it is different from systematic linear block code ?

   5) Explain the Frequency reuse concept.

5. Solve **any two** of the following : **(2×6=12)**

   1) Explain FDMA, TDMA and CDMA in short.

   2) What are the limitations of delta modulation ? Draw and explain block diagram of Adaptive delta modulation.

   3) What is M-ary communication ? Explain in detail.

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SLR-TC – 497

Seat No.	

Set Q

T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 16-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Companding is used in PCM to
   a) reduce bandwidth b) reduce power
   c) increase S/N ratio d) get almost uniform S/N ratio

2) The standard data rate PCM voice channel is
   a) 8kbps b) 8bps c) 16bps d) 64kbps

3) The coding efficiency is given by
   a) 1 – Redundancy b) 1 + Redundancy
   c) 1/ Redundancy d) None

4) Which one is second generation of mobile communication system ?
   a) AMPS b) IMT-2000 c) GSM d) None

5) State True or False : "A code with hamming distance 2 is not capable of error detection".
   a) True b) False

6) The probability density function of a random variable X is ae^{-bx} u(x). Then
   a) a and b can be arbitrary b) a = b/2
   c) a = b d) a = 2b

P.T.O.

7) The audio frequency range is
   a) 10 Hz to 1 KHz
   b) 80 MHz to 108 MHz
   c) 20 Hz to 20 KHz
   d) 1 KHz to 1 MHz

8) FM produced by PM is called
   a) FM b) PM c) Direct FM d) Indirect FM

9) An impulse function consists of
   a) entire frequency range with same relative phase
   b) infinite bandwidth with linear phase variation
   c) pure DC
   d) large DC along with weak harmonics

10) A positive RF peak of an AM voltage rise to maximum value of 12 V and drop to a minimum value 4 V. The modulation index assuming single tone modulation is
   a) 3 b) 1/3 c) $\frac{1}{4}$ d) $\frac{1}{2}$

11) A DSB-SC signal can be demodulated using
   a) low pass filter
   b) a synchronous detector
   c) a phase shift discriminator
   d) an envelope detector

12) The modulating frequency in FM is increased from 10 KHz to 20 KHz. The bandwidth is
   a) doubled
   b) halved
   c) increased by 20 KHz
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13) The output V_R of the ratio detector with the output of V_F of Foster-Seeley discriminator as follows
   a) $V_F = V_R$ b) $V_F < V_R$ c) $V_F = 0.51V_R$ d) $V_F = 2V_R$

14) Base band signal is
   a) Information signal
   b) Carrier signal
   c) High frequency signal
   d) Band pass signal

SLR-TC – 497

Seat No.	

T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 16-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**

1) Define the term Autocorrelation and explain significance of correlation coefficient.

2) Explain with block diagram phase shift method of SSB generation. State advantages and disadvantages.

3) Distinguish between wide band and narrow band FM.

4) Explain preemphasis and deemphasis in FM broadcasting.

5) Show that during maximum modulation only 33.33 % of total power is used in AM for information transmission.

3. Solve **any two** of the following : **(6×2=12)**

1) A 75 MHz carrier signal having amplitude of 50 V is modulated by 3 KHz audio signal having amplitude 20 V.

a) Determine modulation index and percentage modulation.

b) What frequencies are expected in spectrum of modulated wave ?

c) Write the equation of modulating, carrier and modulated signal in terms of LSB and USB.

2) Draw and explain slope detector in detail. Discuss its advantages and drawbacks.

3) What is heterodyne principle ? With the block diagram explain super heterodyne receiver.

SECTION – II

4. Solve **any four** of the following : **(4×4=16)**

   1) State and explain sampling theorem.

   2) How correlation is exploited in delta modulation ? Draw and explain delta modulation.

   3) What are the types of random variables ? Explain with examples.

   4) What is linear block coding ? How it is different from systematic linear block code ?

   5) Explain the Frequency reuse concept.

5. Solve **any two** of the following : **(2×6=12)**

   1) Explain FDMA, TDMA and CDMA in short.

   2) What are the limitations of delta modulation ? Draw and explain block diagram of Adaptive delta modulation.

   3) What is M-ary communication ? Explain in detail.

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SLR-TC – 497

Seat No.	

Set R

T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 16-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The modulating frequency in FM is increased from 10 KHz to 20 KHz. The bandwidth is
   a) doubled b) halved
   c) increased by 20 KHz d) increased tremendously

2) The output V_R of the ratio detector with the output of V_F of Foster-Seeley discriminator as follows
   a) $V_F = V_R$ b) $V_F < V_R$ c) $V_F = 0.51V_R$ d) $V_F = 2V_R$

3) Base band signal is
   a) Information signal b) Carrier signal
   c) High frequency signal d) Band pass signal

4) Companding is used in PCM to
   a) reduce bandwidth b) reduce power
   c) increase S/N ratio d) get almost uniform S/N ratio

5) The standard data rate PCM voice channel is
   a) 8kbps b) 8bps c) 16bps d) 64kbps

P.T.O.

6) The coding efficiency is given by
   a) 1 – Redundancy
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   c) 1/ Redundancy
   d) None

7) Which one is second generation of mobile communication system ?
   a) AMPS
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   c) GSM
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8) State True or False : "A code with hamming distance 2 is not capable of error detection".
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9) The probability density function of a random variable X is ae^{-bx} u(x). Then
   a) a and b can be arbitrary
   b) a = b/2
   c) a = b
   d) a = 2b

10) The audio frequency range is
   a) 10 Hz to 1 KHz
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11) FM produced by PM is called
   a) FM
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   c) Direct FM
   d) Indirect FM

12) An impulse function consists of
   a) entire frequency range with same relative phase
   b) infinite bandwidth with linear phase variation
   c) pure DC
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13) A positive RF peak of an AM voltage rise to maximum value of 12 V and drop to a minimum value 4 V. The modulation index assuming single tone modulation is
   a) 3
   b) 1/3
   c) $\frac{1}{4}$
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14) A DSB-SC signal can be demodulated using
   a) low pass filter
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SLR-TC – 497

Seat No.	

T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 16-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
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SECTION – I

2. Solve **any four** of the following : **(4×4=16)**

1) Define the term Autocorrelation and explain significance of correlation coefficient.

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c) Write the equation of modulating, carrier and modulated signal in terms of LSB and USB.

2) Draw and explain slope detector in detail. Discuss its advantages and drawbacks.

3) What is heterodyne principle ? With the block diagram explain super heterodyne receiver.

SECTION – II

4. Solve **any four** of the following : **(4×4=16)**

   1) State and explain sampling theorem.

   2) How correlation is exploited in delta modulation ? Draw and explain delta modulation.

   3) What are the types of random variables ? Explain with examples.

   4) What is linear block coding ? How it is different from systematic linear block code ?

   5) Explain the Frequency reuse concept.

5. Solve **any two** of the following : **(2×6=12)**

   1) Explain FDMA, TDMA and CDMA in short.

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SLR-TC – 497

Seat No.	

Set S

T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 16-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

Duration : 30 Minutes Marks : 14

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

1) The coding efficiency is given by
   a) 1 – Redundancy b) 1 + Redundancy
   c) 1/ Redundancy d) None

2) Which one is second generation of mobile communication system ?
   a) AMPS b) IMT-2000 c) GSM d) None

3) State True or False : "A code with hamming distance 2 is not capable of error detection".
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4) The probability density function of a random variable X is ae^{-bx} u(x). Then
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5) The audio frequency range is
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P.T.O.

6) FM produced by PM is called

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7) An impulse function consists of

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c) increase S/N ratio d) get almost uniform S/N ratio

14) The standard data rate PCM voice channel is

a) 8kbps b) 8bps c) 16bps d) 64kbps

———————

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Seat No.	

T.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2018
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 16-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
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*3) Figures to **right** indicate **full** marks.*

SECTION – I

2. Solve **any four** of the following : **(4×4=16)**

1) Define the term Autocorrelation and explain significance of correlation coefficient.

2) Explain with block diagram phase shift method of SSB generation. State advantages and disadvantages.

3) Distinguish between wide band and narrow band FM.

4) Explain preemphasis and deemphasis in FM broadcasting.

5) Show that during maximum modulation only 33.33 % of total power is used in AM for information transmission.

3. Solve **any two** of the following : **(6×2=12)**

1) A 75 MHz carrier signal having amplitude of 50 V is modulated by 3 KHz audio signal having amplitude 20 V.

a) Determine modulation index and percentage modulation.

b) What frequencies are expected in spectrum of modulated wave ?

c) Write the equation of modulating, carrier and modulated signal in terms of LSB and USB.

2) Draw and explain slope detector in detail. Discuss its advantages and drawbacks.

3) What is heterodyne principle ? With the block diagram explain super heterodyne receiver.

SECTION – II

4. Solve **any four** of the following : **(4×4=16)**

   1) State and explain sampling theorem.

   2) How correlation is exploited in delta modulation ? Draw and explain delta modulation.

   3) What are the types of random variables ? Explain with examples.

   4) What is linear block coding ? How it is different from systematic linear block code ?

   5) Explain the Frequency reuse concept.

5. Solve **any two** of the following : **(2×6=12)**

   1) Explain FDMA, TDMA and CDMA in short.

   2) What are the limitations of delta modulation ? Draw and explain block diagram of Adaptive delta modulation.

   3) What is M-ary communication ? Explain in detail.

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Seat No.	

SLR-TC – 498

Set P

T.E. (E & E) (Part – II) (CGPA) Examination, 2018
POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The angle δ in the swing equation of a synchronous generator is the _____
   a) Angle between stator voltage and current
   b) Angular displacement of the rotor w.r.t. stator
   c) Angular displacement of the stator mmf w.r.t. a synchronously rotating axis
   d) Angular displacement of an axis fixed to the rotor w.r.t. a synchronously rotating axis

2) In _____ method of load flow, convergence is dependent on the choice of slack bus.
   a) G-S b) N-R c) FD d) All

3) $I\, d^2\delta/dt^2$ = _____
   a) Rotor momentum b) Accelerating power
   c) Inertia constant d) Excitation of generator

4) If the new base MVA is twice the old base MVA, then the new p.u. impedance will be _____ times old p.u. impedance.
   a) Four b) Half c) Two d) Three

P.T.O.

5) The power delivered by a synchronous generator to an infinite bus is given by _____

a) $P = \frac{|V_t||E_f|}{R_a}\sin\delta$ b) $P = \frac{|V_t||E_f|^2}{X_s}\sin\delta$

c) $P = \frac{|V_t||E_f|}{X_s}\sin\delta$ d) $P = \frac{|V_t||E_f|}{X_s}\cos\delta$

6) Normally Z_{bus} matrix is a

a) Null matrix b) Sparse matrix c) Full matrix d) Unity matrix

7) Load flow study is carried out for

a) Load frequency control b) Stability studies

c) System planning d) Fault calculations

8) At slack bus, which one of the following combinations of variables is specified ?

a) $|V|, \delta$ b) P, Q c) P,|V| d) Q, |V|

9) For a load flow solution, the quantities normally specified at a voltage controlled bus are _____

a) P and Q b) P and |V| c) Q and |V| d) P and δ

10) For stability reasons, the transmission line is operated with power angle in the range _____

a) 10 to 25 degree b) 30 to 45 degree

c) 60 to 75 degree d) 65 to 90 degree

11) Which one of the following is correct ?

a) $X''_d = X'_d = X_d$ b) $X''_d < X'_d < X_d$

c) $X''_d = \frac{X_d}{2}$ d) $X'_d = \frac{X_d}{2}$

12) In case of balanced three phase system, negative and zero sequence currents are _____

a) Absent b) Equal c) Infinite d) Present

13) Fault level means

a) Voltage at the point of fault b) Fault power factor

c) Fault current d) Fault MVA

14) The usual value of δ is about

a) 30 b) 45 c) 60 d) 90

_____

SLR-TC – 498

Seat No.	

T.E. (E & E) (Part – II) (CGPA) Examination, 2018
POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

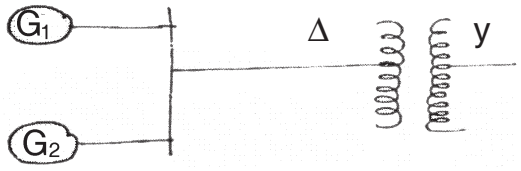
2. Solve **any four** questions : **(4×4=16)**

a) State and derive the equal area criterion of stability.

b) Three generators are rated as G1 : 100 MVA, 33 KV, Xgl = 0.1 pu., G2 : 150 MVA , 32 KV, Xg2 = 0.08 pu and G3 : 110 MVA, 30 KV, Xg3 = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.

c) Assuming 25 MVA as base MVA, calculate the through impedance between the generator and output terminal of the transformer for the system shown below :
The specifications of the components are given below :

Generator G_1	**Generator G_2**	**Transformer**
30 MVA	25 MVA	60 MVA
11 KV	11 KV	11 KVΔ / 66 KV
$X'' = 0.20$ p.u.	$X'' = 0.25$ p.u.	X = 0.10 p.u.



d) Discuss various types of buses and explain their significance in detail.

e) Define per unit system. What are the advantages of using per unit system ?

f) 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 ?

Set P

3. Solve following : **(2×6=12)**

a) 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.

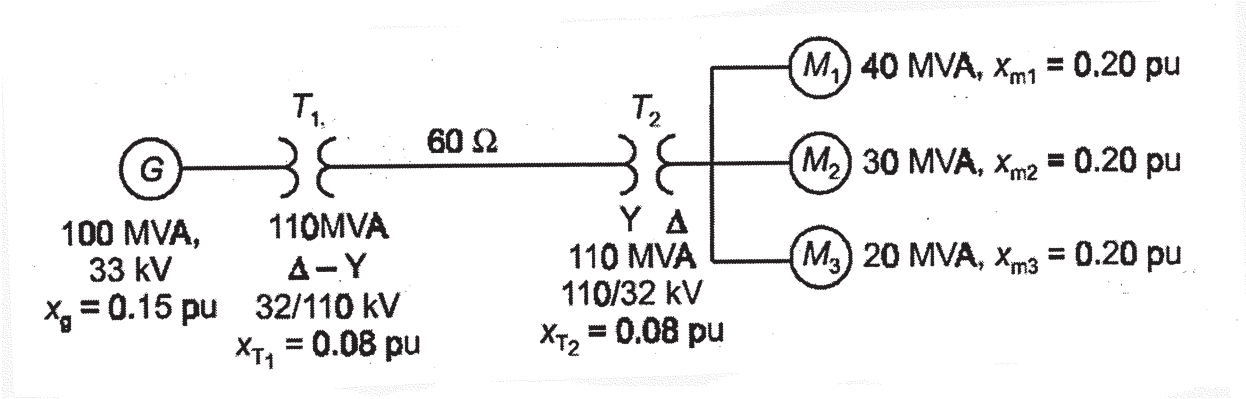
Bus Code i	Assumed Bus Voltage	Generation MW	Generation MVAr	Load MW	Load MVAr
1 (slack bus)	1.05 + j 0.0	–	–	0	0
2	1 + j 0.0	50	30	305.6	140.2
3	1 + j 0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus Code i – k	Impedance Z_{ik}
1 – 2	0.02 + j 0.04
1 – 3	0.01 + j 0.03
2 – 3	0.0125 + j 0.025

OR

a) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



b) Explain the Newton-Raphson method for solution of non-linear algebraic equations.

SECTION – II

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

a) Describe the transients occurring in a transmission line on occurrence of a short circuit.

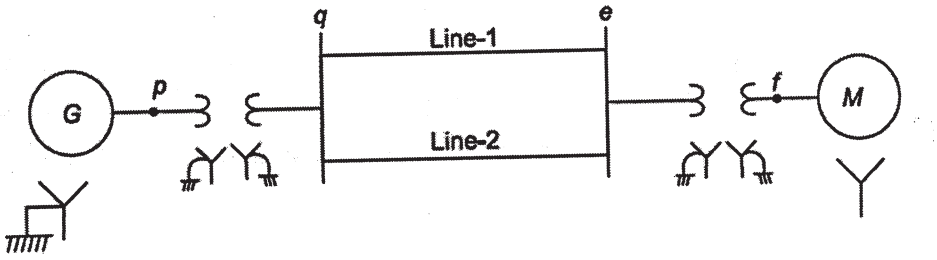
b) Explain different faults taking place in a power system.

c) The zero and positive sequence components of red phase are $E_{R0} = 0.5 - j0.866$ v; $E_{R1} = 2 + j0$ if the phase voltage $E_R = 3 + j0$ find the negative phase sequence component of red phase and voltages E_Y and E_B.

d) Derive an expression for symmetrical components in terms of phase components.

e) For the power system shown below draw zero sequence network :

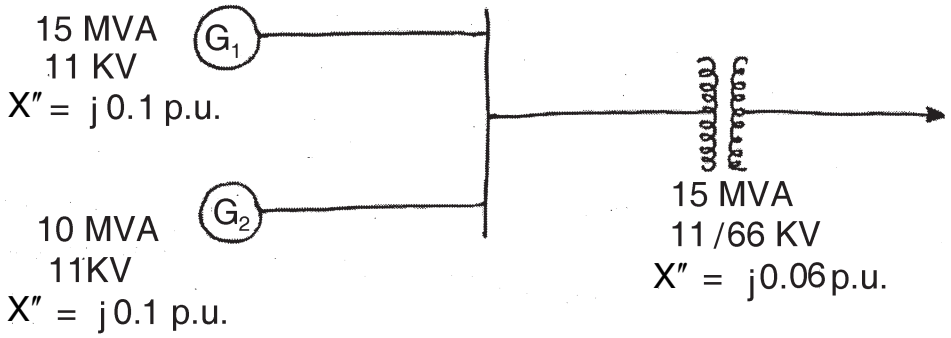
G: $x_{g0} = 0.05$ pu
M: $x_{m0} = 0.03$ pu
T_1: $x_{T1} = 0.12$ pu
T_2: $x_{T2} = 0.10$ pu
Line-1: $x_{L10} = 0.70$ pu
Line-2: $x_{L20} = 0.70$ pu



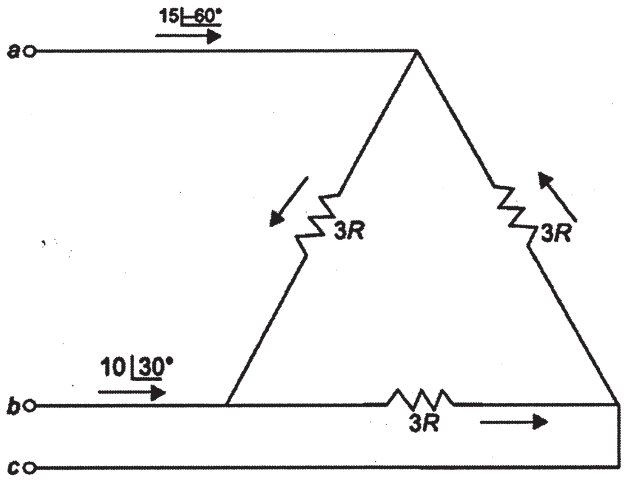
f) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.

5. Solve **any two** questions : **(2×6=12)**

a) Two generators G_1 and G_2 are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high voltage side of the transformer.



b) A delta connected resistive load is connected across a balanced 3 phase supply. Find the symmetrical components of line currents and delta currents.



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. for L – G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.

Seat No.	

SLR-TC – 498

Set **Q**

T.E. (E & E) (Part – II) (CGPA) Examination, 2018
POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) At slack bus, which one of the following combinations of variables is specified ?
a) $|V|, \delta$ b) P, Q c) P,$|V|$ d) Q, $|V|$

2) For a load flow solution, the quantities normally specified at a voltage controlled bus are _____
a) P and Q b) P and $|V|$ c) Q and $|V|$ d) P and δ

3) For stability reasons, the transmission line is operated with power angle in the range _____
a) 10 to 25 degree b) 30 to 45 degree
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4) Which one of the following is correct ?
a) $X''_d = X'_d = X_d$ b) $X''_d < X'_d < X_d$
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5) In case of balanced three phase system, negative and zero sequence currents are _____
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12) The power delivered by a synchronous generator to an infinite bus is given by _____
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13) Normally Z_{bus} matrix is a
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_____

SLR-TC – 498

Seat No.	

T.E. (E & E) (Part – II) (CGPA) Examination, 2018
POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

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

a) State and derive the equal area criterion of stability.

b) Three generators are rated as G1 : 100 MVA, 33 KV, Xgl = 0.1 pu., G2 : 150 MVA , 32 KV, Xg2 = 0.08 pu and G3 : 110 MVA, 30 KV, Xg3 = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.

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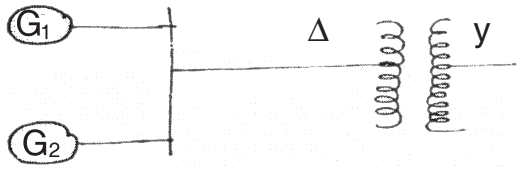

d) Discuss various types of buses and explain their significance in detail.

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f) A 60 Hz, 4 pole turbo generator rated 100 MVA, 13.8 KV has a inertia constant of 10 MJ/MVA. Determine :
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Set Q

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Base MVA = 100

Bus Code i – k	Impedance Z_{ik}
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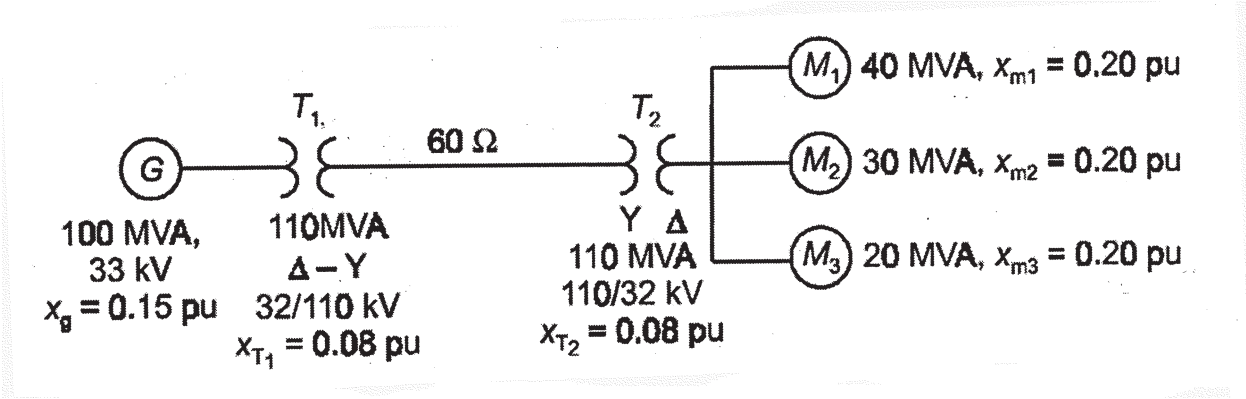
a) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



b) Explain the Newton-Raphson method for solution of non-linear algebraic equations.

SECTION – II

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

a) Describe the transients occurring in a transmission line on occurrence of a short circuit.

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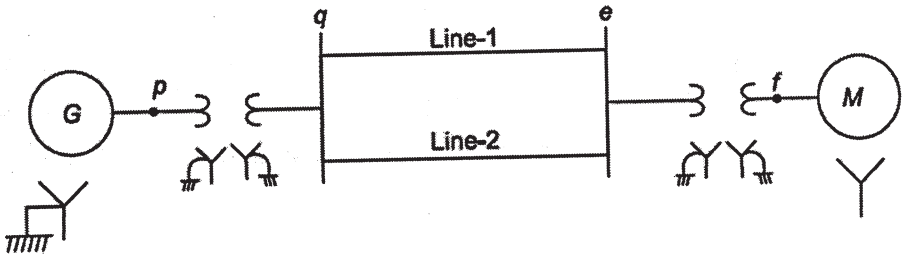
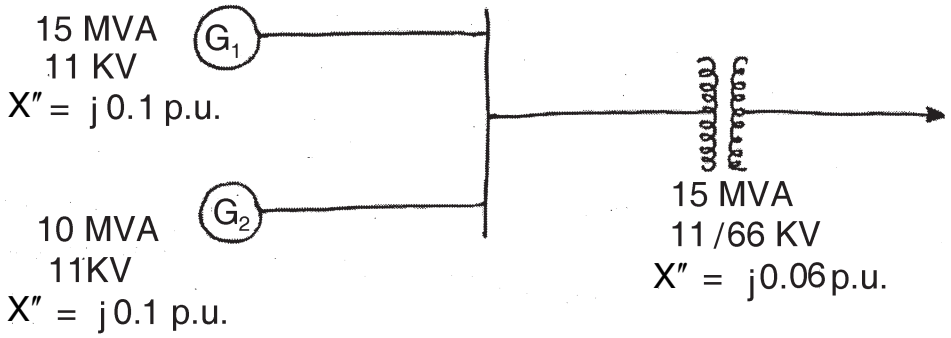


f) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.

5. Solve **any two** questions : **(2×6=12)**

a) Two generators G_1 and G_2 are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high voltage side of the transformer.



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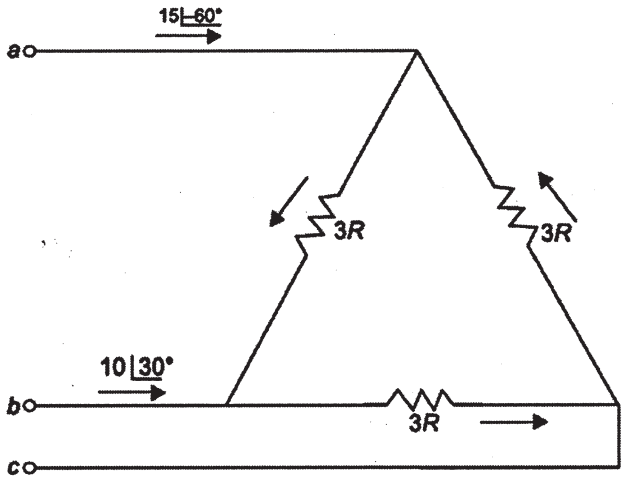

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iii) 4130 Amp. for L – G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.

Seat No.	

SLR-TC – 498

Set **R**

T.E. (E & E) (Part – II) (CGPA) Examination, 2018
POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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2) Normally Z_{bus} matrix is a

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8) In case of balanced three phase system, negative and zero sequence currents are _____
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_____

SLR-TC – 498

Seat No.	

T.E. (E & E) (Part – II) (CGPA) Examination, 2018
POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Marks : 56
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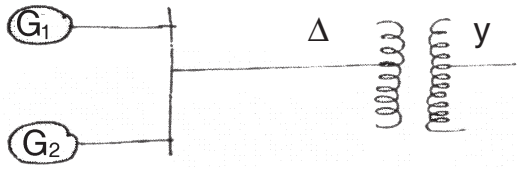

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Set R

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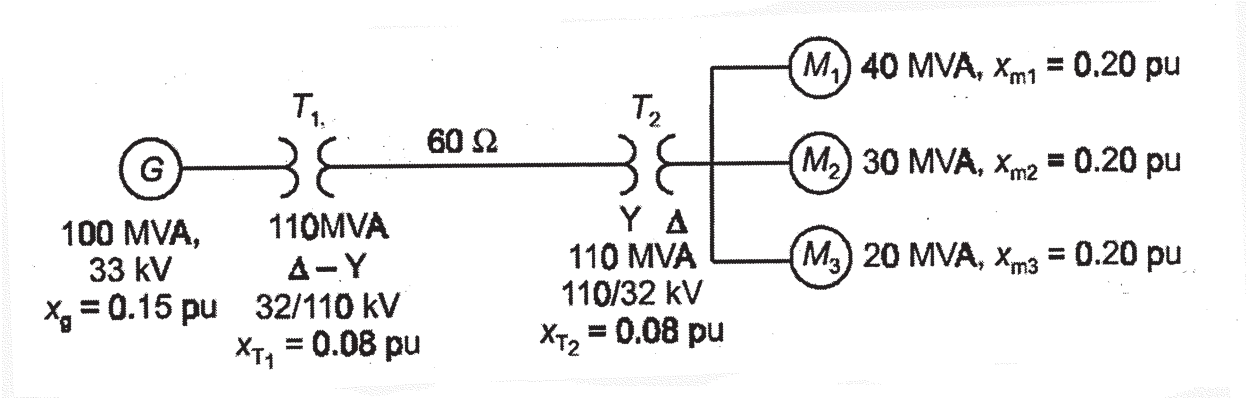
OR

a) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



b) Explain the Newton-Raphson method for solution of non-linear algebraic equations.

SECTION – II

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

a) Describe the transients occurring in a transmission line on occurrence of a short circuit.

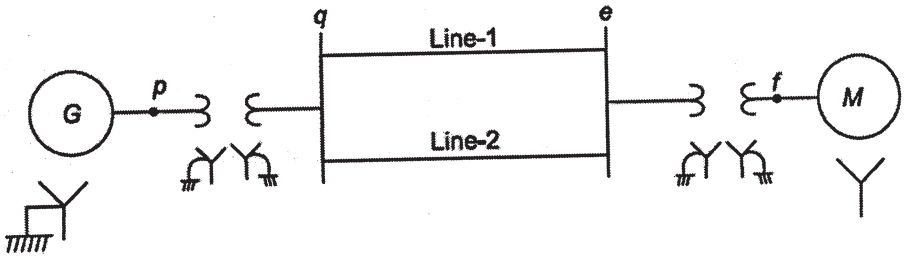
b) Explain different faults taking place in a power system.

c) The zero and positive sequence components of red phase are $E_{R0} = 0.5 - j0.866$ v; $E_{R1} = 2 + j0$ if the phase voltage $E_R = 3 + j0$ find the negative phase sequence component of red phase and voltages E_Y and E_B.

d) Derive an expression for symmetrical components in terms of phase components.

e) For the power system shown below draw zero sequence network :

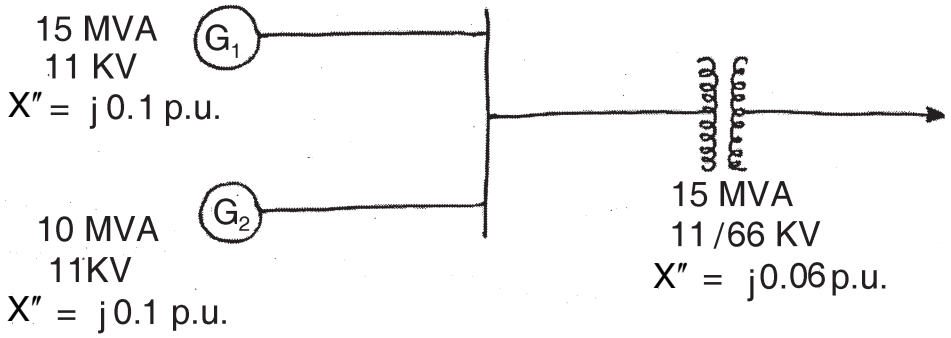
G: $x_{g0} = 0.05$ pu
M: $x_{m0} = 0.03$ pu
T_1: $x_{T1} = 0.12$ pu
T_2: $x_{T2} = 0.10$ pu
Line-1: $x_{L10} = 0.70$ pu
Line-2: $x_{L20} = 0.70$ pu



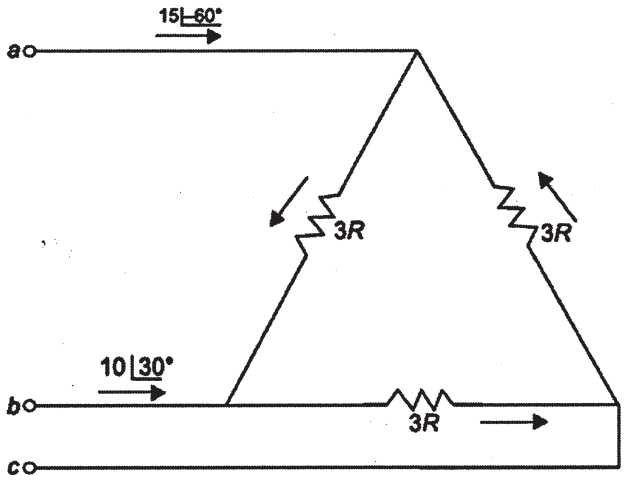
f) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.

5. Solve **any two** questions : **(2×6=12)**

a) Two generators G_1 and G_2 are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high voltage side of the transformer.



b) A delta connected resistive load is connected across a balanced 3 phase supply. Find the symmetrical components of line currents and delta currents.



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. for L – G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.

Seat No.	

SLR-TC – 498

Set **S**

T.E. (E & E) (Part – II) (CGPA) Examination, 2018
POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Max. Marks : 70

Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) For stability reasons, the transmission line is operated with power angle in the range _____

a) 10 to 25 degree b) 30 to 45 degree

c) 60 to 75 degree d) 65 to 90 degree

2) Which one of the following is correct ?

a) $X''_d = X'_d = X_d$ b) $X''_d < X'_d < X_d$

c) $X''_d = \frac{X_d}{2}$ d) $X'_d = \frac{X_d}{2}$

3) In case of balanced three phase system, negative and zero sequence currents are _____

a) Absent b) Equal c) Infinite d) Present

4) Fault level means

a) Voltage at the point of fault b) Fault power factor

c) Fault current d) Fault MVA

5) The usual value of δ is about

a) 30 b) 45 c) 60 d) 90

P.T.O.

6) The angle δ in the swing equation of a synchronous generator is the _____
   a) Angle between stator voltage and current
   b) Angular displacement of the rotor w.r.t. stator
   c) Angular displacement of the stator mmf w.r.t. a synchronously rotating axis
   d) Angular displacement of an axis fixed to the rotor w.r.t. a synchronously rotating axis

7) In _____ method of load flow, convergence is dependent on the choice of slack bus.
   a) G-S b) N-R c) FD d) All

8) I $d^2\delta/dt^2$ = _____
   a) Rotor momentum b) Accelerating power
   c) Inertia constant d) Excitation of generator

9) If the new base MVA is twice the old base MVA, then the new p.u. impedance will be _____ times old p.u. impedance.
   a) Four b) Half c) Two d) Three

10) The power delivered by a synchronous generator to an infinite bus is given by _____
   a) $P = \frac{|V_t||E_f|}{R_a}\sin\delta$ b) $P = \frac{|V_t||E_f|^2}{X_s}\sin\delta$
   c) $P = \frac{|V_t||E_f|}{X_s}\sin\delta$ d) $P = \frac{|V_t||E_f|}{X_s}\cos\delta$

11) Normally Z_{bus} matrix is a
   a) Null matrix b) Sparse matrix c) Full matrix d) Unity matrix

12) Load flow study is carried out for
   a) Load frequency control b) Stability studies
   c) System planning d) Fault calculations

13) At slack bus, which one of the following combinations of variables is specified ?
   a) $|V|, \delta$ b) P, Q c) P,|V| d) Q, |V|

14) For a load flow solution, the quantities normally specified at a voltage controlled bus are _____
   a) P and Q b) P and |V| c) Q and |V| d) P and δ

_____

SLR-TC – 498

Seat No.	

T.E. (E & E) (Part – II) (CGPA) Examination, 2018
POWER SYSTEM ANALYSIS

Day and Date : Friday, 18-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.s

SECTION – I

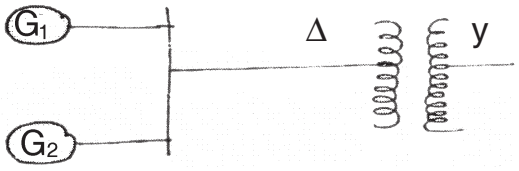
2. Solve **any four** questions : **(4×4=16)**

a) State and derive the equal area criterion of stability.

b) Three generators are rated as G1 : 100 MVA, 33 KV, Xgl = 0.1 pu., G2 : 150 MVA , 32 KV, Xg2 = 0.08 pu and G3 : 110 MVA, 30 KV, Xg3 = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.

c) Assuming 25 MVA as base MVA, calculate the through impedance between the generator and output terminal of the transformer for the system shown below :
The specifications of the components are given below :

Generator G_1	**Generator G_2**	**Transformer**
30 MVA	25 MVA	60 MVA
11 KV	11 KV	11 KVΔ / 66 KV
$X'' = 0.20$ p.u.	$X'' = 0.25$ p.u.	X = 0.10 p.u.



d) Discuss various types of buses and explain their significance in detail.

e) Define per unit system. What are the advantages of using per unit system ?

f) 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 ?

3. Solve following : **(2×6=12)**

a) 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.

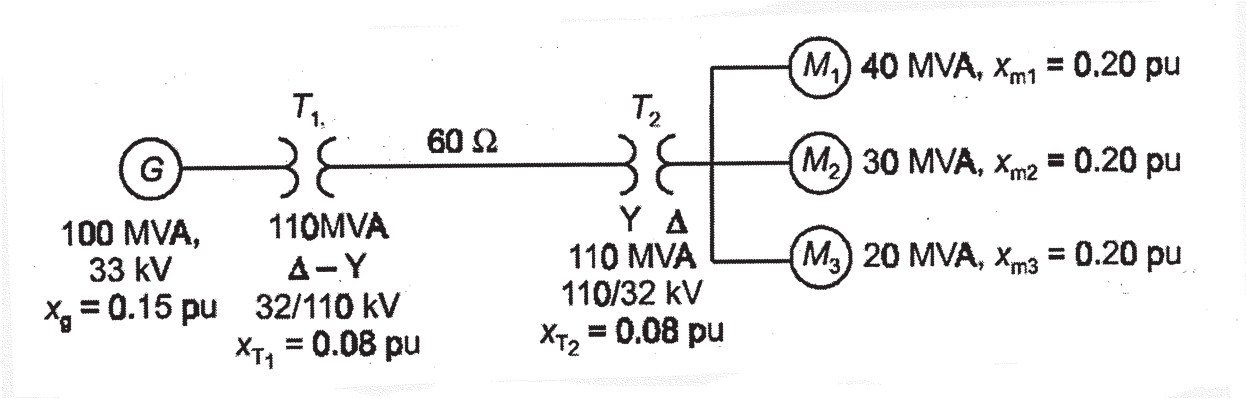
Bus Code i	Assumed Bus Voltage	Generation MW	Generation MVAr	Load MW	Load MVAr
1 (slack bus)	1.05 + j 0.0	–	–	0	0
2	1 + j 0.0	50	30	305.6	140.2
3	1 + j 0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus Code i – k	Impedance Z_{ik}
1 – 2	0.02 + j 0.04
1 – 3	0.01 + j 0.03
2 – 3	0.0125 + j 0.025

OR

a) For the power system shown below, draw per unit reactance diagram. Assume generator rating as base values.



b) Explain the Newton-Raphson method for solution of non-linear algebraic equations.

SECTION – II

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

a) Describe the transients occurring in a transmission line on occurrence of a short circuit.

b) Explain different faults taking place in a power system.

c) The zero and positive sequence components of red phase are $E_{R0} = 0.5 - j0.866$ v; $E_{R1} = 2 + j0$ if the phase voltage $E_R = 3 + j0$ find the negative phase sequence component of red phase and voltages E_Y and E_B.

d) Derive an expression for symmetrical components in terms of phase components.

e) For the power system shown below draw zero sequence network :

G: $x_{g0} = 0.05$ pu
M: $x_{m0} = 0.03$ pu
T_1: $x_{T1} = 0.12$ pu
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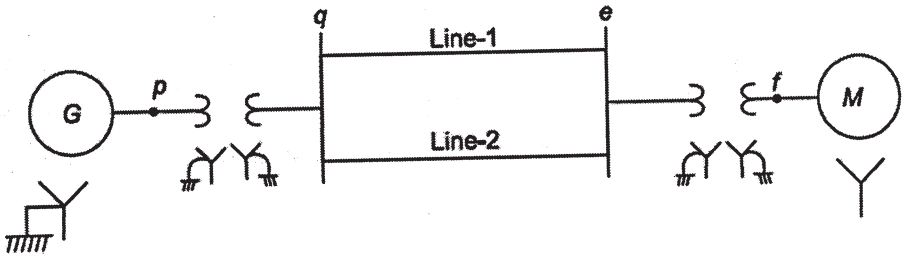
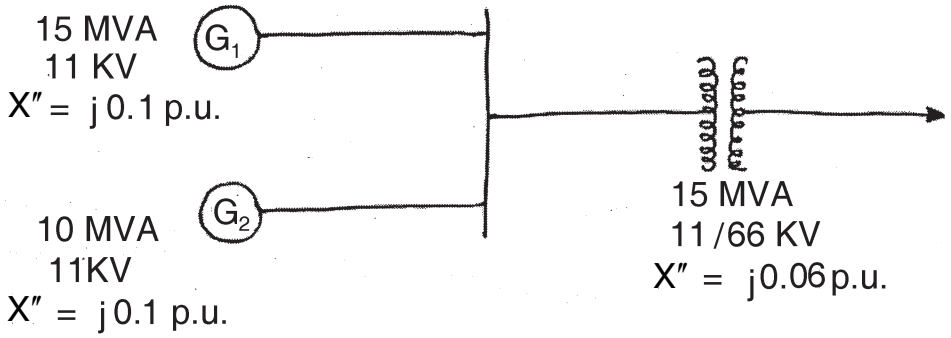
Line-2: $x_{L20} = 0.70$ pu



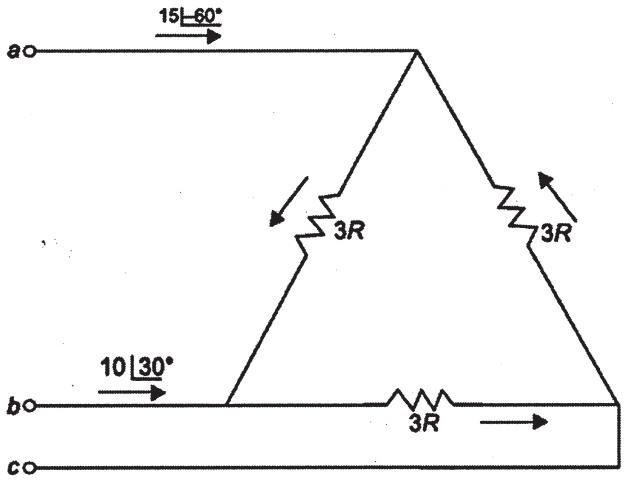
f) A 50 MVA generator with a reactance of 0.1 pu is connected to a busbar. A 25 MVA transformer with a reactance of 0.05 pu is also connected through a busbar reactor of 0.1 pu to a same busbar. Both these reactances are based on 25 MVA rating. If a feeder taken out from a busbar through a circuit breaker develops a line to ground fault what should be the rating of circuit breaker.

5. Solve **any two** questions : **(2×6=12)**

a) Two generators G_1 and G_2 are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high voltage side of the transformer.



b) A delta connected resistive load is connected across a balanced 3 phase supply. Find the symmetrical components of line currents and delta currents.



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. for L – G fault.

The alternator neutral is solidly grounded. Find the three sequence reactances of the alternator.

SLR-TC – 499

Seat No.	

Set **P**

T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018
CONTROL SYSTEMS – II

Day and Date : Monday, 21-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 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 alternative : **(14×1=14)**

1) In state space equation X = AX + BU, B matrix is called
   a) State matrix b) Control matrix
   c) Linear matrix d) Diagonal matrix

2) If the eigenvalues of 3 × 3 matrix A are 1, –2 and 4. What are the eigenvalues of P^{-1} AP where P is a linear transformation
   a) 1, –1/2, 1/4 b) –1, 2, –4
   c) 1, 4, 16 d) 1, –2, 4

3) The eigenvalues of the matrix (A – BK) are called
   a) Open loop poles b) Open loop zeros
   c) Regulator pole d) None of these

4) The TIF having 'P' and/or 'Z' in the RHS of s-plane are called _____ phase TIFs.
   a) Minimum b) Non minimum
   c) All pass d) None of these

5) The eigenvalues of linear system are the location of
   a) Poles of the system b) Zero of the system
   c) Both a) and b) d) Finite pole and zero

6) A state variable approach can be applied to _____ systems.
   a) Continuous time b) Discrete time
   c) Periodic time d) Both a) and b)

7) For the system $X = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x \div \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$ and $y = [1\ 1]\ X$ then the
   a) System is controllable but unstable
   b) System is uncontrollable but unstable
   c) System is controllable and stable
   d) System is uncontrollable but stable

8) The process of designing a closed loop control system is by
   a) Regulator
   b) Lag compensation
   c) Pole placement
   d) None of these

9) The transfer function of a compensating network is of form $(1 + \alpha Ts)/(1 + Ts)$. If this is a phase – Lag network, the value of α should be
   a) Greater than 1
   b) Between 0 and 1
   c) Exactly equal to 1
   d) Exactly equal to 0

10) The transfer function 1 + 0.5s/1 + s represent a
   a) lag network
   b) lead network
   c) lag-lead network
   d) proportional controller

11) The transfer function of a multi-input multi-output system, with the state-space representation of 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) $(sI – A)^{-1} B + D$

12) The information contained in a signal is preserved in the sampled version
   a) wm = ws
   b) ws = 0.1 wm
   c) ws = 0.5 wm
   d) ws = 2 wm

13) In Jury's table _____ number of rows are formed, where n is order of system.
   a) (3n – 2)
   b) (2n – 3)
   c) (3n + 2)
   d) (2n + 3)

14) When the eigenvalues are distinct, real and negative then the singular point is called a
   a) Stable node
   b) Unstable node
   c) Stable focus
   d) Unstable focus

_____

SLR-TC – 499

Seat No.	

T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018
CONTROL SYSTEMS – II

Day and Date : Monday, 21-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Give steps to design lead-lag compensator using root locus method.
   2) Derive the realization of lag compensator network.
   3) Obtain state transition matrix whose system matrix is given by
      $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$.
   4) Obtain state model for the system described in phase variable form.
      $d^3y/dt^3 + 11\ d^2y/dt^2 + 4\frac{dy}{dx} + 8y = 9\ u(t)$.
   5) For the following system test the controllability.
      $X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 1 & 0 \end{bmatrix} U(t)$.

3. Solve **any two** : **(2×6=12)**
   1) Consider the system defined by X = AX + BU where $A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ and C = [1 0] by using state feedback control U = –KX; It is desired to have closed loop poles at s = –3 and s = –4. Determine the state feedback gain matrix 'k' by any one method.
   2) Find out the time response for unit step input of a system given by $x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(t)$ and $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and Y = [1 0]X.

Set P

3) The open loop transfer function of certain unity feedback control system is given by $G(s) = \frac{K}{s(s+4)(s+80)}$. It is desired to have the phase margin to be atleast 33° and the velocity error constant Kv = 30/sec. Design a phase lag series compensator.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Explain in short mapping between s-plane and z-plane.
   b) Derive transfer function of zero order hold.
   c) Derive pulse transfer function of closed loop system.
   d) Determine the kind of singularity for the following differential equation, $\ddot{y} + 3\dot{y} - 10 = 0$.
   e) Explain common physical nonlinearities.
   f) Derive the pulse transfer function of digital controller.

5. Solve **any two** : **(2×6=12)**
   a) Explain the basic digital control system with suitable diagram.
   b) Examine the stability of the system given, by using Jury's stability test $Z^3 - 0.2\,Z^2 - 0.25Z + 0.05 = 0$.
   c) Explain construction of phase trajectory by Delta method.

SLR-TC – 499

Seat No.	

Set **Q**

T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018
CONTROL SYSTEMS – II

Day and Date : Monday, 21-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 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 alternative : **(14×1=14)**

1) The process of designing a closed loop control system is by
   a) Regulator b) Lag compensation
   c) Pole placement d) None of these

2) The transfer function of a compensating network is of form $(1 + \alpha Ts)/(1 + Ts)$. If this is a phase – Lag network, the value of α should be
   a) Greater than 1 b) Between 0 and 1
   c) Exactly equal to 1 d) Exactly equal to 0

3) The transfer function 1 + 0.5s/1 + s represent a
   a) lag network b) lead network
   c) lag-lead network d) proportional controller

4) The transfer function of a multi-input multi-output system, with the state-space representation of 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) $(sI – A)^{-1} B + D$

5) The information contained in a signal is preserved in the sampled version
   a) wm = ws b) ws = 0.1 wm
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6) In Jury's table _____ number of rows are formed, where n is order of system.
   a) (3n – 2) b) (2n – 3)
   c) (3n + 2) d) (2n + 3)

7) When the eigenvalues are distinct, real and negative then the singular point is called a
   a) Stable node b) Unstable node
   c) Stable focus d) Unstable focus

8) In state space equation X = AX + BU, B matrix is called
   a) State matrix b) Control matrix
   c) Linear matrix d) Diagonal matrix

9) If the eigenvalues of 3 × 3 matrix A are 1, –2 and 4. What are the eigenvalues of P^{-1} AP where P is a linear transformation
   a) 1, –1/2, 1/4 b) –1, 2, –4
   c) 1, 4, 16 d) 1, –2, 4

10) The eigenvalues of the matrix (A – BK) are called
   a) Open loop poles b) Open loop zeros
   c) Regulator pole d) None of these

11) The TIF having 'P' and/or 'Z' in the RHS of s-plane are called _____ phase TIFs.
   a) Minimum b) Non minimum
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12) The eigenvalues of linear system are the location of
   a) Poles of the system b) Zero of the system
   c) Both a) and b) d) Finite pole and zero

13) A state variable approach can be applied to _____ systems.
   a) Continuous time b) Discrete time
   c) Periodic time d) Both a) and b)

14) For the system $X = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x \div \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$ and y = [1 1] X then the
   a) System is controllable but unstable
   b) System is uncontrollable but unstable
   c) System is controllable and stable
   d) System is uncontrollable but stable

_____

SLR-TC – 499

Seat No.	

T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018
CONTROL SYSTEMS – II

Day and Date : Monday, 21-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Give steps to design lead-lag compensator using root locus method.
   2) Derive the realization of lag compensator network.
   3) Obtain state transition matrix whose system matrix is given by
      $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$.
   4) Obtain state model for the system described in phase variable form.
      $d^3y/dt^3 + 11\ d^2y/dt^2 + 4\frac{dy}{dx} + 8y = 9\ u(t)$.
   5) For the following system test the controllability.
      $X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 1 & 0 \end{bmatrix} U(t)$.

3. Solve **any two** : **(2×6=12)**
   1) Consider the system defined by X = AX + BU where $A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ and C = [1 0] by using state feedback control U = –KX; It is desired to have closed loop poles at s = –3 and s = –4. Determine the state feedback gain matrix 'k' by any one method.
   2) Find out the time response for unit step input of a system given by $x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(t)$ and $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and Y = [1 0]X.

Set Q

3) The open loop transfer function of certain unity feedback control system is given by $G(s) = \frac{K}{s(s+4)(s+80)}$. It is desired to have the phase margin to be atleast 33° and the velocity error constant Kv = 30/sec. Design a phase lag series compensator.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Explain in short mapping between s-plane and z-plane.
   b) Derive transfer function of zero order hold.
   c) Derive pulse transfer function of closed loop system.
   d) Determine the kind of singularity for the following differential equation, $\ddot{y} + 3\dot{y} - 10 = 0$.
   e) Explain common physical nonlinearities.
   f) Derive the pulse transfer function of digital controller.

5. Solve **any two** : **(2×6=12)**
   a) Explain the basic digital control system with suitable diagram.
   b) Examine the stability of the system given, by using Jury's stability test $Z^3 - 0.2\,Z^2 - 0.25Z + 0.05 = 0$.
   c) Explain construction of phase trajectory by Delta method.

SLR-TC – 499

Seat No.	

Set R

T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018
CONTROL SYSTEMS – II

Day and Date : Monday, 21-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The eigenvalues of linear system are the location of
   a) Poles of the system b) Zero of the system
   c) Both a) and b) d) Finite pole and zero

2) A state variable approach can be applied to _____ systems.
   a) Continuous time b) Discrete time
   c) Periodic time d) Both a) and b)

3) For the system $X = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x \div \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$ and y = [1 1] X then the
   a) System is controllable but unstable
   b) System is uncontrollable but unstable
   c) System is controllable and stable
   d) System is uncontrollable but stable

4) The process of designing a closed loop control system is by
   a) Regulator b) Lag compensation
   c) Pole placement d) None of these

5) The transfer function of a compensating network is of form $(1 + \alpha Ts)/(1 + Ts)$. If this is a phase – Lag network, the value of α should be
   a) Greater than 1 b) Between 0 and 1
   c) Exactly equal to 1 d) Exactly equal to 0

P.T.O.

6) The transfer function 1 + 0.5s/1 + s represent a
   a) lag network
   b) lead network
   c) lag-lead network
   d) proportional controller

7) The transfer function of a multi-input multi-output system, with the state-space representation of 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) $(sI - A)^{-1} B + D$

8) The information contained in a signal is preserved in the sampled version
   a) wm = ws
   b) ws = 0.1 wm
   c) ws = 0.5 wm
   d) ws = 2 wm

9) In Jury's table _____ number of rows are formed, where n is order of system.
   a) (3n – 2)
   b) (2n – 3)
   c) (3n + 2)
   d) (2n + 3)

10) When the eigenvalues are distinct, real and negative then the singular point is called a
   a) Stable node
   b) Unstable node
   c) Stable focus
   d) Unstable focus

11) In state space equation X = AX + BU, B matrix is called
   a) State matrix
   b) Control matrix
   c) Linear matrix
   d) Diagonal matrix

12) If the eigenvalues of 3×3 matrix A are 1, –2 and 4. What are the eigenvalues of $P^{-1} AP$ where P is a linear transformation
   a) 1, –1/2, 1/4
   b) –1, 2, –4
   c) 1, 4, 16
   d) 1, –2, 4

13) The eigenvalues of the matrix (A – BK) are called
   a) Open loop poles
   b) Open loop zeros
   c) Regulator pole
   d) None of these

14) The TIF having 'P' and/or 'Z' in the RHS of s-plane are called _____ phase TIFs.
   a) Minimum
   b) Non minimum
   c) All pass
   d) None of these

_____

SLR-TC – 499

Seat No.	

T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018
CONTROL SYSTEMS – II

Day and Date : Monday, 21-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Give steps to design lead-lag compensator using root locus method.
   2) Derive the realization of lag compensator network.
   3) Obtain state transition matrix whose system matrix is given by
      $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$.
   4) Obtain state model for the system described in phase variable form.
      $d^3y/dt^3 + 11\ d^2y/dt^2 + 4\frac{dy}{dx} + 8y = 9\ u(t)$.
   5) For the following system test the controllability.
      $X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 1 & 0 \end{bmatrix} U(t)$.

3. Solve **any two** : **(2×6=12)**
   1) Consider the system defined by X = AX + BU where $A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ and C = [1 0] by using state feedback control U = –KX; It is desired to have closed loop poles at s = –3 and s = –4. Determine the state feedback gain matrix 'k' by any one method.
   2) Find out the time response for unit step input of a system given by $x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(t)$ and $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and Y = [1 0]X.

Set R

3) The open loop transfer function of certain unity feedback control system is given by $G(s) = \frac{K}{s(s+4)(s+80)}$. It is desired to have the phase margin to be atleast 33° and the velocity error constant Kv = 30/sec. Design a phase lag series compensator.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Explain in short mapping between s-plane and z-plane.
   b) Derive transfer function of zero order hold.
   c) Derive pulse transfer function of closed loop system.
   d) Determine the kind of singularity for the following differential equation, $\ddot{y} + 3\dot{y} - 10 = 0$.
   e) Explain common physical nonlinearities.
   f) Derive the pulse transfer function of digital controller.

5. Solve **any two** : **(2×6=12)**
   a) Explain the basic digital control system with suitable diagram.
   b) Examine the stability of the system given, by using Jury's stability test $Z^3 - 0.2\,Z^2 - 0.25Z + 0.05 = 0$.
   c) Explain construction of phase trajectory by Delta method.

SLR-TC – 499

Seat No.	

Set **S**

T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018
CONTROL SYSTEMS – II

Day and Date : Monday, 21-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 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 alternative : **(14×1=14)**

1) The transfer function 1 + 0.5s/1 + s represent a
   a) lag network b) lead network
   c) lag-lead network d) proportional controller

2) The transfer function of a multi-input multi-output system, with the state-space representation of 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) $(sI – A)^{-1} B + D$

3) The information contained in a signal is preserved in the sampled version
   a) wm = ws b) ws = 0.1 wm
   c) ws = 0.5 wm d) ws = 2 wm

4) In Jury's table _____ number of rows are formed, where n is order of system.
   a) (3n – 2) b) (2n – 3)
   c) (3n + 2) d) (2n + 3)

5) When the eigenvalues are distinct, real and negative then the singular point is called a
   a) Stable node b) Unstable node
   c) Stable focus d) Unstable focus

P.T.O.

6) In state space equation X = AX + BU, B matrix is called
   a) State matrix
   b) Control matrix
   c) Linear matrix
   d) Diagonal matrix

7) If the eigenvalues of 3×3 matrix A are 1, –2 and 4. What are the eigenvalues of P^{-1} AP where P is a linear transformation
   a) 1, –1/2, 1/4
   b) –1, 2, –4
   c) 1, 4, 16
   d) 1, –2, 4

8) The eigenvalues of the matrix (A – BK) are called
   a) Open loop poles
   b) Open loop zeros
   c) Regulator pole
   d) None of these

9) The TIF having 'P' and/or 'Z' in the RHS of s-plane are called _____ phase TIFs.
   a) Minimum
   b) Non minimum
   c) All pass
   d) None of these

10) The eigenvalues of linear system are the location of
   a) Poles of the system
   b) Zero of the system
   c) Both a) and b)
   d) Finite pole and zero

11) A state variable approach can be applied to _____ systems.
   a) Continuous time
   b) Discrete time
   c) Periodic time
   d) Both a) and b)

12) For the system $X = \begin{bmatrix} 0 & 1 \\ -1 & -2 \end{bmatrix} x \div \begin{bmatrix} 0 \\ 1 \end{bmatrix} u$ and y = [1 1] X then the
   a) System is controllable but unstable
   b) System is uncontrollable but unstable
   c) System is controllable and stable
   d) System is uncontrollable but stable

13) The process of designing a closed loop control system is by
   a) Regulator
   b) Lag compensation
   c) Pole placement
   d) None of these

14) The transfer function of a compensating network is of form $(1 + \alpha Ts)/(1 + Ts)$. If this is a phase – Lag network, the value of α should be
   a) Greater than 1
   b) Between 0 and 1
   c) Exactly equal to 1
   d) Exactly equal to 0

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SLR-TC – 499

Seat No.	

T.E. (E & E Engg.) (Part – II) (CGPA) Examination, 2018
CONTROL SYSTEMS – II

Day and Date : Monday, 21-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Give steps to design lead-lag compensator using root locus method.
   2) Derive the realization of lag compensator network.
   3) Obtain state transition matrix whose system matrix is given by
      $A = \begin{bmatrix} 1 & 0 \\ 1 & 1 \end{bmatrix}$.
   4) Obtain state model for the system described in phase variable form.
      $d^3y/dt^3 + 11\ d^2y/dt^2 + 4\frac{dy}{dx} + 8y = 9\ u(t)$.
   5) For the following system test the controllability.
      $X = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ 0 & -2 & -3 \end{bmatrix} X + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 1 & 0 \end{bmatrix} U(t)$.

3. Solve **any two** : **(2×6=12)**
   1) Consider the system defined by X = AX + BU where $A = \begin{bmatrix} 0 & 1 \\ -1 & -3 \end{bmatrix}$, $B = \begin{bmatrix} 0 \\ 2 \end{bmatrix}$ and C = [1 0] by using state feedback control U = –KX; It is desired to have closed loop poles at s = –3 and s = –4. Determine the state feedback gain matrix 'k' by any one method.
   2) Find out the time response for unit step input of a system given by $x(t) = \begin{bmatrix} 0 & 1 \\ -4 & -5 \end{bmatrix} x(t) + \begin{bmatrix} 0 \\ 1 \end{bmatrix} U(t)$ and $X(0) = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and Y = [1 0]X.

Set S

3) The open loop transfer function of certain unity feedback control system is given by $G(s) = \frac{K}{s(s+4)(s+80)}$. It is desired to have the phase margin to be atleast 33° and the velocity error constant Kv = 30/sec. Design a phase lag series compensator.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Explain in short mapping between s-plane and z-plane.
   b) Derive transfer function of zero order hold.
   c) Derive pulse transfer function of closed loop system.
   d) Determine the kind of singularity for the following differential equation, $\ddot{y} + 3\dot{y} - 10 = 0$.
   e) Explain common physical nonlinearities.
   f) Derive the pulse transfer function of digital controller.

5. Solve **any two** : **(2×6=12)**
   a) Explain the basic digital control system with suitable diagram.
   b) Examine the stability of the system given, by using Jury's stability test $Z^3 - 0.2\,Z^2 - 0.25Z + 0.05 = 0$.
   c) Explain construction of phase trajectory by Delta method.

SLR-TC – 500

Seat No.	

Set P

T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 23-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) 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

2) RS = 0 for LCD module selects _____ Register.
A) Command B) Data C) DPTR D) SAR

3) Bit addressable area for 8051 microcontroller is
A) 16 byte B) 128 bits
C) Both A and B D) 32 byte

4) 8051 timer mode 1 is
A) 16 bit timer B) 13 bit timer
C) Auto reload mode D) 8 bit timer

5) MOVX instruction is normally used for data transfer of
   A) Internal RAM B) External ROM
   C) External RAM D) Internal ROM

6) MUL AB instruction stores lower byte of result in the register.
   A) B B) A C) R0 D) R1

7) As we push data onto the stack, the SP is _____ by one.
   A) incremented B) decremented
   C) subtracted D) initialized

8) Interfacing LCD with 89C51 _____ data lines are used along with the _____ signals.
   A) 6, RS, RW B) 5, RW, EN
   C) 8, RS, EN, RW D) 9, RS, EN, RW

9) Timer count _____ clock pulses while counter count _____ clock pules.
   A) External, Internal B) Internal, External
   C) TH0, TL0 D) None

10) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 4800
   A) FD B) FA C) F4 D) E8

11) The only registers that can be used for pointers in register indirect addressing mode
   A) A and B B) PC and DPTR
   C) A and R0 D) R0 and R1

12) If data can be transmitted and received simultaneously, it is a _____ transmission.
   A) Simplex B) Half duplex C) Full duplex D) Multiplex

13) When the 8051 is reset and the EA line is LOW, the program counter points to the first program instruction in the
   A) Internal code memory B) External code memory
   C) Internal data memory D) External data memory

14) Which of the following instruction perform as of indirect RAM to accumulator ?
   A) MOV A, Rn B) MOV @Ri, A
   C) MOV A, @Ri D) MOV Rn, A

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SLR-TC – 500

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to **right** indicate **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) How interrupts are handled by 8051 microcontroller ? Write interrupt vector addresses of all interrupts for 8051.

2) Explain data memory organization of 8051 microcontroller.

3) Write a program to copy a block of 10 bytes of data from 35H to 60H.

4) Give the operation of each bit in the SFR SCON.

5) Draw and explain the operation of Port1, pin internal logic circuit.

3. Solve **any two** questions : **(8×2=16)**

1) Write a program for the 8051 to receive bytes of data serially and put them in P1, set the baud rate at 4800, 8-bit data and 1 stop bit.

2) Explain the operation of following instructions with one example

A	SWAP A
B	MUL AB
C	MOV DPTR,#nn
D	DJNZ Rn,radd
E	AJMP sadd

3) Draw and explain RESET and clock circuit for 8051 microcontroller.

SECTION – II

4. Solve **any three** questions : **(4×3=12)**

   1) Explain I2c protocol for serial communication.

   2) How common anode seven segment display can be interfaced with 8051 ? What should be done to display digit 5 on it ?

   3) How DS1307 RTC can be interfaced with microcontroller ? List different registers present in DS 1307.

   4) Draw and explain serial EEPROM interfacing.

   5) Interface 8255 with microcontroller and give the address of PA, PB, PC and CWR.

5. Solve **any two** questions : **(8×2=16)**

   1) Explain mode 1 of UART communication of 8051. How mode 1 baud rate can be changed ?

   2) Discuss microcontroller based proportional temperature control system in detail.

   3) How 8255 can be interfaced with microcontroller ? Program PC4 of the 8255 to generate a pulse of 50 ms with 50% duty cycle.

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SLR-TC – 500

Seat No.	

Set Q

T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 23-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Interfacing LCD with 89C51 _____ data lines are used along with the _____ signals.
A) 6, RS, RW B) 5, RW, EN
C) 8, RS, EN, RW D) 9, RS, EN, RW

2) Timer count _____ clock pulses while counter count _____ clock pules.
A) External, Internal B) Internal, External
C) TH0, TL0 D) None

3) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 4800
A) FD B) FA C) F4 D) E8

4) The only registers that can be used for pointers in register indirect addressing mode
A) A and B B) PC and DPTR
C) A and R0 D) R0 and R1

P.T.O.

5) If data can be transmitted and received simultaneously, it is a _____ transmission.
A) Simplex B) Half duplex C) Full duplex D) Multiplex

6) When the 8051 is reset and the EA line is LOW, the program counter points to the first program instruction in the
A) Internal code memory B) External code memory
C) Internal data memory D) External data memory

7) Which of the following instruction perform as of indirect RAM to accumulator ?
A) MOV A, Rn B) MOV @Ri, A
C) MOV A, @Ri D) MOV Rn, A

8) 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

9) RS = 0 for LCD module selects _____ Register.
A) Command B) Data C) DPTR D) SAR

10) Bit addressable area for 8051 microcontroller is
A) 16 byte B) 128 bits
C) Both A and B D) 32 byte

11) 8051 timer mode 1 is
A) 16 bit timer B) 13 bit timer
C) Auto reload mode D) 8 bit timer

12) MOVX instruction is normally used for data transfer of
A) Internal RAM B) External ROM
C) External RAM D) Internal ROM

13) MUL AB instruction stores lower byte of result in the register.
A) B B) A C) R0 D) R1

14) As we push data onto the stack, the SP is _____ by one.
A) incremented B) decremented
C) subtracted D) initialized

_____

SLR-TC – 500

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to **right** indicate **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) How interrupts are handled by 8051 microcontroller ? Write interrupt vector addresses of all interrupts for 8051.

2) Explain data memory organization of 8051 microcontroller.

3) Write a program to copy a block of 10 bytes of data from 35H to 60H.

4) Give the operation of each bit in the SFR SCON.

5) Draw and explain the operation of Port1, pin internal logic circuit.

3. Solve **any two** questions : **(8×2=16)**

1) Write a program for the 8051 to receive bytes of data serially and put them in P1, set the baud rate at 4800, 8-bit data and 1 stop bit.

2) Explain the operation of following instructions with one example

A	SWAP A
B	MUL AB
C	MOV DPTR,#nn
D	DJNZ Rn,radd
E	AJMP sadd

3) Draw and explain RESET and clock circuit for 8051 microcontroller.

SECTION – II

4. Solve **any three** questions : **(4×3=12)**

   1) Explain I2c protocol for serial communication.

   2) How common anode seven segment display can be interfaced with 8051 ? What should be done to display digit 5 on it ?

   3) How DS1307 RTC can be interfaced with microcontroller ? List different registers present in DS 1307.

   4) Draw and explain serial EEPROM interfacing.

   5) Interface 8255 with microcontroller and give the address of PA, PB, PC and CWR.

5. Solve **any two** questions : **(8×2=16)**

   1) Explain mode 1 of UART communication of 8051. How mode 1 baud rate can be changed ?

   2) Discuss microcontroller based proportional temperature control system in detail.

   3) How 8255 can be interfaced with microcontroller ? Program PC4 of the 8255 to generate a pulse of 50 ms with 50% duty cycle.

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SLR-TC – 500

Seat No.	

Set R

T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 23-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) MOVX instruction is normally used for data transfer of
A) Internal RAM B) External ROM
C) External RAM D) Internal ROM

2) MUL AB instruction stores lower byte of result in the register.
A) B B) A C) R0 D) R1

3) As we push data onto the stack, the SP is _____ by one.
A) incremented B) decremented
C) subtracted D) initialized

4) Interfacing LCD with 89C51 _____ data lines are used along with the _____ signals.
A) 6, RS, RW B) 5, RW, EN
C) 8, RS, EN, RW D) 9, RS, EN, RW

P.T.O.

5) Timer count _____ clock pulses while counter count _____ clock pules.
   A) External, Internal B) Internal, External
   C) TH0, TL0 D) None

6) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 4800
   A) FD B) FA C) F4 D) E8

7) The only registers that can be used for pointers in register indirect addressing mode
   A) A and B B) PC and DPTR
   C) A and R0 D) R0 and R1

8) If data can be transmitted and received simultaneously, it is a _____ transmission.
   A) Simplex B) Half duplex C) Full duplex D) Multiplex

9) When the 8051 is reset and the EA line is LOW, the program counter points to the first program instruction in the
   A) Internal code memory B) External code memory
   C) Internal data memory D) External data memory

10) Which of the following instruction perform as of indirect RAM to accumulator ?
   A) MOV A, Rn B) MOV @Ri, A
   C) MOV A, @Ri D) MOV Rn, A

11) 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

12) RS = 0 for LCD module selects _____ Register.
   A) Command B) Data C) DPTR D) SAR

13) Bit addressable area for 8051 microcontroller is
   A) 16 byte B) 128 bits
   C) Both A and B D) 32 byte

14) 8051 timer mode 1 is
   A) 16 bit timer B) 13 bit timer
   C) Auto reload mode D) 8 bit timer

_____

SLR-TC – 500

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to **right** indicate **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) How interrupts are handled by 8051 microcontroller ? Write interrupt vector addresses of all interrupts for 8051.

2) Explain data memory organization of 8051 microcontroller.

3) Write a program to copy a block of 10 bytes of data from 35H to 60H.

4) Give the operation of each bit in the SFR SCON.

5) Draw and explain the operation of Port1, pin internal logic circuit.

3. Solve **any two** questions : **(8×2=16)**

1) Write a program for the 8051 to receive bytes of data serially and put them in P1, set the baud rate at 4800, 8-bit data and 1 stop bit.

2) Explain the operation of following instructions with one example

A	SWAP A
B	MUL AB
C	MOV DPTR,#nn
D	DJNZ Rn,radd
E	AJMP sadd

3) Draw and explain RESET and clock circuit for 8051 microcontroller.

SECTION – II

4. Solve **any three** questions : **(4×3=12)**

   1) Explain I2c protocol for serial communication.

   2) How common anode seven segment display can be interfaced with 8051 ? What should be done to display digit 5 on it ?

   3) How DS1307 RTC can be interfaced with microcontroller ? List different registers present in DS 1307.

   4) Draw and explain serial EEPROM interfacing.

   5) Interface 8255 with microcontroller and give the address of PA, PB, PC and CWR.

5. Solve **any two** questions : **(8×2=16)**

   1) Explain mode 1 of UART communication of 8051. How mode 1 baud rate can be changed ?

   2) Discuss microcontroller based proportional temperature control system in detail.

   3) How 8255 can be interfaced with microcontroller ? Program PC4 of the 8255 to generate a pulse of 50 ms with 50% duty cycle.

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SLR-TC – 500

Seat No.	

Set S

T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 23-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 4800
A) FD B) FA C) F4 D) E8

2) The only registers that can be used for pointers in register indirect addressing mode
A) A and B B) PC and DPTR
C) A and R0 D) R0 and R1

3) If data can be transmitted and received simultaneously, it is a _____ transmission.
A) Simplex B) Half duplex C) Full duplex D) Multiplex

4) When the 8051 is reset and the EA line is LOW, the program counter points to the first program instruction in the
A) Internal code memory B) External code memory
C) Internal data memory D) External data memory

5) Which of the following instruction perform as of indirect RAM to accumulator ?
   A) MOV A, Rn B) MOV @Ri, A
   C) MOV A, @Ri D) MOV Rn, A

6) 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

7) RS = 0 for LCD module selects _____ Register.
   A) Command B) Data C) DPTR D) SAR

8) Bit addressable area for 8051 microcontroller is
   A) 16 byte B) 128 bits
   C) Both A and B D) 32 byte

9) 8051 timer mode 1 is
   A) 16 bit timer B) 13 bit timer
   C) Auto reload mode D) 8 bit timer

10) MOVX instruction is normally used for data transfer of
   A) Internal RAM B) External ROM
   C) External RAM D) Internal ROM

11) MUL AB instruction stores lower byte of result in the register.
   A) B B) A C) R0 D) R1

12) As we push data onto the stack, the SP is _____ by one.
   A) incremented B) decremented
   C) subtracted D) initialized

13) Interfacing LCD with 89C51 _____ data lines are used along with the _____ signals.
   A) 6, RS, RW B) 5, RW, EN
   C) 8, RS, EN, RW D) 9, RS, EN, RW

14) Timer count _____ clock pulses while counter count _____ clock pules.
   A) External, Internal B) Internal, External
   C) TH0, TL0 D) None

_____

SLR-TC – 500

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (CGPA) Examination, 2018
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 23-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Figures to **right** indicate **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) How interrupts are handled by 8051 microcontroller ? Write interrupt vector addresses of all interrupts for 8051.

2) Explain data memory organization of 8051 microcontroller.

3) Write a program to copy a block of 10 bytes of data from 35H to 60H.

4) Give the operation of each bit in the SFR SCON.

5) Draw and explain the operation of Port1, pin internal logic circuit.

3. Solve **any two** questions : **(8×2=16)**

1) Write a program for the 8051 to receive bytes of data serially and put them in P1, set the baud rate at 4800, 8-bit data and 1 stop bit.

2) Explain the operation of following instructions with one example

A	SWAP A
B	MUL AB
C	MOV DPTR,#nn
D	DJNZ Rn,radd
E	AJMP sadd

3) Draw and explain RESET and clock circuit for 8051 microcontroller.

SECTION – II

4. Solve **any three** questions : **(4×3=12)**

   1) Explain I2c protocol for serial communication.

   2) How common anode seven segment display can be interfaced with 8051 ? What should be done to display digit 5 on it ?

   3) How DS1307 RTC can be interfaced with microcontroller ? List different registers present in DS 1307.

   4) Draw and explain serial EEPROM interfacing.

   5) Interface 8255 with microcontroller and give the address of PA, PB, PC and CWR.

5. Solve **any two** questions : **(8×2=16)**

   1) Explain mode 1 of UART communication of 8051. How mode 1 baud rate can be changed ?

   2) Discuss microcontroller based proportional temperature control system in detail.

   3) How 8255 can be interfaced with microcontroller ? Program PC4 of the 8255 to generate a pulse of 50 ms with 50% duty cycle.

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SLR-TC – 501

Seat No.	

Set P

T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 25-5-2018 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) Strategic management is primarily carried out by
   a) Top management b) Middle management
   c) Knowledge management d) Operational management

2) The objective of plant layout are
   a) Optimum utilization of resources b) Better inventory control
   c) Economics of material handling d) All of above

3) F. W. Taylor introduced a system of management known as
   a) Line organization
   b) Functional management
   c) Line and staff organization
   d) Line, staff and functional organization

P.T.O.

4) The product layout
   a) Lower the overall manufacturing time
   b) Requires less space for placing machines
   c) Utilize machine and labour better
   d) All of these

5) Job evolution is a method of determining the
   a) Relative value of job
   b) Job enrichment
   c) Worth of machine
   d) Value of overall production

6) In value engineering, important consideration is given to
   a) Customer satisfaction
   b) Function concept
   c) Profit maximization
   d) Cost reduction

7) Functional management is
   a) Less differentiated and more diffused
   b) More differentiated and longer term
   c) More differentiated and focused
   d) Goal oriented

8) Manufacturing a number of identical articles in lots either to meet specific order or to meet continuous demand is known as
   a) Job production
   b) Batch production
   c) Continuous production
   d) Flow production

9) The appellate authority for any industrial dispute is
   a) Management
   b) Labour court
   c) High court
   d) Board of directors

10) The time elapsed between the placing of an order and its arrival is called as
   a) Cycle time
   b) Load time
   c) Work station process time
   d) None of the above

SLR-TC – 501

Seat No.	

T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 25-5-2018 Marks : 40
Time : 2.30 p.m. to 4.30 p.m.

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

Solve **any four** from Q. No. **2** to Q. No. **6** : **40**

2. a) What is cost control ? Brief the cost control area in production organization. **5**

   b) Explain role of public relation officer in industry. **5**

3. a) Explain recruitment and selection procedure in engineering industry. **5**

   b) What are the different types of production system ? **5**

4. a) What credit facilities are given to a small scale industry by banks ? **5**

   b) Explain importance of “Staffing” in an organization. **5**

5. a) Explain core concept of marketing. **5**

   b) Brief evolution of scientific management. **5**

6. Write short notes on **any two** : **(2×5=10)**

   a) What type of compensation is given to a employee injured in the organization during working ?

   b) Explain safety majors during fire in a workshop.

   c) Brief inventory management.

Set P

SLR-TC – 501

Seat No.	

Set Q

T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 25-5-2018 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) The appellate authority for any industrial dispute is
   a) Management b) Labour court
   c) High court d) Board of directors

2) The time elapsed between the placing of an order and its arrival is called as
   a) Cycle time b) Load time
   c) Work station process time d) None of the above

3) Functional management is
   a) Less differentiated and more diffused
   b) More differentiated and longer term
   c) More differentiated and focused
   d) Goal oriented

P.T.O.

4) Manufacturing a number of identical articles in lots either to meet specific order or to meet continuous demand is known as

a) Job production
b) Batch production
c) Continuous production
d) Flow production

5) Strategic management is primarily carried out by

a) Top management
b) Middle management
c) Knowledge management
d) Operational management

6) The objective of plant layout are

a) Optimum utilization of resources
b) Better inventory control
c) Economics of material handling
d) All of above

7) F. W. Taylor introduced a system of management known as

a) Line organization
b) Functional management
c) Line and staff organization
d) Line, staff and functional organization

8) The product layout

a) Lower the overall manufacturing time
b) Requires less space for placing machines
c) Utilize machine and labour better
d) All of these

9) Job evolution is a method of determining the

a) Relative value of job
b) Job enrichment
c) Worth of machine
d) Value of overall production

10) In value engineering, important consideration is given to

a) Customer satisfaction
b) Function concept
c) Profit maximization
d) Cost reduction

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SLR-TC – 501

Seat No.	

T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 25-5-2018 Marks : 40
Time : 2.30 p.m. to 4.30 p.m.

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

Solve **any four** from Q. No. **2** to Q. No. **6** : **40**

2. a) What is cost control ? Brief the cost control area in production organization. **5**

   b) Explain role of public relation officer in industry. **5**

3. a) Explain recruitment and selection procedure in engineering industry. **5**

   b) What are the different types of production system ? **5**

4. a) What credit facilities are given to a small scale industry by banks ? **5**

   b) Explain importance of “Staffing” in an organization. **5**

5. a) Explain core concept of marketing. **5**

   b) Brief evolution of scientific management. **5**

6. Write short notes on **any two** : **(2×5=10)**

   a) What type of compensation is given to a employee injured in the organization during working ?

   b) Explain safety majors during fire in a workshop.

   c) Brief inventory management.

Set Q

Set Q

SLR-TC – 501

Seat No.	

Set **R**

T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 25-5-2018 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) Job evolution is a method of determining the
   a) Relative value of job b) Job enrichment
   c) Worth of machine d) Value of overall production

2) In value engineering, important consideration is given to
   a) Customer satisfaction b) Function concept
   c) Profit maximization d) Cost reduction

3) The appellate authority for any industrial dispute is
   a) Management b) Labour court
   c) High court d) Board of directors

4) The time elapsed between the placing of an order and its arrival is called as
   a) Cycle time b) Load time
   c) Work station process time d) None of the above

5) F. W. Taylor introduced a system of management known as
   a) Line organization
   b) Functional management
   c) Line and staff organization
   d) Line, staff and functional organization

6) The product layout
   a) Lower the overall manufacturing time
   b) Requires less space for placing machines
   c) Utilize machine and labour better
   d) All of these

7) Strategic management is primarily carried out by
   a) Top management
   b) Middle management
   c) Knowledge management
   d) Operational management

8) The objective of plant layout are
   a) Optimum utilization of resources
   b) Better inventory control
   c) Economics of material handling
   d) All of above

9) Functional management is
   a) Less differentiated and more diffused
   b) More differentiated and longer term
   c) More differentiated and focused
   d) Goal oriented

10) Manufacturing a number of identical articles in lots either to meet specific order or to meet continuous demand is known as
   a) Job production
   b) Batch production
   c) Continuous production
   d) Flow production

SLR-TC – 501

Seat No.	

T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 25-5-2018 Marks : 40
Time : 2.30 p.m. to 4.30 p.m.

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

Solve **any four** from Q. No. **2** to Q. No. **6** : **40**

2. a) What is cost control ? Brief the cost control area in production organization. **5**

   b) Explain role of public relation officer in industry. **5**

3. a) Explain recruitment and selection procedure in engineering industry. **5**

   b) What are the different types of production system ? **5**

4. a) What credit facilities are given to a small scale industry by banks ? **5**

   b) Explain importance of “Staffing” in an organization. **5**

5. a) Explain core concept of marketing. **5**

   b) Brief evolution of scientific management. **5**

6. Write short notes on **any two** : **(2×5=10)**

   a) What type of compensation is given to a employee injured in the organization during working ?

   b) Explain safety majors during fire in a workshop.

   c) Brief inventory management.

Set R

Set R

SLR-TC – 501

Seat No.	

Set S

T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 25-5-2018 Total Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **10**

1) F. W. Taylor introduced a system of management known as
   a) Line organization
   b) Functional management
   c) Line and staff organization
   d) Line, staff and functional organization

2) The product layout
   a) Lower the overall manufacturing time
   b) Requires less space for placing machines
   c) Utilize machine and labour better
   d) All of these

P.T.O.

3) Job evolution is a method of determining the
   a) Relative value of job
   b) Job enrichment
   c) Worth of machine
   d) Value of overall production

4) In value engineering, important consideration is given to
   a) Customer satisfaction
   b) Function concept
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   d) Cost reduction

5) Functional management is
   a) Less differentiated and more diffused
   b) More differentiated and longer term
   c) More differentiated and focused
   d) Goal oriented

6) Manufacturing a number of identical articles in lots either to meet specific order or to meet continuous demand is known as
   a) Job production
   b) Batch production
   c) Continuous production
   d) Flow production

7) The appellate authority for any industrial dispute is
   a) Management
   b) Labour court
   c) High court
   d) Board of directors

8) The time elapsed between the placing of an order and its arrival is called as
   a) Cycle time
   b) Load time
   c) Work station process time
   d) None of the above

9) Strategic management is primarily carried out by
   a) Top management
   b) Middle management
   c) Knowledge management
   d) Operational management

10) The objective of plant layout are
   a) Optimum utilization of resources
   b) Better inventory control
   c) Economics of material handling
   d) All of above

SLR-TC – 501

Seat No.	

T.E. (Part –II) (Electrical and Electronic Engg.) (CGPA) Examination, 2018
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 25-5-2018 Marks : 40
Time : 2.30 p.m. to 4.30 p.m.

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

Solve **any four** from Q. No. **2** to Q. No. **6** : **40**

2. a) What is cost control ? Brief the cost control area in production organization. **5**

   b) Explain role of public relation officer in industry. **5**

3. a) Explain recruitment and selection procedure in engineering industry. **5**

   b) What are the different types of production system ? **5**

4. a) What credit facilities are given to a small scale industry by banks ? **5**

   b) Explain importance of “Staffing” in an organization. **5**

5. a) Explain core concept of marketing. **5**

   b) Brief evolution of scientific management. **5**

6. Write short notes on **any two** : **(2×5=10)**

   a) What type of compensation is given to a employee injured in the organization during working ?

   b) Explain safety majors during fire in a workshop.

   c) Brief inventory management.

Set S

Seat No.	

SLR-TC – 502

Set **P**

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date : Friday, 25-5-2018 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Note : *1) Q. No.* ***1*** *is* ***compulsory****. Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(1×10=10)**

1) A stepper motor is a _____device.

a) Mechanical b) Electrical

c) Analog d) Incremental

2) A variable reluctance stepper motor is constructed of_____ material with salient poles.

a) Paramagnetic b) Ferromagnetic

c) Diamagnetic d) Non-magnetic

3) The control _____synchro's has three phase winding both on its stator and rotor.

a) Differential b) Transformer

c) Receiver d) Transmitter

4) Which of the following motor runs from a low d.c. supply and has permanently magnetized salient poles on its rotor ?

a) Permanent magnet d.c. motor

b) Disk d.c. motor

c) Permanent magnet synchro motor

d) Brushless d.c. motor

5) A D.C. Servomotor is similar to a regular d.c. motor except that its design is modified to cope with
   a) Electronic switching
   b) Slow speeds
   c) Static conditions
   d) Both b) and c)

6) Which of the following synchros are used for error detection in a servo control system ?
   a) Control transmitter
   b) Control transformer
   c) Control receiver
   d) Both a) and b)

7) A stepper motor may be considered as a _____converter.
   a) D. C. to D.C.
   b) A. C. to A. C.
   c) D. C. to A. C.
   d) Digital to analog

8) In a brushless d.c. motor we have
   a) No mechanical commutator
   b) No brushes
   c) No arcing
   d) All of above

9) Motors that use electronic commutators are classified as
   a) Thyristor controlled
   b) Servo motors
   c) Brushless motors
   d) Electronic motors

10) The amount of torque required to make a stepper motor one full step is called
   a) Holding torque
   b) Residual torque
   c) Dent torque
   d) Developed torque

_____

SLR-TC – 502

Seat No.	

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date : Friday, 25-5-2018 Marks : 40
Time : 2.30 p.m. to 4.30 p.m.

***Note** : Answer **any four** questions from Q. No. **2** to Q. No. **6**.*

2. a) What is a stepper motor ? Explain its applications. **5**

   b) Explain the construction of variable reluctance stepper motor. **5**

3. a) Explain the construction and working of permanent magnet D.C. motor. **5**

   b) Explain the construction and working of hybrid stepper motor. **5**

4. a) Explain the constructional features of synchros. **5**

   b) Explain the application of synchro for torque transmission. **5**

5. a) Explain the construction and working of A.C. servo motor. **5**

   b) Explain the working of switched reluctance motor. **5**

6. a) Explain the construction and working of brushless D.C. motor. **5**

   b) Explain the construction and working of Scharge motor. **5**

Set P

Seat No.	

SLR-TC – 502

Set Q

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date : Friday, 25-5-2018 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Note : *1) Q. No.* ***1*** *is* ***compulsory****. Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(1×10=10)**

1) Motors that use electronic commutators are classified as
   a) Thyristor controlled b) Servo motors
   c) Brushless motors d) Electronic motors

2) The amount of torque required to make a stepper motor one full step is called
   a) Holding torque b) Residual torque
   c) Dent torque d) Developed torque

3) A stepper motor may be considered as a _____converter.
   a) D. C. to D.C. b) A. C. to A. C.
   c) D. C. to A. C. d) Digital to analog

4) In a brushless d.c. motor we have
   a) No mechanical commutator b) No brushes
   c) No arcing d) All of above

5) A stepper motor is a _____device.
   a) Mechanical b) Electrical
   c) Analog d) Incremental

6) A variable reluctance stepper motor is constructed of_____ material with salient poles.
   a) Paramagnetic
   b) Ferromagnetic
   c) Diamagnetic
   d) Non-magnetic

7) The control _____synchro's has three phase winding both on its stator and rotor.
   a) Differential
   b) Transformer
   c) Receiver
   d) Transmitter

8) Which of the following motor runs from a low d.c. supply and has permanently magnetized salient poles on its rotor ?
   a) Permanent magnet d.c. motor
   b) Disk d.c. motor
   c) Permanent magnet synchro motor
   d) Brushless d.c. motor

9) A D.C. Servomotor is similar to a regular d.c. motor except that its design is modified to cope with
   a) Electronic switching
   b) Slow speeds
   c) Static conditions
   d) Both b) and c)

10) Which of the following synchros are used for error detection in a servo control system ?
   a) Control transmitter
   b) Control transformer
   c) Control receiver
   d) Both a) and b)

_____

SLR-TC – 502

Seat No.	

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date : Friday, 25-5-2018 Marks : 40
Time : 2.30 p.m. to 4.30 p.m.

***Note** : Answer **any four** questions from Q. No. **2** to Q. No. **6**.*

2. a) What is a stepper motor ? Explain its applications. **5**

   b) Explain the construction of variable reluctance stepper motor. **5**

3. a) Explain the construction and working of permanent magnet D.C. motor. **5**

   b) Explain the construction and working of hybrid stepper motor. **5**

4. a) Explain the constructional features of synchros. **5**

   b) Explain the application of synchro for torque transmission. **5**

5. a) Explain the construction and working of A.C. servo motor. **5**

   b) Explain the working of switched reluctance motor. **5**

6. a) Explain the construction and working of brushless D.C. motor. **5**

   b) Explain the construction and working of Scharge motor. **5**

Set Q

Seat No.	

SLR-TC – 502

Set **R**

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date : Friday, 25-5-2018 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

***Note** : 1) Q. No. **1** is **compulsory**. Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(1×10=10)**

1) A D.C. Servomotor is similar to a regular d.c. motor except that its design is modified to cope with
   a) Electronic switching b) Slow speeds
   c) Static conditions d) Both b) and c)

2) Which of the following synchros are used for error detection in a servo control system ?
   a) Control transmitter b) Control transformer
   c) Control receiver d) Both a) and b)

3) Motors that use electronic commutators are classified as
   a) Thyristor controlled b) Servo motors
   c) Brushless motors d) Electronic motors

4) The amount of torque required to make a stepper motor one full step is called
   a) Holding torque b) Residual torque
   c) Dent torque d) Developed torque

5) The control _____synchro's has three phase winding both on its stator and rotor.
   a) Differential b) Transformer
   c) Receiver d) Transmitter

6) Which of the following motor runs from a low d.c. supply and has permanently magnetized salient poles on its rotor ?
   a) Permanent magnet d.c. motor
   b) Disk d.c. motor
   c) Permanent magnet synchro motor
   d) Brushless d.c. motor

7) A stepper motor is a _____device.
   a) Mechanical b) Electrical
   c) Analog d) Incremental

8) A variable reluctance stepper motor is constructed of_____ material with salient poles.
   a) Paramagnetic b) Ferromagnetic
   c) Diamagnetic d) Non-magnetic

9) A stepper motor may be considered as a _____converter.
   a) D. C. to D.C. b) A. C. to A. C.
   c) D. C. to A. C. d) Digital to analog

10) In a brushless d.c. motor we have
   a) No mechanical commutator b) No brushes
   c) No arcing d) All of above

_____

SLR-TC – 502

Seat No.	

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date : Friday, 25-5-2018 Marks : 40
Time : 2.30 p.m. to 4.30 p.m.

***Note** : Answer **any four** questions from Q. No. **2** to Q. No. **6**.*

2. a) What is a stepper motor ? Explain its applications. **5**

   b) Explain the construction of variable reluctance stepper motor. **5**

3. a) Explain the construction and working of permanent magnet D.C. motor. **5**

   b) Explain the construction and working of hybrid stepper motor. **5**

4. a) Explain the constructional features of synchros. **5**

   b) Explain the application of synchro for torque transmission. **5**

5. a) Explain the construction and working of A.C. servo motor. **5**

   b) Explain the working of switched reluctance motor. **5**

6. a) Explain the construction and working of brushless D.C. motor. **5**

   b) Explain the construction and working of Scharge motor. **5**

Set R

Seat No.	

SLR-TC – 502

Set **S**

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date : Friday, 25-5-2018 Max. Marks : 50
Time : 2.30 p.m. to 4.30 p.m.

Note : *1) Q. No.* ***1*** *is* ***compulsory****. Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(1×10=10)**

1) The control _____synchro's has three phase winding both on its stator and rotor.

a) Differential b) Transformer

c) Receiver d) Transmitter

2) Which of the following motor runs from a low d.c. supply and has permanently magnetized salient poles on its rotor ?

a) Permanent magnet d.c. motor

b) Disk d.c. motor

c) Permanent magnet synchro motor

d) Brushless d.c. motor

3) A D.C. Servomotor is similar to a regular d.c. motor except that its design is modified to cope with

a) Electronic switching b) Slow speeds

c) Static conditions d) Both b) and c)

4) Which of the following synchros are used for error detection in a servo control system ?

a) Control transmitter b) Control transformer

c) Control receiver d) Both a) and b)

P.T.O.

5) A stepper motor may be considered as a _____converter.
   a) D. C. to D.C. b) A. C. to A. C.
   c) D. C. to A. C. d) Digital to analog

6) In a brushless d.c. motor we have
   a) No mechanical commutator b) No brushes
   c) No arcing d) All of above

7) Motors that use electronic commutators are classified as
   a) Thyristor controlled b) Servo motors
   c) Brushless motors d) Electronic motors

8) The amount of torque required to make a stepper motor one full step is called
   a) Holding torque b) Residual torque
   c) Dent torque d) Developed torque

9) A stepper motor is a _____device.
   a) Mechanical b) Electrical
   c) Analog d) Incremental

10) A variable reluctance stepper motor is constructed of_____ material with salient poles.
   a) Paramagnetic b) Ferromagnetic
   c) Diamagnetic d) Non-magnetic

_____

SLR-TC – 502

Seat No.	

T.E. (Electrical and Electronics Engg.) Part – II (CGPA) Examination, 2018
SPECIAL MACHINES
(Self Learning Technical)

Day and Date : Friday, 25-5-2018 Marks : 40
Time : 2.30 p.m. to 4.30 p.m.

***Note** : Answer **any four** questions from Q. No. **2** to Q. No. **6**.*

2. a) What is a stepper motor ? Explain its applications. **5**

   b) Explain the construction of variable reluctance stepper motor. **5**

3. a) Explain the construction and working of permanent magnet D.C. motor. **5**

   b) Explain the construction and working of hybrid stepper motor. **5**

4. a) Explain the constructional features of synchros. **5**

   b) Explain the application of synchro for torque transmission. **5**

5. a) Explain the construction and working of A.C. servo motor. **5**

   b) Explain the working of switched reluctance motor. **5**

6. a) Explain the construction and working of brushless D.C. motor. **5**

   b) Explain the construction and working of Scharge motor. **5**

Set S

SLR-TC – 505

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 11-5-2018 Total Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) The output of current to voltage converter is given by
a) – If.Rf b) Vo/Rin c) – Rf/R1 d) 1 + (Rf/R1)

2) Bourdon tube are made of
a) Copper b) Aluminum c) Metal Alloy d) Phosphorous

3) Butterworth filters are also known as
a) Ripple filter b) Ripple stop band
c) Flat filter d) Spike filter

4) In Pt-100 RTD 100 means
a) Can measure up to 100°C
b) Has 100 ohm resistance at 100°C
c) Has 0 ohm resistance at 100°C
d) Has 100 ohm resistance at 0°C

5) Radiation pyrometer is used in for temperature range of
a) 0 – 500°C b) 500 – 1000°C
c) – 250 – 500°C d) 1200 – 2500°C

6) X-Y recorders record
a) one quality with respect to other quantity
b) one quantity on x axis with respect to time on y axis
c) one quantity on y axis with respect to time on x axis
d) record both quantity on both axis

7) Telemetry processes the information from remote by means of
a) Mechanical means b) Electrical means
c) CRO d) All of the above

8) Which of the following is transducer ?
   a) Piezoelectric b) Thermocouple
   c) Photovoltaic cell d) LVDT

9) Which of the following is non-planar display ?
   a) LCD b) LED
   c) Rear projection display d) None of these

10) What are selection criteria of PLC ?
   a) Size of memory of CPU b) No. of input and output
   c) Scan time d) All of above

11) In optical pyrometer temperature is measured by
   a) Photocell principle b) Peltier effect
   c) Comparing brightness of source d) None of these

12) Strip chart recorders have advantage of
   a) Long period run b) Change in speed chart
   c) Uniform resolution d) All of above

13) High value pot resistance leads to
   a) Low sensitivity b) High sensitivity
   c) Low non-linearity d) Less error

14) What is value of LSB of an 8-bit DAC for 0-12.8 v range ?
   a) 1.6 v b) 50 mv c) 0.625 v d) 1.28 v

15) In microwave telemetry repeater stations are required at every
   a) 2 Km b) 5 Km c) 40 Km d) 100 Km

16) The strain gauge should have low
   a) Resistance b) Resistance temperature
   c) Gauge factor d) All of above

17) For surface temperature measurement one can use
   a) Strain gauge b) Diaphragm c) RTD d) Thermocouple

18) Null type recorders are _____ recorders.
   a) Potentiometric b) Bridge c) LVDT d) Any of above

19) The sensitivity factor of strain gauge is normally of order of
   a) 1 to 1.5 b) 1.5 to 2.0 c) 0.5 to 1.0 d) 5 to 10

20) Doppler shift principle is used in measurement of
   a) Temperature b) Frequency c) Speed d) Pressure

_____

SLR-TC – 505

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 11-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Assume suitable data **wherever** necessary.*
*2) Non-programmable calculators are **permitted**.*

SECTION – I

2. Solve **any four**. **(5×4=20)**

a) How velocity is measured ? Explain with neat diagram.

b) Explain various types of transducer. Explain active and passive transducer with example based on working principle.

c) Explain Chopper stabilized amplifier.

d) What is error ? Explain various errors in instrumentation.

e) Define :

1) Resolution 2) Accuracy
3) Threshold 4) Static error

3. Solve **any two**. **(10×2=20)**

a) Explain the instrumentation system with neat block diagram. Give a practical example of it with explanation.

b) Explain various types of modulation.

c) Define telemetry. Explain voltage and current telemetry system.

SECTION – II

4. Solve **any four**. **(5×4=20)**

a) Explain the various types of DAC.

b) Enlist different types of digital and analog input, output devices.

c) Write short note on :
   1) LCD display
   2) LED display.

d) Explain in short about sample and hold circuit.

e) Explain data acquisition system.

5. Solve **any two**. **(2×10=20)**

a) Explain magnetic strip chart recorder in detail.

b) Explain frequency division multiplexing and time division multiplexing.

c) Explain the architecture of PLC with neat diagram.

SLR-TC – 505

Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 11-5-2018 Total Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) The strain gauge should have low
   a) Resistance b) Resistance temperature
   c) Gauge factor d) All of above

2) For surface temperature measurement one can use
   a) Strain gauge b) Diaphragm c) RTD d) Thermocouple

3) Null type recorders are _____ recorders.
   a) Potentiometric b) Bridge c) LVDT d) Any of above

4) The sensitivity factor of strain gauge is normally of order of
   a) 1 to 1.5 b) 1.5 to 2.0 c) 0.5 to 1.0 d) 5 to 10

5) Doppler shift principle is used in measurement of
   a) Temperature b) Frequency c) Speed d) Pressure

6) The output of current to voltage converter is given by
   a) – If.Rf b) Vo/Rin c) – Rf/R1 d) 1 + (Rf/R1)

7) Bourdon tube are made of
   a) Copper b) Aluminum c) Metal Alloy d) Phosphorous

8) Butterworth filters are also known as
   a) Ripple filter b) Ripple stop band
   c) Flat filter d) Spike filter

P.T.O.

9) In Pt-100 RTD 100 means
   a) Can measure up to 100°C
   b) Has 100 ohm resistance at 100°C
   c) Has 0 ohm resistance at 100°C
   d) Has 100 ohm resistance at 0°C

10) Radiation pyrometer is used in for temperature range of
   a) 0 – 500°C b) 500 – 1000°C
   c) – 250 – 500°C d) 1200 – 2500°C

11) X-Y recorders record
   a) one quality with respect to other quantity
   b) one quantity on x axis with respect to time on y axis
   c) one quantity on y axis with respect to time on x axis
   d) record both quantity on both axis

12) Telemetry processes the information from remote by means of
   a) Mechanical means b) Electrical means
   c) CRO d) All of the above

13) Which of the following is transducer ?
   a) Piezoelectric b) Thermocouple
   c) Photovoltaic cell d) LVDT

14) Which of the following is non-planar display ?
   a) LCD b) LED
   c) Rear projection display d) None of these

15) What are selection criteria of PLC ?
   a) Size of memory of CPU b) No. of input and output
   c) Scan time d) All of above

16) In optical pyrometer temperature is measured by
   a) Photocell principle b) Peltier effect
   c) Comparing brightness of source d) None of these

17) Strip chart recorders have advantage of
   a) Long period run b) Change in speed chart
   c) Uniform resolution d) All of above

18) High value pot resistance leads to
   a) Low sensitivity b) High sensitivity
   c) Low non-linearity d) Less error

19) What is value of LSB of an 8-bit DAC for 0-12.8 v range ?
   a) 1.6 v b) 50 mv c) 0.625 v d) 1.28 v

20) In microwave telemetry repeater stations are required at every
   a) 2 Km b) 5 Km c) 40 Km d) 100 Km

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SLR-TC – 505

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 11-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Assume suitable data **wherever** necessary.*
*2) Non-programmable calculators are **permitted**.*

SECTION – I

2. Solve **any four**. **(5×4=20)**

a) How velocity is measured ? Explain with neat diagram.

b) Explain various types of transducer. Explain active and passive transducer with example based on working principle.

c) Explain Chopper stabilized amplifier.

d) What is error ? Explain various errors in instrumentation.

e) Define :

1) Resolution 2) Accuracy
3) Threshold 4) Static error

3. Solve **any two**. **(10×2=20)**

a) Explain the instrumentation system with neat block diagram. Give a practical example of it with explanation.

b) Explain various types of modulation.

c) Define telemetry. Explain voltage and current telemetry system.

SECTION – II

4. Solve **any four**. **(5×4=20)**

a) Explain the various types of DAC.

b) Enlist different types of digital and analog input, output devices.

c) Write short note on :
   1) LCD display
   2) LED display.

d) Explain in short about sample and hold circuit.

e) Explain data acquisition system.

5. Solve **any two**. **(2×10=20)**

a) Explain magnetic strip chart recorder in detail.

b) Explain frequency division multiplexing and time division multiplexing.

c) Explain the architecture of PLC with neat diagram.

SLR-TC – 505

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 11-5-2018 Total Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) In optical pyrometer temperature is measured by
   a) Photocell principle b) Peltier effect
   c) Comparing brightness of source d) None of these

2) Strip chart recorders have advantage of
   a) Long period run b) Change in speed chart
   c) Uniform resolution d) All of above

3) High value pot resistance leads to
   a) Low sensitivity b) High sensitivity
   c) Low non-linearity d) Less error

4) What is value of LSB of an 8-bit DAC for 0-12.8 v range ?
   a) 1.6 v b) 50 mv c) 0.625 v d) 1.28 v

5) In microwave telemetry repeater stations are required at every
   a) 2 Km b) 5 Km c) 40 Km d) 100 Km

6) The strain gauge should have low
   a) Resistance b) Resistance temperature
   c) Gauge factor d) All of above

7) For surface temperature measurement one can use
   a) Strain gauge b) Diaphragm c) RTD d) Thermocouple

8) Null type recorders are _____ recorders.
a) Potentiometric b) Bridge c) LVDT d) Any of above

9) The sensitivity factor of strain gauge is normally of order of
a) 1 to 1.5 b) 1.5 to 2.0 c) 0.5 to 1.0 d) 5 to 10

10) Doppler shift principle is used in measurement of
a) Temperature b) Frequency c) Speed d) Pressure

11) The output of current to voltage converter is given by
a) – If.Rf b) Vo/Rin c) – Rf/R1 d) 1 + (Rf/R1)

12) Bourdon tube are made of
a) Copper b) Aluminum c) Metal Alloy d) Phosphorous

13) Butterworth filters are also known as
a) Ripple filter b) Ripple stop band
c) Flat filter d) Spike filter

14) In Pt-100 RTD 100 means
a) Can measure up to 100°C
b) Has 100 ohm resistance at 100°C
c) Has 0 ohm resistance at 100°C
d) Has 100 ohm resistance at 0°C

15) Radiation pyrometer is used in for temperature range of
a) 0 – 500°C b) 500 – 1000°C
c) – 250 – 500°C d) 1200 – 2500°C

16) X-Y recorders record
a) one quality with respect to other quantity
b) one quantity on x axis with respect to time on y axis
c) one quantity on y axis with respect to time on x axis
d) record both quantity on both axis

17) Telemetry processes the information from remote by means of
a) Mechanical means b) Electrical means
c) CRO d) All of the above

18) Which of the following is transducer ?
a) Piezoelectric b) Thermocouple
c) Photovoltaic cell d) LVDT

19) Which of the following is non-planar display ?
a) LCD b) LED
c) Rear projection display d) None of these

20) What are selection criteria of PLC ?
a) Size of memory of CPU b) No. of input and output
c) Scan time d) All of above

_____

SLR-TC – 505

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 11-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Assume suitable data **wherever** necessary.*
*2) Non-programmable calculators are **permitted**.*

SECTION – I

2. Solve **any four**. **(5×4=20)**

a) How velocity is measured ? Explain with neat diagram.

b) Explain various types of transducer. Explain active and passive transducer with example based on working principle.

c) Explain Chopper stabilized amplifier.

d) What is error ? Explain various errors in instrumentation.

e) Define :

1) Resolution 2) Accuracy
3) Threshold 4) Static error

3. Solve **any two**. **(10×2=20)**

a) Explain the instrumentation system with neat block diagram. Give a practical example of it with explanation.

b) Explain various types of modulation.

c) Define telemetry. Explain voltage and current telemetry system.

SECTION – II

4. Solve **any four**. **(5×4=20)**

a) Explain the various types of DAC.

b) Enlist different types of digital and analog input, output devices.

c) Write short note on :
   1) LCD display
   2) LED display.

d) Explain in short about sample and hold circuit.

e) Explain data acquisition system.

5. Solve **any two**. **(2×10=20)**

a) Explain magnetic strip chart recorder in detail.

b) Explain frequency division multiplexing and time division multiplexing.

c) Explain the architecture of PLC with neat diagram.

SLR-TC – 505

Seat No.	

Set **S**

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 11-5-2018 Total Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) X-Y recorders record
   a) one quality with respect to other quantity
   b) one quantity on x axis with respect to time on y axis
   c) one quantity on y axis with respect to time on x axis
   d) record both quantity on both axis

2) Telemetry processes the information from remote by means of
   a) Mechanical means b) Electrical means
   c) CRO d) All of the above

3) Which of the following is transducer ?
   a) Piezoelectric b) Thermocouple
   c) Photovoltaic cell d) LVDT

4) Which of the following is non-planar display ?
   a) LCD b) LED
   c) Rear projection display d) None of these

5) What are selection criteria of PLC ?
   a) Size of memory of CPU b) No. of input and output
   c) Scan time d) All of above

6) In optical pyrometer temperature is measured by
   a) Photocell principle b) Peltier effect
   c) Comparing brightness of source d) None of these

7) Strip chart recorders have advantage of
   a) Long period run b) Change in speed chart
   c) Uniform resolution d) All of above

8) High value pot resistance leads to
   a) Low sensitivity b) High sensitivity
   c) Low non-linearity d) Less error

9) What is value of LSB of an 8-bit DAC for 0-12.8 v range ?
   a) 1.6 v b) 50 mv c) 0.625 v d) 1.28 v

10) In microwave telemetry repeater stations are required at every
   a) 2 Km b) 5 Km c) 40 Km d) 100 Km

11) The strain gauge should have low
   a) Resistance b) Resistance temperature
   c) Gauge factor d) All of above

12) For surface temperature measurement one can use
   a) Strain gauge b) Diaphragm c) RTD d) Thermocouple

13) Null type recorders are _____ recorders.
   a) Potentiometric b) Bridge c) LVDT d) Any of above

14) The sensitivity factor of strain gauge is normally of order of
   a) 1 to 1.5 b) 1.5 to 2.0 c) 0.5 to 1.0 d) 5 to 10

15) Doppler shift principle is used in measurement of
   a) Temperature b) Frequency c) Speed d) Pressure

16) The output of current to voltage converter is given by
   a) – If.Rf b) Vo/Rin c) – Rf/R1 d) 1 + (Rf/R1)

17) Bourdon tube are made of
   a) Copper b) Aluminum c) Metal Alloy d) Phosphorous

18) Butterworth filters are also known as
   a) Ripple filter b) Ripple stop band
   c) Flat filter d) Spike filter

19) In Pt-100 RTD 100 means
   a) Can measure up to 100°C
   b) Has 100 ohm resistance at 100°C
   c) Has 0 ohm resistance at 100°C
   d) Has 100 ohm resistance at 0°C

20) Radiation pyrometer is used in for temperature range of
   a) 0 – 500°C b) 500 – 1000°C
   c) – 250 – 500°C d) 1200 – 2500°C

_____

SLR-TC – 505

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) (Old) Examination, 2018
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 11-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) Assume suitable data **wherever** necessary.*
*2) Non-programmable calculators are **permitted**.*

SECTION – I

2. Solve **any four**. **(5×4=20)**

a) How velocity is measured ? Explain with neat diagram.

b) Explain various types of transducer. Explain active and passive transducer with example based on working principle.

c) Explain Chopper stabilized amplifier.

d) What is error ? Explain various errors in instrumentation.

e) Define :

1) Resolution 2) Accuracy
3) Threshold 4) Static error

3. Solve **any two**. **(10×2=20)**

a) Explain the instrumentation system with neat block diagram. Give a practical example of it with explanation.

b) Explain various types of modulation.

c) Define telemetry. Explain voltage and current telemetry system.

SECTION – II

4. Solve **any four**. **(5×4=20)**

a) Explain the various types of DAC.

b) Enlist different types of digital and analog input, output devices.

c) Write short note on :
   1) LCD display
   2) LED display.

d) Explain in short about sample and hold circuit.

e) Explain data acquisition system.

5. Solve **any two**. **(2×10=20)**

a) Explain magnetic strip chart recorder in detail.

b) Explain frequency division multiplexing and time division multiplexing.

c) Explain the architecture of PLC with neat diagram.

SLR-TC – 506

Seat No.	

Set **P**

B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018
POWER SYSTEM – II

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

Instructions *:*
i) ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume ***suitable*** *data if 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 : 20

1. Choose the correct answer : **(20×1=20)**

1) Load flow study is carried out for
   a) Load frequency control b) Planning of power system
   c) Fault calculation d) Study of stability of the system

2) The stability of power system is not affected by
   a) Generator reactance b) Line reactance
   c) Line losses d) Excitation of generators

3) Which of the following results in a symmetrical fault ?
   a) Single L-G fault b) L-L faults
   c) All three phase to earth fault d) Two phase to earth fault

4) Zero sequence fault current is absent when fault is
   a) Single L-G fault b) L-L faults c) Double L-L fault d) None of these

5) A negative sequence relay is commonly used to protect
   a) Alternator b) Transformer c) Transmission line d) Bus bar

6) The magnitude of fault current depends on
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supply before occurrence of faults
   d) Both a) and b)

7) Equal area criterion gives the information regarding
   a) Stability region b) Absolute stability
   c) Relative stability d) Swing curves

8) The critical clearing time of a fault in power system is related to
   a) Reactive power limit b) Short circuit limit
   c) Steady state limit d) Transient stability limit

P.T.O.

9) Negative sequence reactance of a transformer is
   a) Equal to the positive sequence reactance
   b) Lesser than positive sequence reactance
   c) Greater than positive sequence reactance
   d) None of these

10) If all sequence voltages at the fault point in a power system are equal, then the fault is
   a) 3-phase fault b) L-G fault
   c) L-L fault d) Double L-G fault

11) The positive sequence currents of a transmission line is
   a) Always b) 1/3 of negative sequence current
   c) Equal to negative sequence current d) 3 times the negative sequence current

12) When a line to ground fault occurs, the current in the faulted phase is 100 A. The zero equence current in this case will be
   a) Zero b) 33.3 A c) 66.6 A d) 100 A

13) A balanced 3-phase system consists of
   a) Zero sequence currents only
   b) Positive sequence currents only
   c) Negative sequence currents only
   d) Zero, positive and negative sequence currents

14) The distribution systems in India are mostly
   a) Radial b) Parallel c) Network d) None of these

15) Transient disturbance are caused by
   a) Sudden load changes b) Switching operation
   c) Faults in the power system d) All of the above

16) The constant H of a turbo-generator of 200 MVA is 6.0. Its value corresponding to 300 MVA base will be
   a) 9.0 b) 4.0 c) 6.0 d) 13.5

17) If the torque angle of an alternator increases infinitely the system will show
   a) Steady state stability b) Transient stability
   c) Instability d) None of these

18) Load-flow studies involve solving simultaneous
   a) Linear algebraic equations b) Non-linear algebraic equations
   c) Linear differential equations d) Non-linear differential equations

19) Slack bus is _____ bus.
   a) Load b) Generator c) Feeder d) Measurement

20) In load-flow analysis, the load connected at a bus is represented as
   a) Constant current drawn from the bus
   b) Constant impedance connected at the bus
   c) Voltage and frequency dependent source at the bus
   d) Constant real and reactive power drawn from the bus

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SLR-TC – 506

Seat No.	

B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018
POWER SYSTEM – II

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Explain representation of loads.
   b) State advantages of PU system.
   c) Write short note on Slack bus.
   d) Derive an expression for SLFE.
   e) Explain the advantages and disadvantages of Gauss Seidel method and Newton Raphson method.
   f) Explain short circuit on synchronous machine at no load.

3. Solve **any two** : **(10×2=20)**
   a) Derive and explain the expression of Newton Raphson method.
   b) Explain briefly equal area criterion and how it may be used to study the stability of a two machine system.
   c) A double line fault occurs between the two phases of the transmission line with impedance Zf between them. Find the interconnection of the three sequence networks and hence determine the fault current.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   a) Derive and draw sequence network of two conductor open fault.
   b) Draw the zero sequence network of different type of transformer connections.
   c) Write a short note on selection of circuit breaker.
   d) Explain the equal area criteria of power system stability.
   e) Analyze a single line to ground fault and show the connections of sequence network.

5. Solve **any two** : **(10×2=20)**

a) What are the factors affecting transient stability ? Explain the methods for improving stability of system.

b) Explain in detail contingency analysis and sensitivity factors.

c) Explain the system constraints in the power system. What is Unit commitment ? Explain in detail.

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SLR-TC – 506

Seat No.	

Set **Q**

B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018
POWER SYSTEM – II

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

Instructions *:*
i) ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume ***suitable*** *data if 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 : 20

1. Choose the correct answer : **(20×1=20)**

1) The constant H of a turbo-generator of 200 MVA is 6.0. Its value corresponding to 300 MVA base will be
a) 9.0 b) 4.0 c) 6.0 d) 13.5

2) If the torque angle of an alternator increases infinitely the system will show
a) Steady state stability b) Transient stability
c) Instability d) None of these

3) Load-flow studies involve solving simultaneous
a) Linear algebraic equations b) Non-linear algebraic equations
c) Linear differential equations d) Non-linear differential equations

4) Slack bus is _____ bus.
a) Load b) Generator c) Feeder d) Measurement

5) In load-flow analysis, the load connected at a bus is represented as
a) Constant current drawn from the bus
b) Constant impedance connected at the bus
c) Voltage and frequency dependent source at the bus
d) Constant real and reactive power drawn from the bus

6) Load flow study is carried out for
a) Load frequency control b) Planning of power system
c) Fault calculation d) Study of stability of the system

7) The stability of power system is not affected by
a) Generator reactance b) Line reactance
c) Line losses d) Excitation of generators

8) Which of the following results in a symmetrical fault ?
   a) Single L-G fault
   b) L-L faults
   c) All three phase to earth fault
   d) Two phase to earth fault

9) Zero sequence fault current is absent when fault is
   a) Single L-G fault b) L-L faults c) Double L-L fault d) None of these

10) A negative sequence relay is commonly used to protect
   a) Alternator b) Transformer c) Transmission line d) Bus bar

11) The magnitude of fault current depends on
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supply before occurrence of faults
   d) Both a) and b)

12) Equal area criterion gives the information regarding
   a) Stability region
   b) Absolute stability
   c) Relative stability
   d) Swing curves

13) The critical clearing time of a fault in power system is related to
   a) Reactive power limit
   b) Short circuit limit
   c) Steady state limit
   d) Transient stability limit

14) Negative sequence reactance of a transformer is
   a) Equal to the positive sequence reactance
   b) Lesser than positive sequence reactance
   c) Greater than positive sequence reactance
   d) None of these

15) If all sequence voltages at the fault point in a power system are equal, then the fault is
   a) 3-phase fault
   b) L-G fault
   c) L-L fault
   d) Double L-G fault

16) The positive sequence currents of a transmission line is
   a) Always
   b) 1/3 of negative sequence current
   c) Equal to negative sequence current
   d) 3 times the negative sequence current

17) When a line to ground fault occurs, the current in the faulted phase is 100 A. The zero equence current in this case will be
   a) Zero b) 33.3 A c) 66.6 A d) 100 A

18) A balanced 3-phase system consists of
   a) Zero sequence currents only
   b) Positive sequence currents only
   c) Negative sequence currents only
   d) Zero, positive and negative sequence currents

19) The distribution systems in India are mostly
   a) Radial b) Parallel c) Network d) None of these

20) Transient disturbance are caused by
   a) Sudden load changes
   b) Switching operation
   c) Faults in the power system
   d) All of the above

SLR-TC – 506

Seat No.	

B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018
POWER SYSTEM – II

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Explain representation of loads.
   b) State advantages of PU system.
   c) Write short note on Slack bus.
   d) Derive an expression for SLFE.
   e) Explain the advantages and disadvantages of Gauss Seidel method and Newton Raphson method.
   f) Explain short circuit on synchronous machine at no load.

3. Solve **any two** : **(10×2=20)**
   a) Derive and explain the expression of Newton Raphson method.
   b) Explain briefly equal area criterion and how it may be used to study the stability of a two machine system.
   c) A double line fault occurs between the two phases of the transmission line with impedance Zf between them. Find the interconnection of the three sequence networks and hence determine the fault current.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   a) Derive and draw sequence network of two conductor open fault.
   b) Draw the zero sequence network of different type of transformer connections.
   c) Write a short note on selection of circuit breaker.
   d) Explain the equal area criteria of power system stability.
   e) Analyze a single line to ground fault and show the connections of sequence network.

Set Q

5. Solve **any two** : **(10×2=20)**

a) What are the factors affecting transient stability ? Explain the methods for improving stability of system.

b) Explain in detail contingency analysis and sensitivity factors.

c) Explain the system constraints in the power system. What is Unit commitment ? Explain in detail.

SLR-TC – 506

Seat No.	

Set **R**

B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018
POWER SYSTEM – II

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

Instructions *:*
i) ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume ***suitable*** *data if 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 : 20

1. Choose the correct answer : **(20×1=20)**

1) The positive sequence currents of a transmission line is
   a) Always
   b) 1/3 of negative sequence current
   c) Equal to negative sequence current
   d) 3 times the negative sequence current

2) When a line to ground fault occurs, the current in the faulted phase is 100 A. The zero equence current in this case will be
   a) Zero b) 33.3 A c) 66.6 A d) 100 A

3) A balanced 3-phase system consists of
   a) Zero sequence currents only
   b) Positive sequence currents only
   c) Negative sequence currents only
   d) Zero, positive and negative sequence currents

4) The distribution systems in India are mostly
   a) Radial b) Parallel c) Network d) None of these

5) Transient disturbance are caused by
   a) Sudden load changes
   b) Switching operation
   c) Faults in the power system
   d) All of the above

6) The constant H of a turbo-generator of 200 MVA is 6.0. Its value corresponding to 300 MVA base will be
   a) 9.0 b) 4.0 c) 6.0 d) 13.5

7) If the torque angle of an alternator increases infinitely the system will show
   a) Steady state stability
   b) Transient stability
   c) Instability
   d) None of these

P.T.O.

8) Load-flow studies involve solving simultaneous
   a) Linear algebraic equations
   b) Non-linear algebraic equations
   c) Linear differential equations
   d) Non-linear differential equations

9) Slack bus is _____ bus.
   a) Load b) Generator c) Feeder d) Measurement

10) In load-flow analysis, the load connected at a bus is represented as
   a) Constant current drawn from the bus
   b) Constant impedance connected at the bus
   c) Voltage and frequency dependent source at the bus
   d) Constant real and reactive power drawn from the bus

11) Load flow study is carried out for
   a) Load frequency control
   b) Planning of power system
   c) Fault calculation
   d) Study of stability of the system

12) The stability of power system is not affected by
   a) Generator reactance
   b) Line reactance
   c) Line losses
   d) Excitation of generators

13) Which of the following results in a symmetrical fault ?
   a) Single L-G fault
   b) L-L faults
   c) All three phase to earth fault
   d) Two phase to earth fault

14) Zero sequence fault current is absent when fault is
   a) Single L-G fault b) L-L faults c) Double L-L fault d) None of these

15) A negative sequence relay is commonly used to protect
   a) Alternator b) Transformer c) Transmission line d) Bus bar

16) The magnitude of fault current depends on
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supply before occurrence of faults
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17) Equal area criterion gives the information regarding
   a) Stability region
   b) Absolute stability
   c) Relative stability
   d) Swing curves

18) The critical clearing time of a fault in power system is related to
   a) Reactive power limit
   b) Short circuit limit
   c) Steady state limit
   d) Transient stability limit

19) Negative sequence reactance of a transformer is
   a) Equal to the positive sequence reactance
   b) Lesser than positive sequence reactance
   c) Greater than positive sequence reactance
   d) None of these

20) If all sequence voltages at the fault point in a power system are equal, then the fault is
   a) 3-phase fault
   b) L-G fault
   c) L-L fault
   d) Double L-G fault

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SLR-TC – 506

Seat No.	

B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018
POWER SYSTEM – II

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Explain representation of loads.
   b) State advantages of PU system.
   c) Write short note on Slack bus.
   d) Derive an expression for SLFE.
   e) Explain the advantages and disadvantages of Gauss Seidel method and Newton Raphson method.
   f) Explain short circuit on synchronous machine at no load.

3. Solve **any two** : **(10×2=20)**
   a) Derive and explain the expression of Newton Raphson method.
   b) Explain briefly equal area criterion and how it may be used to study the stability of a two machine system.
   c) A double line fault occurs between the two phases of the transmission line with impedance Zf between them. Find the interconnection of the three sequence networks and hence determine the fault current.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   a) Derive and draw sequence network of two conductor open fault.
   b) Draw the zero sequence network of different type of transformer connections.
   c) Write a short note on selection of circuit breaker.
   d) Explain the equal area criteria of power system stability.
   e) Analyze a single line to ground fault and show the connections of sequence network.

Set R

5. Solve **any two** : **(10×2=20)**

a) What are the factors affecting transient stability ? Explain the methods for improving stability of system.

b) Explain in detail contingency analysis and sensitivity factors.

c) Explain the system constraints in the power system. What is Unit commitment ? Explain in detail.

SLR-TC – 506

Seat No.	

Set **S**

B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018
POWER SYSTEM – II

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

Instructions *:*
i) ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume ***suitable*** *data if 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 : 20

1. Choose the correct answer : **(20×1=20)**

1) The magnitude of fault current depends on
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supply before occurrence of faults
   d) Both a) and b)

2) Equal area criterion gives the information regarding
   a) Stability region b) Absolute stability
   c) Relative stability d) Swing curves

3) The critical clearing time of a fault in power system is related to
   a) Reactive power limit b) Short circuit limit
   c) Steady state limit d) Transient stability limit

4) Negative sequence reactance of a transformer is
   a) Equal to the positive sequence reactance
   b) Lesser than positive sequence reactance
   c) Greater than positive sequence reactance
   d) None of these

5) If all sequence voltages at the fault point in a power system are equal, then the fault is
   a) 3-phase fault b) L-G fault
   c) L-L fault d) Double L-G fault

6) The positive sequence currents of a transmission line is
   a) Always b) 1/3 of negative sequence current
   c) Equal to negative sequence current d) 3 times the negative sequence current

7) When a line to ground fault occurs, the current in the faulted phase is 100 A. The zero equence current in this case will be
   a) Zero b) 33.3 A c) 66.6 A d) 100 A

8) A balanced 3-phase system consists of
   a) Zero sequence currents only
   b) Positive sequence currents only
   c) Negative sequence currents only
   d) Zero, positive and negative sequence currents

9) The distribution systems in India are mostly
   a) Radial b) Parallel c) Network d) None of these

10) Transient disturbance are caused by
   a) Sudden load changes b) Switching operation
   c) Faults in the power system d) All of the above

11) The constant H of a turbo-generator of 200 MVA is 6.0. Its value corresponding to 300 MVA base will be
   a) 9.0 b) 4.0 c) 6.0 d) 13.5

12) If the torque angle of an alternator increases infinitely the system will show
   a) Steady state stability b) Transient stability
   c) Instability d) None of these

13) Load-flow studies involve solving simultaneous
   a) Linear algebraic equations b) Non-linear algebraic equations
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14) Slack bus is _____ bus.
   a) Load b) Generator c) Feeder d) Measurement

15) In load-flow analysis, the load connected at a bus is represented as
   a) Constant current drawn from the bus
   b) Constant impedance connected at the bus
   c) Voltage and frequency dependent source at the bus
   d) Constant real and reactive power drawn from the bus

16) Load flow study is carried out for
   a) Load frequency control b) Planning of power system
   c) Fault calculation d) Study of stability of the system

17) The stability of power system is not affected by
   a) Generator reactance b) Line reactance
   c) Line losses d) Excitation of generators

18) Which of the following results in a symmetrical fault ?
   a) Single L-G fault b) L-L faults
   c) All three phase to earth fault d) Two phase to earth fault

19) Zero sequence fault current is absent when fault is
   a) Single L-G fault b) L-L faults c) Double L-L fault d) None of these

20) A negative sequence relay is commonly used to protect
   a) Alternator b) Transformer c) Transmission line d) Bus bar

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SLR-TC – 506

Seat No.	

B.E. (Part – I) (Old) (Electrical and Electronics Engineering) Examination, 2018
POWER SYSTEM – II

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Explain representation of loads.
   b) State advantages of PU system.
   c) Write short note on Slack bus.
   d) Derive an expression for SLFE.
   e) Explain the advantages and disadvantages of Gauss Seidel method and Newton Raphson method.
   f) Explain short circuit on synchronous machine at no load.

3. Solve **any two** : **(10×2=20)**
   a) Derive and explain the expression of Newton Raphson method.
   b) Explain briefly equal area criterion and how it may be used to study the stability of a two machine system.
   c) A double line fault occurs between the two phases of the transmission line with impedance Zf between them. Find the interconnection of the three sequence networks and hence determine the fault current.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   a) Derive and draw sequence network of two conductor open fault.
   b) Draw the zero sequence network of different type of transformer connections.
   c) Write a short note on selection of circuit breaker.
   d) Explain the equal area criteria of power system stability.
   e) Analyze a single line to ground fault and show the connections of sequence network.

5. Solve **any two** : **(10×2=20)**

a) What are the factors affecting transient stability ? Explain the methods for improving stability of system.

b) Explain in detail contingency analysis and sensitivity factors.

c) Explain the system constraints in the power system. What is Unit commitment ? Explain in detail.

SLR-TC – 507

Seat No.	

Set P

B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***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 pole changing type squirrel cage motors used in derricks has four, eight and twenty four poles. In this, the medium speed is used for
   a) lifting b) hoisting
   c) lowering d) landing the load

2) Light duty cranes are generally used in
   a) automobile workshops b) pumping stations
   c) power houses d) all of above

3) To get speed higher than the base speed of the dc shunt motor
   a) armature resistance control is used
   b) field resistance control is used
   c) armature voltage control is used
   d) none of these

4) Which of the following pair is used for frequency converter ?
   a) squirrel cage IM and synchronous motor
   b) wound rotor IM and synchronous motor
   c) wound rotor IM and squirrel cage IM
   d) any of above

5) Which of the following is preferred for automatic drive ?
   a) Synchronous motor b) Squirrel cage IM
   c) Ward Leonard controlled dc motors d) Any of above

6) A wound rotor IM is preferred over squirrel cage IM when the major consideration involved is
   a) high starting torque b) low starting current
   c) speed control over limited range d) any of above

7) 15 minutes rated motors are suitable for
   a) light duty crane b) medium duty crane
   c) high duty crane d) all of above

8) In motor circuit, static frequency changers are used for
   a) power factor improvement b) improved cooling
   c) reversal of direction d) speed regulation

9) During regenerative braking
   a) E < V b) E > V c) E = V d) none of above

10) The variable frequency supply to IM for speed control can be made available using
   a) VSI b) CSI c) Cycloconverter d) All

11) When quick speed reversal consideration, the motor preferred is
   a) Synchronous motor b) Squirrel cage IM
   c) Wound rotor IM d) DC motor

12) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is
   a) high starting torque b) low starting current
   c) speed control over limited range d) any of above

13) Effect of friction torque is more pronounced
   a) when the drive is running on full speed
   b) when the drive is being started
   c) when the drive is being stopped
   d) when drive at half of its normal speed

14) The motor commonly used in computers and digital systems is
   a) dc shunt motor b) induction motor
   c) stepper motor d) synchronous motor

SLR-TC – 507

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **Assume** suitable data **wherever** necessary.*
*2) Non-programmable calculators are **permitted**.*

SECTION – I

2. Solve **any three** : **(3×4=12)**
   a) Explain the function of Control Unit and Sensing Unit in electrical drives.
   b) Give classification of Drives.
   c) What are the criteria for selection of Electrical Drives ?
   d) Explain Current limit control loop with block diagram.
   e) Define dynamics and explain effect of dynamics on Electrical Drives.

3. Solve **any two** : **(2×8=16)**
   a) A drive has following parameters :

      J = 10kg-m^2, T = 100-0.1N, Nm, passive load torque T_1 = 0.05N, Nm where N is speed in rpm. Initially, the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristics is changed to T = –100-0.1N,Nm. Calculate the time of reversal.

   b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ohm. It is braked by plugging from an initial speed of 1000 rpm.

      Calculate :

      i) Resistance to be placed in armature circuit to twice full load torque.

      ii) Braking torque.

   c) Explain braking methods of D.C. drives with necessary diagram.

SECTION – II

4. Solve **any three** : **(3×4=12)**

   a) Explain speed control of induction motor by VSI.

   b) Explain static rotor resistance control method.

   c) Explain static Krammer drive with block diagram and waveforms.

   d) Explain operation stepper motor drives.

   e) A 440V, 50 Hz, 6 pole Y-connected wound rotor motor has following parameters-RS = 0.5Ω, Rr' = 0.4Ω, Xs = Xr' = 1.2Ω, Xm = 50Ω . Stator to rotor turn ratio is 3.5.

      Motor is controlled by static rotor resistance control. External resistance is chosen such that breakdown torque is produced at stand still for duty ratio of zero. Calculate value of external resistance.

5. Solve **any two** : **(8×2=16)**

   a) Describe Slip Power Recovery Scheme with needed diagram.

   b) A 440V, 50 Hz, 970 rpm, 6 pole, star connected, 3Φ wound rotor IM has following parameter referred to stator :

      Rs = 0.1Ω, Rr' = 0.08Ω, Xs =0.3Ω, Xr' = 0.4Ω. Stator to rotor turn ratio is 2. Motor speed is controlled by Static Scherbius Drive. Drive is designed for speed range of 25% below synchronous speed. Maximum value of firing angle 165°. Calculate

      i) Transformer turns ratio.

      ii) Torque for the speed of 780 rpm and α =140°

      [Note : Rd = 0.01Ω].

   c) Explain variable frequency control of multiple synchronous motor drives.

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SLR-TC – 507

Seat No.	

Set Q

B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***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) In motor circuit, static frequency changers are used for
   a) power factor improvement b) improved cooling
   c) reversal of direction d) speed regulation

2) During regenerative braking
   a) E < V b) E > V c) E = V d) none of above

3) The variable frequency supply to IM for speed control can be made available using
   a) VSI b) CSI c) Cycloconverter d) All

4) When quick speed reversal consideration, the motor preferred is
   a) Synchronous motor b) Squirrel cage IM
   c) Wound rotor IM d) DC motor

5) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is
   a) high starting torque
   b) low starting current
   c) speed control over limited range
   d) any of above

6) Effect of friction torque is more pronounced
   a) when the drive is running on full speed
   b) when the drive is being started
   c) when the drive is being stopped
   d) when drive at half of its normal speed

7) The motor commonly used in computers and digital systems is
   a) dc shunt motor
   b) induction motor
   c) stepper motor
   d) synchronous motor

8) A pole changing type squirrel cage motors used in derricks has four, eight and twenty four poles. In this, the medium speed is used for
   a) lifting
   b) hoisting
   c) lowering
   d) landing the load

9) Light duty cranes are generally used in
   a) automobile workshops
   b) pumping stations
   c) power houses
   d) all of above

10) To get speed higher than the base speed of the dc shunt motor
   a) armature resistance control is used
   b) field resistance control is used
   c) armature voltage control is used
   d) none of these

11) Which of the following pair is used for frequency converter ?
   a) squirrel cage IM and synchronous motor
   b) wound rotor IM and synchronous motor
   c) wound rotor IM and squirrel cage IM
   d) any of above

12) Which of the following is preferred for automatic drive ?
   a) Synchronous motor
   b) Squirrel cage IM
   c) Ward Leonard controlled dc motors
   d) Any of above

13) A wound rotor IM is preferred over squirrel cage IM when the major consideration involved is
   a) high starting torque
   b) low starting current
   c) speed control over limited range
   d) any of above

14) 15 minutes rated motors are suitable for
   a) light duty crane
   b) medium duty crane
   c) high duty crane
   d) all of above

SLR-TC – 507

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **Assume** suitable data **wherever** necessary.*
*2) Non-programmable calculators are **permitted**.*

SECTION – I

2. Solve **any three** : **(3×4=12)**
   a) Explain the function of Control Unit and Sensing Unit in electrical drives.
   b) Give classification of Drives.
   c) What are the criteria for selection of Electrical Drives ?
   d) Explain Current limit control loop with block diagram.
   e) Define dynamics and explain effect of dynamics on Electrical Drives.

3. Solve **any two** : **(2×8=16)**
   a) A drive has following parameters :

      J = 10kg-m^2, T = 100-0.1N, Nm, passive load torque T_1 = 0.05N, Nm where N is speed in rpm. Initially, the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristics is changed to T = –100-0.1N,Nm. Calculate the time of reversal.

   b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ohm. It is braked by plugging from an initial speed of 1000 rpm.

      Calculate :

      i) Resistance to be placed in armature circuit to twice full load torque.
      ii) Braking torque.

   c) Explain braking methods of D.C. drives with necessary diagram.

SECTION – II

4. Solve **any three** : **(3×4=12)**

   a) Explain speed control of induction motor by VSI.

   b) Explain static rotor resistance control method.

   c) Explain static Krammer drive with block diagram and waveforms.

   d) Explain operation stepper motor drives.

   e) A 440V, 50 Hz, 6 pole Y-connected wound rotor motor has following parameters-RS = 0.5Ω, Rr' = 0.4Ω, Xs = Xr' = 1.2Ω, Xm = 50Ω . Stator to rotor turn ratio is 3.5.

      Motor is controlled by static rotor resistance control. External resistance is chosen such that breakdown torque is produced at stand still for duty ratio of zero. Calculate value of external resistance.

5. Solve **any two** : **(8×2=16)**

   a) Describe Slip Power Recovery Scheme with needed diagram.

   b) A 440V, 50 Hz, 970 rpm, 6 pole, star connected, 3Φ wound rotor IM has following parameter referred to stator :

      Rs = 0.1Ω, Rr' = 0.08Ω, Xs =0.3Ω, Xr' = 0.4Ω. Stator to rotor turn ratio is 2. Motor speed is controlled by Static Scherbius Drive. Drive is designed for speed range of 25% below synchronous speed. Maximum value of firing angle 165°. Calculate

      i) Transformer turns ratio.

      ii) Torque for the speed of 780 rpm and α =140°

      [Note : Rd = 0.01Ω].

   c) Explain variable frequency control of multiple synchronous motor drives.

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SLR-TC – 507

Seat No.	

Set R

B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***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) Which of the following is preferred for automatic drive ?
   a) Synchronous motor b) Squirrel cage IM
   c) Ward Leonard controlled dc motors d) Any of above

2) A wound rotor IM is preferred over squirrel cage IM when the major consideration involved is
   a) high starting torque b) low starting current
   c) speed control over limited range d) any of above

3) 15 minutes rated motors are suitable for
   a) light duty crane b) medium duty crane
   c) high duty crane d) all of above

4) In motor circuit, static frequency changers are used for
   a) power factor improvement b) improved cooling
   c) reversal of direction d) speed regulation

5) During regenerative braking
   a) E < V b) E > V c) E = V d) none of above

6) The variable frequency supply to IM for speed control can be made available using
   a) VSI b) CSI c) Cycloconverter d) All

P.T.O.

7) When quick speed reversal consideration, the motor preferred is
   a) Synchronous motor b) Squirrel cage IM
   c) Wound rotor IM d) DC motor

8) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is
   a) high starting torque b) low starting current
   c) speed control over limited range d) any of above

9) Effect of friction torque is more pronounced
   a) when the drive is running on full speed
   b) when the drive is being started
   c) when the drive is being stopped
   d) when drive at half of its normal speed

10) The motor commonly used in computers and digital systems is
   a) dc shunt motor b) induction motor
   c) stepper motor d) synchronous motor

11) A pole changing type squirrel cage motors used in derricks has four, eight and twenty four poles. In this, the medium speed is used for
   a) lifting b) hoisting
   c) lowering d) landing the load

12) Light duty cranes are generally used in
   a) automobile workshops b) pumping stations
   c) power houses d) all of above

13) To get speed higher than the base speed of the dc shunt motor
   a) armature resistance control is used
   b) field resistance control is used
   c) armature voltage control is used
   d) none of these

14) Which of the following pair is used for frequency converter ?
   a) squirrel cage IM and synchronous motor
   b) wound rotor IM and synchronous motor
   c) wound rotor IM and squirrel cage IM
   d) any of above

SLR-TC – 507

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **Assume** suitable data **wherever** necessary.*
*2) Non-programmable calculators are **permitted**.*

SECTION – I

2. Solve **any three** : **(3×4=12)**
   a) Explain the function of Control Unit and Sensing Unit in electrical drives.
   b) Give classification of Drives.
   c) What are the criteria for selection of Electrical Drives ?
   d) Explain Current limit control loop with block diagram.
   e) Define dynamics and explain effect of dynamics on Electrical Drives.

3. Solve **any two** : **(2×8=16)**
   a) A drive has following parameters :

      J = 10kg-m^2, T = 100-0.1N, Nm, passive load torque T_1 = 0.05N, Nm where N is speed in rpm. Initially, the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristics is changed to T = –100-0.1N,Nm. Calculate the time of reversal.

   b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ohm. It is braked by plugging from an initial speed of 1000 rpm.

      Calculate :

      i) Resistance to be placed in armature circuit to twice full load torque.

      ii) Braking torque.

   c) Explain braking methods of D.C. drives with necessary diagram.

SECTION – II

4. Solve **any three** : **(3×4=12)**

   a) Explain speed control of induction motor by VSI.

   b) Explain static rotor resistance control method.

   c) Explain static Krammer drive with block diagram and waveforms.

   d) Explain operation stepper motor drives.

   e) A 440V, 50 Hz, 6 pole Y-connected wound rotor motor has following parameters-RS = 0.5Ω, Rr' = 0.4Ω, Xs = Xr' = 1.2Ω, Xm = 50Ω . Stator to rotor turn ratio is 3.5.

      Motor is controlled by static rotor resistance control. External resistance is chosen such that breakdown torque is produced at stand still for duty ratio of zero. Calculate value of external resistance.

5. Solve **any two** : **(8×2=16)**

   a) Describe Slip Power Recovery Scheme with needed diagram.

   b) A 440V, 50 Hz, 970 rpm, 6 pole, star connected, 3Φ wound rotor IM has following parameter referred to stator :

      Rs = 0.1Ω, Rr' = 0.08Ω, Xs =0.3Ω, Xr' = 0.4Ω. Stator to rotor turn ratio is 2. Motor speed is controlled by Static Scherbius Drive. Drive is designed for speed range of 25% below synchronous speed. Maximum value of firing angle 165°. Calculate

      i) Transformer turns ratio.

      ii) Torque for the speed of 780 rpm and α =140°

      [Note : Rd = 0.01Ω].

   c) Explain variable frequency control of multiple synchronous motor drives.

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SLR-TC – 507

Seat No.	

Set S

B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 3-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***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 variable frequency supply to IM for speed control can be made available using
a) VSI b) CSI c) Cycloconverter d) All

2) When quick speed reversal consideration, the motor preferred is
a) Synchronous motor b) Squirrel cage IM
c) Wound rotor IM d) DC motor

3) As compared to squirrel cage IM, a wound rotor IM is preferred when the major consideration is
a) high starting torque b) low starting current
c) speed control over limited range d) any of above

4) Effect of friction torque is more pronounced
a) when the drive is running on full speed
b) when the drive is being started
c) when the drive is being stopped
d) when drive at half of its normal speed

5) The motor commonly used in computers and digital systems is
a) dc shunt motor b) induction motor
c) stepper motor d) synchronous motor

6) A pole changing type squirrel cage motors used in derricks has four, eight and twenty four poles. In this, the medium speed is used for
   a) lifting b) hoisting
   c) lowering d) landing the load

7) Light duty cranes are generally used in
   a) automobile workshops b) pumping stations
   c) power houses d) all of above

8) To get speed higher than the base speed of the dc shunt motor
   a) armature resistance control is used
   b) field resistance control is used
   c) armature voltage control is used
   d) none of these

9) Which of the following pair is used for frequency converter ?
   a) squirrel cage IM and synchronous motor
   b) wound rotor IM and synchronous motor
   c) wound rotor IM and squirrel cage IM
   d) any of above

10) Which of the following is preferred for automatic drive ?
   a) Synchronous motor b) Squirrel cage IM
   c) Ward Leonard controlled dc motors d) Any of above

11) A wound rotor IM is preferred over squirrel cage IM when the major consideration involved is
   a) high starting torque b) low starting current
   c) speed control over limited range d) any of above

12) 15 minutes rated motors are suitable for
   a) light duty crane b) medium duty crane
   c) high duty crane d) all of above

13) In motor circuit, static frequency changers are used for
   a) power factor improvement b) improved cooling
   c) reversal of direction d) speed regulation

14) During regenerative braking
   a) E < V b) E > V c) E = V d) none of above

SLR-TC – 507

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2018
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 3-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **Assume** suitable data **wherever** necessary.*
*2) Non-programmable calculators are **permitted**.*

SECTION – I

2. Solve **any three** : **(3×4=12)**
   a) Explain the function of Control Unit and Sensing Unit in electrical drives.
   b) Give classification of Drives.
   c) What are the criteria for selection of Electrical Drives ?
   d) Explain Current limit control loop with block diagram.
   e) Define dynamics and explain effect of dynamics on Electrical Drives.

3. Solve **any two** : **(2×8=16)**
   a) A drive has following parameters :

      J = 10kg-m^2, T = 100-0.1N, Nm, passive load torque T_1 = 0.05N, Nm where N is speed in rpm. Initially, the drive is operating in steady state. Now, it is to be reversed. For this, motor characteristics is changed to T = –100-0.1N,Nm. Calculate the time of reversal.

   b) A 220V, 970 rpm, 100A dc separately excited motor has an armature resistance of 0.05 Ohm. It is braked by plugging from an initial speed of 1000 rpm.

      Calculate :

      i) Resistance to be placed in armature circuit to twice full load torque.

      ii) Braking torque.

   c) Explain braking methods of D.C. drives with necessary diagram.

SECTION – II

4. Solve **any three** : **(3×4=12)**

   a) Explain speed control of induction motor by VSI.

   b) Explain static rotor resistance control method.

   c) Explain static Krammer drive with block diagram and waveforms.

   d) Explain operation stepper motor drives.

   e) A 440V, 50 Hz, 6 pole Y-connected wound rotor motor has following parameters-RS = 0.5Ω, Rr' = 0.4Ω, Xs = Xr' = 1.2Ω, Xm = 50Ω . Stator to rotor turn ratio is 3.5.

      Motor is controlled by static rotor resistance control. External resistance is chosen such that breakdown torque is produced at stand still for duty ratio of zero. Calculate value of external resistance.

5. Solve **any two** : **(8×2=16)**

   a) Describe Slip Power Recovery Scheme with needed diagram.

   b) A 440V, 50 Hz, 970 rpm, 6 pole, star connected, 3Φ wound rotor IM has following parameter referred to stator :

      Rs = 0.1Ω, Rr' = 0.08Ω, Xs =0.3Ω, Xr' = 0.4Ω. Stator to rotor turn ratio is 2. Motor speed is controlled by Static Scherbius Drive. Drive is designed for speed range of 25% below synchronous speed. Maximum value of firing angle 165°. Calculate

      i) Transformer turns ratio.

      ii) Torque for the speed of 780 rpm and α =140°

      [Note : Rd = 0.01Ω].

   c) Explain variable frequency control of multiple synchronous motor drives.

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SLR-TC – 508

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer. **14**

1) What will be the total flux emitted by a source of 60 candle power ?
   a) 754.2 lumens b) 0.001326 lumens
   c) 60 lumens d) None of these

2) For intermittent work which of the following furnace is suitable ?
   a) Core less furnace b) Indirect arc furnace
   c) Either of above d) Neither of above

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) Which of the following statement is correct ?
   a) Light consists of electromagnetic waves
   b) Light consists of ultraviolet waves
   c) Light consists of infrared waves
   d) Light consists of gamma rays

6) The main application of indirect arc furnace is to melt
   a) Steel b) Iron
   c) Non-ferrous metals d) None of the above

7) Candela is the unit of
   a) Wavelength b) Luminous intensity
   c) Luminous flux d) Frequency

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) Which locomotive has the highest operational availability ?
   a) Diesel b) Electric
   c) Steam d) All have same availability

10) The advantages 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) The magnitude for the tractive effort which is required for the propulsion of the train depends on
   a) The adhesive weight
   b) Friction between the driving wheel and the track
   c) Both a) and b)
   d) Neither a) nor b)

13) A trolley bus runs on tyres driven by
   a) A DC compound motor b) A DC series motor
   c) An AC series motor d) An AC shunt motor

14) The function of duct in air conditioning unit is
   a) air cooling b) air cleaning c) air drying d) air distribution

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SLR-TC – 508

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 4-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

***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 illumination.
   2) With a neat sketch explain Ajax-Wyatt furnace.
   3) Explain refrigeration cycle with neat diagram.
   4) What is air conditioning ? Discuss the role of air conditioning in our day to day life.
   5) A 250V lamp has a total flux of 3000 lumens and takes a current of 0.8 A. Calculate lumens/watt and MSCP/Watt.

3. Solve **any two** : **(8×2=16)**
   1) a) Discuss the general requirements of good lighting scheme.
      b) What are the factors affecting in designing of lighting scheme ?
   2) What do you understand by refrigerator ? Draw and explain electrical circuits used in a refrigerator.
   3) A lamp of 500 Watts having MSCP of 1000 is suspended 2.7 m above the working plane.
      Calculate :
      i) Illumination directly below the lamp at the working plane.
      ii) Lamp efficiency.
      iii) Illumination at a point 2.5 m away on the horizontal plane from vertically below the lamp.

SECTION – II

4. Write short notes on the following (**any three**) : **(3×4=12)**
   1) Design features of traction motor.
   2) Current collection system for electric traction.
   3) Quadrilateral speed-time curve.
   4) Speed control of traction motors.
   5) Discharging operation of battery in EV.

5. Solve **any two** : **(8×2=16)**
   1) What do you mean by hybrid vehicles ? What are motors to be selected for interconnection with hybrid vehicles ?
   2) What is specific energy consumption of a train ? Discuss the various factors affecting it.
   3) An electric train has quadrilateral speed time curve as follows :
      i) Uniform acceleration from rest at 2 kmphps for 30 secs.
      ii) Coasting for 50 secs.
      iii) Uniform braking to rest for 20 secs.

      If train is moving a uniform up gradient of 10/1000, train resistance is 40 N/tone, rotational inertia effect 10% of dead weight and duration of stop 30 secs, find the scheduled speed.

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Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer. **14**

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) Which locomotive has the highest operational availability ?
   a) Diesel b) Electric
   c) Steam d) All have same availability

3) The advantages of electric traction over other methods is
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4) What are the constituents in speed time curve of train ?
   a) Coasting b) Initial acceleration
   c) Constant speed d) All of these

5) The magnitude for the tractive effort which is required for the propulsion of the train depends on
   a) The adhesive weight
   b) Friction between the driving wheel and the track
   c) Both a) and b)
   d) Neither a) nor b)

6) A trolley bus runs on tyres driven by
   a) A DC compound motor
   b) A DC series motor
   c) An AC series motor
   d) An AC shunt motor

7) The function of duct in air conditioning unit is
   a) air cooling
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   c) air drying
   d) air distribution

8) What will be the total flux emitted by a source of 60 candle power ?
   a) 754.2 lumens
   b) 0.001326 lumens
   c) 60 lumens
   d) None of these

9) For intermittent work which of the following furnace is suitable ?
   a) Core less furnace
   b) Indirect arc furnace
   c) Either of above
   d) Neither of above

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
   d) Compression

12) Which of the following statement is correct ?
   a) Light consists of electromagnetic waves
   b) Light consists of ultraviolet waves
   c) Light consists of infrared waves
   d) Light consists of gamma rays

13) The main application of indirect arc furnace is to melt
   a) Steel
   b) Iron
   c) Non-ferrous metals
   d) None of the above

14) Candela is the unit of
   a) Wavelength
   b) Luminous intensity
   c) Luminous flux
   d) Frequency

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Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 4-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

***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 illumination.
   2) With a neat sketch explain Ajax-Wyatt furnace.
   3) Explain refrigeration cycle with neat diagram.
   4) What is air conditioning ? Discuss the role of air conditioning in our day to day life.
   5) A 250V lamp has a total flux of 3000 lumens and takes a current of 0.8 A. Calculate lumens/watt and MSCP/Watt.

3. Solve **any two** : **(8×2=16)**
   1) a) Discuss the general requirements of good lighting scheme.
      b) What are the factors affecting in designing of lighting scheme ?
   2) What do you understand by refrigerator ? Draw and explain electrical circuits used in a refrigerator.
   3) A lamp of 500 Watts having MSCP of 1000 is suspended 2.7 m above the working plane.
      Calculate :
      i) Illumination directly below the lamp at the working plane.
      ii) Lamp efficiency.
      iii) Illumination at a point 2.5 m away on the horizontal plane from vertically below the lamp.

SECTION – II

4. Write short notes on the following (**any three**) : **(3×4=12)**
   1) Design features of traction motor.
   2) Current collection system for electric traction.
   3) Quadrilateral speed-time curve.
   4) Speed control of traction motors.
   5) Discharging operation of battery in EV.

5. Solve **any two** : **(8×2=16)**
   1) What do you mean by hybrid vehicles ? What are motors to be selected for interconnection with hybrid vehicles ?
   2) What is specific energy consumption of a train ? Discuss the various factors affecting it.
   3) An electric train has quadrilateral speed time curve as follows :
      i) Uniform acceleration from rest at 2 kmphps for 30 secs.
      ii) Coasting for 50 secs.
      iii) Uniform braking to rest for 20 secs.

      If train is moving a uniform up gradient of 10/1000, train resistance is 40 N/tone, rotational inertia effect 10% of dead weight and duration of stop 30 secs, find the scheduled speed.

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Seat No.	

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer. **14**

1) Which of the following statement is correct ?
   a) Light consists of electromagnetic waves
   b) Light consists of ultraviolet waves
   c) Light consists of infrared waves
   d) Light consists of gamma rays

2) The main application of indirect arc furnace is to melt
   a) Steel b) Iron
   c) Non-ferrous metals d) None of the above

3) Candela is the unit of
   a) Wavelength b) Luminous intensity
   c) Luminous flux d) Frequency

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) Which locomotive has the highest operational availability ?
   a) Diesel b) Electric
   c) Steam d) All have same availability

6) The advantages of electric traction over other methods is
   a) No pollution problems
   b) Faster acceleration
   c) Better braking action
   d) All of the above

7) What are the constituents in speed time curve of train ?
   a) Coasting
   b) Initial acceleration
   c) Constant speed
   d) All of these

8) The magnitude for the tractive effort which is required for the propulsion of the train depends on
   a) The adhesive weight
   b) Friction between the driving wheel and the track
   c) Both a) and b)
   d) Neither a) nor b)

9) A trolley bus runs on tyres driven by
   a) A DC compound motor
   b) A DC series motor
   c) An AC series motor
   d) An AC shunt motor

10) The function of duct in air conditioning unit is
   a) air cooling b) air cleaning c) air drying d) air distribution

11) What will be the total flux emitted by a source of 60 candle power ?
   a) 754.2 lumens
   b) 0.001326 lumens
   c) 60 lumens
   d) None of these

12) For intermittent work which of the following furnace is suitable ?
   a) Core less furnace
   b) Indirect arc furnace
   c) Either of above
   d) Neither of above

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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Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 4-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

***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 illumination.
   2) With a neat sketch explain Ajax-Wyatt furnace.
   3) Explain refrigeration cycle with neat diagram.
   4) What is air conditioning ? Discuss the role of air conditioning in our day to day life.
   5) A 250V lamp has a total flux of 3000 lumens and takes a current of 0.8 A. Calculate lumens/watt and MSCP/Watt.

3. Solve **any two** : **(8×2=16)**
   1) a) Discuss the general requirements of good lighting scheme.
      b) What are the factors affecting in designing of lighting scheme ?
   2) What do you understand by refrigerator ? Draw and explain electrical circuits used in a refrigerator.
   3) A lamp of 500 Watts having MSCP of 1000 is suspended 2.7 m above the working plane.
      Calculate :
      i) Illumination directly below the lamp at the working plane.
      ii) Lamp efficiency.
      iii) Illumination at a point 2.5 m away on the horizontal plane from vertically below the lamp.

SECTION – II

4. Write short notes on the following (**any three**) : **(3×4=12)**
   1) Design features of traction motor.
   2) Current collection system for electric traction.
   3) Quadrilateral speed-time curve.
   4) Speed control of traction motors.
   5) Discharging operation of battery in EV.

5. Solve **any two** : **(8×2=16)**
   1) What do you mean by hybrid vehicles ? What are motors to be selected for interconnection with hybrid vehicles ?
   2) What is specific energy consumption of a train ? Discuss the various factors affecting it.
   3) An electric train has quadrilateral speed time curve as follows :
      i) Uniform acceleration from rest at 2 kmphps for 30 secs.
      ii) Coasting for 50 secs.
      iii) Uniform braking to rest for 20 secs.

      If train is moving a uniform up gradient of 10/1000, train resistance is 40 N/tone, rotational inertia effect 10% of dead weight and duration of stop 30 secs, find the scheduled speed.

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Seat No.	

Set **S**

B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 4-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer. **14**

1) The advantages 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) The magnitude for the tractive effort which is required for the propulsion of the train depends on
   a) The adhesive weight
   b) Friction between the driving wheel and the track
   c) Both a) and b)
   d) Neither a) nor b)

4) A trolley bus runs on tyres driven by
   a) A DC compound motor b) A DC series motor
   c) An AC series motor d) An AC shunt motor

5) The function of duct in air conditioning unit is
   a) air cooling b) air cleaning c) air drying d) air distribution

6) What will be the total flux emitted by a source of 60 candle power ?
   a) 754.2 lumens
   b) 0.001326 lumens
   c) 60 lumens
   d) None of these

7) For intermittent work which of the following furnace is suitable ?
   a) Core less furnace
   b) Indirect arc furnace
   c) Either of above
   d) Neither of above

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) Which of the following statement is correct ?
   a) Light consists of electromagnetic waves
   b) Light consists of ultraviolet waves
   c) Light consists of infrared waves
   d) Light consists of gamma rays

11) The main application of indirect arc furnace is to melt
   a) Steel
   b) Iron
   c) Non-ferrous metals
   d) None of the above

12) Candela is the unit of
   a) Wavelength
   b) Luminous intensity
   c) Luminous flux
   d) Frequency

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) Which locomotive has the highest operational availability ?
   a) Diesel
   b) Electric
   c) Steam
   d) All have same availability

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Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 4-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

***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 illumination.
   2) With a neat sketch explain Ajax-Wyatt furnace.
   3) Explain refrigeration cycle with neat diagram.
   4) What is air conditioning ? Discuss the role of air conditioning in our day to day life.
   5) A 250V lamp has a total flux of 3000 lumens and takes a current of 0.8 A. Calculate lumens/watt and MSCP/Watt.

3. Solve **any two** : **(8×2=16)**
   1) a) Discuss the general requirements of good lighting scheme.
      b) What are the factors affecting in designing of lighting scheme ?
   2) What do you understand by refrigerator ? Draw and explain electrical circuits used in a refrigerator.
   3) A lamp of 500 Watts having MSCP of 1000 is suspended 2.7 m above the working plane.
      Calculate :
      i) Illumination directly below the lamp at the working plane.
      ii) Lamp efficiency.
      iii) Illumination at a point 2.5 m away on the horizontal plane from vertically below the lamp.

SECTION – II

4. Write short notes on the following (**any three**) : **(3×4=12)**
   1) Design features of traction motor.
   2) Current collection system for electric traction.
   3) Quadrilateral speed-time curve.
   4) Speed control of traction motors.
   5) Discharging operation of battery in EV.

5. Solve **any two** : **(8×2=16)**
   1) What do you mean by hybrid vehicles ? What are motors to be selected for interconnection with hybrid vehicles ?
   2) What is specific energy consumption of a train ? Discuss the various factors affecting it.
   3) An electric train has quadrilateral speed time curve as follows :
      i) Uniform acceleration from rest at 2 kmphps for 30 secs.
      ii) Coasting for 50 secs.
      iii) Uniform braking to rest for 20 secs.

      If train is moving a uniform up gradient of 10/1000, train resistance is 40 N/tone, rotational inertia effect 10% of dead weight and duration of stop 30 secs, find the scheduled speed.

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Seat No.	

Set **P**

B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In fire extinguisher we use
   a) CO_2 b) SO_2 c) O_2 d) H_2O

2) The torque of induction motor is
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversely proportional to V d) Inversely proportional to V^2

3) Brake test is _____ method of testing machine.
   a) Regenerative b) Direct c) Indirect d) All of these

4) Short circuit test on transformer is performed to determine
   a) Copper losses b) Iron losses
   c) Both a and b d) None of the above

5) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is
   a) 2 sec b) 5 sec c) 8 sec d) 9.5 sec

6) The impulse test level is determined by operating level is _____ times normal operating value.
   a) 1 to 2 b) 2 to 2.5 c) 4 to 5 d) 7 to 9

7) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
   a) 100 kv b) 150 kv c) 220 kv d) 325 kv

8) In Insulation resistance test of 132 kv transformer, minimum insulation resistance is
   a) 250 MΩ b) 500 MΩ c) 750 MΩ d) 1000 MΩ

9) For induced type transformer test, test voltage is equal to _____ highest system voltage + 1000 volt.
   a) twice b) thrice c) four times d) None of these

10) In moisture proofness test, humidity is maintained to
   a) 70% b) 80% c) 90% d) 110%

11) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour c) 30 min d) 5 min

12) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5 c) 2 d) 2.5

13) While Installing electrical machines, checking of foundation for correct level is to be carried out then, we use
   a) Spirit level b) Dial indicator
   c) Bearing puller d) Filler gauge

14) Thermal relays are used for the protection of motors against over-current owing to
   a) Short circuit b) Heavy loads
   c) Earth fault d) All the above

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Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

   1) What are the objectives of testing of electrical machines ?

   2) What precautions should be taken to avoid the electric accidents ?

   3) Explain the workmen's safety devices.

   4) What precautions to be taken to avoid the fire due to electric reason ?

   5) Explain the voltage ratio test of transformer.

   6) Explain routine and breakdown maintenance of transformer.

3. Solve **any two** : **(2×6=12)**

   1) Explain various methods of artificial respiration.

   2) Explain the back to back test for transformer.

   3) Explain the term efficiency and regulation of transformer.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain the type test and routine test of 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 retardation test of synchronous machine.

5) Explain the commissioning test for induction motor.

6) Explain the maintenance schedule of breaker.

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 factory test and site test for induction motor.

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Seat No.	

Set **Q**

B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In Insulation resistance test of 132 kv transformer, minimum insulation resistance is
a) 250 MΩ b) 500 MΩ c) 750 MΩ d) 1000 MΩ

2) For induced type transformer test, test voltage is equal to _____ highest system voltage + 1000 volt.
a) twice b) thrice c) four times d) None of these

3) In moisture proofness test, humidity is maintained to
a) 70% b) 80% c) 90% d) 110%

4) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
a) 24 hour b) 12 hour c) 30 min d) 5 min

5) Polarization index is greater than _____ for class A insulation.
a) 1 b) 1.5 c) 2 d) 2.5

6) While Installing electrical machines, checking of foundation for correct level is to be carried out then, we use
a) Spirit level b) Dial indicator
c) Bearing puller d) Filler gauge

7) Thermal relays are used for the protection of motors against over-current owing to
   a) Short circuit
   b) Heavy loads
   c) Earth fault
   d) All the above

8) In fire extinguisher we use
   a) CO_2 b) SO_2 c) O_2 d) H_2O

9) The torque of induction motor is
   a) Directly proportional to V
   b) Directly proportional to V^2
   c) Inversely proportional to V
   d) Inversely proportional to V^2

10) Brake test is _____ method of testing machine.
   a) Regenerative b) Direct c) Indirect d) All of these

11) Short circuit test on transformer is performed to determine
   a) Copper losses
   b) Iron losses
   c) Both a and b
   d) None of the above

12) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is
   a) 2 sec b) 5 sec c) 8 sec d) 9.5 sec

13) The impulse test level is determined by operating level is _____ times normal operating value.
   a) 1 to 2 b) 2 to 2.5 c) 4 to 5 d) 7 to 9

14) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
   a) 100 kv b) 150 kv c) 220 kv d) 325 kv

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Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

   1) What are the objectives of testing of electrical machines ?

   2) What precautions should be taken to avoid the electric accidents ?

   3) Explain the workmen's safety devices.

   4) What precautions to be taken to avoid the fire due to electric reason ?

   5) Explain the voltage ratio test of transformer.

   6) Explain routine and breakdown maintenance of transformer.

3. Solve **any two** : **(2×6=12)**

   1) Explain various methods of artificial respiration.

   2) Explain the back to back test for transformer.

   3) Explain the term efficiency and regulation of transformer.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain the type test and routine test of 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 retardation test of synchronous machine.

5) Explain the commissioning test for induction motor.

6) Explain the maintenance schedule of breaker.

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 factory test and site test for induction motor.

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Seat No.	

Set **R**

B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is
a) 2 sec b) 5 sec c) 8 sec d) 9.5 sec

2) The impulse test level is determined by operating level is _____ times normal operating value.
a) 1 to 2 b) 2 to 2.5 c) 4 to 5 d) 7 to 9

3) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
a) 100 kv b) 150 kv c) 220 kv d) 325 kv

4) In Insulation resistance test of 132 kv transformer, minimum insulation resistance is
a) 250 MΩ b) 500 MΩ c) 750 MΩ d) 1000 MΩ

5) For induced type transformer test, test voltage is equal to _____ highest system voltage + 1000 volt.
a) twice b) thrice c) four times d) None of these

6) In moisture proofness test, humidity is maintained to
a) 70% b) 80% c) 90% d) 110%

7) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
   a) 24 hour b) 12 hour c) 30 min d) 5 min

8) Polarization index is greater than _____ for class A insulation.
   a) 1 b) 1.5 c) 2 d) 2.5

9) While Installing electrical machines, checking of foundation for correct level is to be carried out then, we use
   a) Spirit level b) Dial indicator
   c) Bearing puller d) Filler gauge

10) Thermal relays are used for the protection of motors against over-current owing to
   a) Short circuit b) Heavy loads
   c) Earth fault d) All the above

11) In fire extinguisher we use
   a) CO_2 b) SO_2 c) O_2 d) H_2O

12) The torque of induction motor is
   a) Directly proportional to V b) Directly proportional to V^2
   c) Inversely proportional to V d) Inversely proportional to V^2

13) Brake test is _____ method of testing machine.
   a) Regenerative b) Direct c) Indirect d) All of these

14) Short circuit test on transformer is performed to determine
   a) Copper losses b) Iron losses
   c) Both a and b d) None of the above

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Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

   1) What are the objectives of testing of electrical machines ?

   2) What precautions should be taken to avoid the electric accidents ?

   3) Explain the workmen's safety devices.

   4) What precautions to be taken to avoid the fire due to electric reason ?

   5) Explain the voltage ratio test of transformer.

   6) Explain routine and breakdown maintenance of transformer.

3. Solve **any two** : **(2×6=12)**

   1) Explain various methods of artificial respiration.

   2) Explain the back to back test for transformer.

   3) Explain the term efficiency and regulation of transformer.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain the type test and routine test of induction motor.

   2) Explain the various tests of transformer oil.

Set R

3) What are the effects of mis-alignment in the installation of synchronous machine ?

4) Explain the retardation test of synchronous machine.

5) Explain the commissioning test for induction motor.

6) Explain the maintenance schedule of breaker.

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 factory test and site test for induction motor.

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Set **S**

B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In moisture proofness test, humidity is maintained to
a) 70% b) 80% c) 90% d) 110%

2) In dielectric absorption test by using megger, insulation resistance is measured at regular interval of _____ and recorded.
a) 24 hour b) 12 hour c) 30 min d) 5 min

3) Polarization index is greater than _____ for class A insulation.
a) 1 b) 1.5 c) 2 d) 2.5

4) While Installing electrical machines, checking of foundation for correct level is to be carried out then, we use
a) Spirit level b) Dial indicator
c) Bearing puller d) Filler gauge

5) Thermal relays are used for the protection of motors against over-current owing to
a) Short circuit b) Heavy loads
c) Earth fault d) All the above

6) In fire extinguisher we use
a) CO_2 b) SO_2 c) O_2 d) H_2O

P.T.O.

7) The torque of induction motor is
   a) Directly proportional to V
   b) Directly proportional to V^2
   c) Inversely proportional to V
   d) Inversely proportional to V^2

8) Brake test is _____ method of testing machine.
   a) Regenerative b) Direct c) Indirect d) All of these

9) Short circuit test on transformer is performed to determine
   a) Copper losses
   b) Iron losses
   c) Both a and b
   d) None of the above

10) While conducting momentary overload test on induction motor, the duration of excess load 50 H.P. motor is
   a) 2 sec b) 5 sec c) 8 sec d) 9.5 sec

11) The impulse test level is determined by operating level is _____ times normal operating value.
   a) 1 to 2 b) 2 to 2.5 c) 4 to 5 d) 7 to 9

12) As per I.E.C. for 66 kv system voltage, the impulse withstand voltage is
   a) 100 kv b) 150 kv c) 220 kv d) 325 kv

13) In Insulation resistance test of 132 kv transformer, minimum insulation resistance is
   a) 250 MΩ b) 500 MΩ c) 750 MΩ d) 1000 MΩ

14) For induced type transformer test, test voltage is equal to _____ highest system voltage + 1000 volt.
   a) twice b) thrice c) four times d) None of these

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SLR-TC – 509

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2018
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 5-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

   1) What are the objectives of testing of electrical machines ?

   2) What precautions should be taken to avoid the electric accidents ?

   3) Explain the workmen's safety devices.

   4) What precautions to be taken to avoid the fire due to electric reason ?

   5) Explain the voltage ratio test of transformer.

   6) Explain routine and breakdown maintenance of transformer.

3. Solve **any two** : **(2×6=12)**

   1) Explain various methods of artificial respiration.

   2) Explain the back to back test for transformer.

   3) Explain the term efficiency and regulation of transformer.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain the type test and routine test of 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 retardation test of synchronous machine.

5) Explain the commissioning test for induction motor.

6) Explain the maintenance schedule of breaker.

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 factory test and site test for induction motor.

SLR-TC – 510

Seat No.	

Set **P**

B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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) Differential relays are used to protect the equipment against.
   a) Over current b) Reverse current
   c) Internal fault d) None of the above

2) Surge diverter should be located at _____ the apparatus to be protected.
   a) close to b) far away from
   c) in the middle of d) none of the above

3) The IDMT relays are used for over current and earth fault protection of transformer against
   a) Heavy load b) Internal short circuits
   c) External short circuits d) All of the above

4) The rate of rise of restriking voltage depends on
   a) Type of circuit breaker
   b) Inductance of the system only
   c) The capacitance of the system only
   d) Both inductance and capacitance system only

5) The current rating of fuse wire is 5 A. The fusing current will be
   a) 5 A b) 2.5 A c) 1 A d) more than 5 A

6) The fusing factor is
   a) Always one
   b) Always more than one
   c) Always less than one
   d) None of above

7) A fuse should have
   a) Low melting point
   b) High conductivity
   c) Low cost
   d) All above

8) The current chopping mainly occurs in
   a) Air blast circuit breaker
   b) Oil circuit breaker
   c) SF6 circuit breaker
   d) Vacuum circuit breaker

9) 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 the above

10) Capacitive current breaking results in
   a) Short circuit
   b) Open circuit
   c) Voltage surges
   d) None of the above

11) Which statement is correct ?
   a) SF6 gas is non corrosive
   b) SF6 gas has high dielectric strength
   c) SF6 gas is non toxic
   d) All above

12) Burden of a protective relay is the power
   a) Required to operate the circuit breaker
   b) Absorbed by the circuit of
   c) Developed by the relay circuit
   d) None of the above

13) Directional relays are based on flow of
   a) Power b) Current c) Voltage wave d) All of the above

14) Protective relays are devices that detect abnormal conditions in electrical circuits by measuring
   a) Current during abnormal condition
   b) Voltage during abnormal condition
   c) Constantly the electrical quantities which differ during normal and abnormal conditions
   d) None of the above

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SLR-TC – 510

Seat No.	

B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any three** of the following : **(3×4=12)**
   1) Explain the theories of arc extinction.
   2) Explain the selection criterion of a fuse for induction motor protection.
   3) Explain working principle of vacuum circuit breaker.
   4) Describe the types of isolators.

3. Solve **any two** : **(8×2=16)**
   1) Derive an expression for restriking voltage and RRRV.
   2) Explain direct testing of circuit breaker with diagram.
   3) Explain making and breaking capacity of circuit breaker.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) Explain the meaning of percentage differential protection. Why is it necessary to provide bias setting ?
   2) Explain the static definite time over current relay with block diagram.
   3) What is the difference between MHO and OFFSET MHO ?
   4) Explain the advantages and disadvantages of microprocessor based relays.

5. Attempt **any two** : **(8×2=16)**
   1) Describe Metal Oxide Surge Arrester (MOA) with neat diagram.
   2) Derive mathematical expression for distance relay.
   3) Describe microprocessor based reactance relay with schematic block diagram of interface.

Set P

SLR-TC – 510

Seat No.	

Set **Q**

B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 current chopping mainly occurs in
   a) Air blast circuit breaker b) Oil circuit breaker
   c) SF6 circuit breaker d) Vacuum circuit breaker

2) 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 the above

3) Capacitive current breaking results in
   a) Short circuit b) Open circuit
   c) Voltage surges d) None of the above

4) Which statement is correct ?
   a) SF6 gas is non corrosive
   b) SF6 gas has high dielectric strength
   c) SF6 gas is non toxic
   d) All above

5) Burden of a protective relay is the power
   a) Required to operate the circuit breaker
   b) Absorbed by the circuit of
   c) Developed by the relay circuit
   d) None of the above

P.T.O.

6) Directional relays are based on flow of
   a) Power b) Current c) Voltage wave d) All of the above
7) Protective relays are devices that detect abnormal conditions in electrical circuits by measuring
   a) Current during abnormal condition
   b) Voltage during abnormal condition
   c) Constantly the electrical quantities which differ during normal and abnormal conditions
   d) None of the above
8) Differential relays are used to protect the equipment against.
   a) Over current b) Reverse current
   c) Internal fault d) None of the above
9) Surge diverter should be located at _____ the apparatus to be protected.
   a) close to b) far away from
   c) in the middle of d) none of the above
10) The IDMT relays are used for over current and earth fault protection of transformer against
   a) Heavy load b) Internal short circuits
   c) External short circuits d) All of the above
11) The rate of rise of restriking voltage depends on
   a) Type of circuit breaker
   b) Inductance of the system only
   c) The capacitance of the system only
   d) Both inductance and capacitance system only
12) The current rating of fuse wire is 5 A. The fusing current will be
   a) 5 A b) 2.5 A c) 1 A d) more than 5 A
13) The fusing factor is
   a) Always one b) Always more than one
   c) Always less than one d) None of above
14) A fuse should have
   a) Low melting point b) High conductivity
   c) Low cost d) All above

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SLR-TC – 510

Seat No.	

B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any three** of the following : **(3×4=12)**
   1) Explain the theories of arc extinction.
   2) Explain the selection criterion of a fuse for induction motor protection.
   3) Explain working principle of vacuum circuit breaker.
   4) Describe the types of isolators.

3. Solve **any two** : **(8×2=16)**
   1) Derive an expression for restriking voltage and RRRV.
   2) Explain direct testing of circuit breaker with diagram.
   3) Explain making and breaking capacity of circuit breaker.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) Explain the meaning of percentage differential protection. Why is it necessary to provide bias setting ?
   2) Explain the static definite time over current relay with block diagram.
   3) What is the difference between MHO and OFFSET MHO ?
   4) Explain the advantages and disadvantages of microprocessor based relays.

5. Attempt **any two** : **(8×2=16)**
   1) Describe Metal Oxide Surge Arrester (MOA) with neat diagram.
   2) Derive mathematical expression for distance relay.
   3) Describe microprocessor based reactance relay with schematic block diagram of interface.

Set Q

Set Q

SLR-TC – 510

Seat No.	

Set **R**

B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 current rating of fuse wire is 5 A. The fusing current will be
a) 5 A b) 2.5 A c) 1 A d) more than 5 A

2) The fusing factor is
a) Always one b) Always more than one
c) Always less than one d) None of above

3) A fuse should have
a) Low melting point b) High conductivity
c) Low cost d) All above

4) The current chopping mainly occurs in
a) Air blast circuit breaker b) Oil circuit breaker
c) SF6 circuit breaker d) Vacuum circuit breaker

5) 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 the above

6) Capacitive current breaking results in
a) Short circuit b) Open circuit
c) Voltage surges d) None of the above

P.T.O.

7) Which statement is correct ?
   a) SF6 gas is non corrosive
   b) SF6 gas has high dielectric strength
   c) SF6 gas is non toxic
   d) All above

8) Burden of a protective relay is the power
   a) Required to operate the circuit breaker
   b) Absorbed by the circuit of
   c) Developed by the relay circuit
   d) None of the above

9) Directional relays are based on flow of
   a) Power b) Current c) Voltage wave d) All of the above

10) Protective relays are devices that detect abnormal conditions in electrical circuits by measuring
   a) Current during abnormal condition
   b) Voltage during abnormal condition
   c) Constantly the electrical quantities which differ during normal and abnormal conditions
   d) None of the above

11) Differential relays are used to protect the equipment against.
   a) Over current b) Reverse current
   c) Internal fault d) None of the above

12) Surge diverter should be located at _____ the apparatus to be protected.
   a) close to b) far away from
   c) in the middle of d) none of the above

13) The IDMT relays are used for over current and earth fault protection of transformer against
   a) Heavy load b) Internal short circuits
   c) External short circuits d) All of the above

14) The rate of rise of restriking voltage depends on
   a) Type of circuit breaker
   b) Inductance of the system only
   c) The capacitance of the system only
   d) Both inductance and capacitance system only

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SLR-TC – 510

Seat No.	

B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any three** of the following : **(3×4=12)**
   1) Explain the theories of arc extinction.
   2) Explain the selection criterion of a fuse for induction motor protection.
   3) Explain working principle of vacuum circuit breaker.
   4) Describe the types of isolators.

3. Solve **any two** : **(8×2=16)**
   1) Derive an expression for restriking voltage and RRRV.
   2) Explain direct testing of circuit breaker with diagram.
   3) Explain making and breaking capacity of circuit breaker.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) Explain the meaning of percentage differential protection. Why is it necessary to provide bias setting ?
   2) Explain the static definite time over current relay with block diagram.
   3) What is the difference between MHO and OFFSET MHO ?
   4) Explain the advantages and disadvantages of microprocessor based relays.

5. Attempt **any two** : **(8×2=16)**
   1) Describe Metal Oxide Surge Arrester (MOA) with neat diagram.
   2) Derive mathematical expression for distance relay.
   3) Describe microprocessor based reactance relay with schematic block diagram of interface.

Set R

Set R

SLR-TC – 510

Seat No.	

Set **S**

B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 7-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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) Capacitive current breaking results in
   a) Short circuit
   b) Open circuit
   c) Voltage surges
   d) None of the above

2) Which statement is correct ?
   a) SF6 gas is non corrosive
   b) SF6 gas has high dielectric strength
   c) SF6 gas is non toxic
   d) All above

3) Burden of a protective relay is the power
   a) Required to operate the circuit breaker
   b) Absorbed by the circuit of
   c) Developed by the relay circuit
   d) None of the above

4) Directional relays are based on flow of
   a) Power
   b) Current
   c) Voltage wave
   d) All of the above

5) Protective relays are devices that detect abnormal conditions in electrical circuits by measuring
   a) Current during abnormal condition
   b) Voltage during abnormal condition
   c) Constantly the electrical quantities which differ during normal and abnormal conditions
   d) None of the above

6) Differential relays are used to protect the equipment against.
   a) Over current b) Reverse current
   c) Internal fault d) None of the above

7) Surge diverter should be located at _____ the apparatus to be protected.
   a) close to b) far away from
   c) in the middle of d) none of the above

8) The IDMT relays are used for over current and earth fault protection of transformer against
   a) Heavy load b) Internal short circuits
   c) External short circuits d) All of the above

9) The rate of rise of restriking voltage depends on
   a) Type of circuit breaker
   b) Inductance of the system only
   c) The capacitance of the system only
   d) Both inductance and capacitance system only

10) The current rating of fuse wire is 5 A. The fusing current will be
   a) 5 A b) 2.5 A c) 1 A d) more than 5 A

11) The fusing factor is
   a) Always one b) Always more than one
   c) Always less than one d) None of above

12) A fuse should have
   a) Low melting point b) High conductivity
   c) Low cost d) All above

13) The current chopping mainly occurs in
   a) Air blast circuit breaker b) Oil circuit breaker
   c) SF6 circuit breaker d) Vacuum circuit breaker

14) 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 the above

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SLR-TC – 510

Seat No.	

B.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2018
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 7-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any three** of the following : **(3×4=12)**
   1) Explain the theories of arc extinction.
   2) Explain the selection criterion of a fuse for induction motor protection.
   3) Explain working principle of vacuum circuit breaker.
   4) Describe the types of isolators.

3. Solve **any two** : **(8×2=16)**
   1) Derive an expression for restriking voltage and RRRV.
   2) Explain direct testing of circuit breaker with diagram.
   3) Explain making and breaking capacity of circuit breaker.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) Explain the meaning of percentage differential protection. Why is it necessary to provide bias setting ?
   2) Explain the static definite time over current relay with block diagram.
   3) What is the difference between MHO and OFFSET MHO ?
   4) Explain the advantages and disadvantages of microprocessor based relays.

5. Attempt **any two** : **(8×2=16)**
   1) Describe Metal Oxide Surge Arrester (MOA) with neat diagram.
   2) Derive mathematical expression for distance relay.
   3) Describe microprocessor based reactance relay with schematic block diagram of interface.

Set S

SLR-TC – 512

Seat No.	

Set **P**

B.E. (E&E) (Part – I) (CGPA) Examination, 2018
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1 mark each)**

1) Heliostats used for exploiting solar energy are called
   a) diffusers b) ponds
   c) reflecting mirrors d) mantle

2) For solar thermal electric plants, preferable area is
   a) mountain tops b) hot arid zones
   c) coastal areas d) high rainfall zones

3) Photovoltaic solar energy conversion system makes use of
   a) fuel cell b) solar cell
   c) solar pond d) none of the above

4) The output of a solar cell is of the order of
   a) 0.1 W b) 0.5 W c) 1 W d) 5 W

5) A module is a
   a) newly installed solar cell
   b) series parallel arrangement of solar cells
   c) a series of solar cells when not used for power generation
   d) none of the above

6) _____ is the major disadvantage of solar cells for power generation.
   a) lack of availability
   b) large area requirement
   c) variable power
   d) high cost

7) Local winds are created due to
   a) differential heating of land and water
   b) differential heating of plains and mountains
   c) any of the above
   d) none of the above

8) What kind of energy does a wind turbine use ?
   a) kinetic energy
   b) potential energy
   c) chemical energy
   d) thermal energy

9) Geothermal energy is
   a) a renewable energy resource
   b) alternative energy source
   c) inexhaustible energy source
   d) any of the above

10) Geologists believe that below the earth's crust, the molten mass exists in the form of
   a) magma b) vent c) hot cell d) liquation

11) Tidal energy mainly utilises
   a) kinetic energy of water
   b) potential energy of water
   c) both kinetic as well as potential energy of water
   d) none of the above

12) A rotameter measures
   a) velocity of fluids
   b) viscosity of fluids
   c) density of fluids
   d) discharge of fluids

13) Hydrogen is produced by
   a) Electrolysis
   b) Incineration
   c) Aerobic digestion
   d) Decomposting

14) Hydrogen can be stored as a
   a) compressed gas
   b) liquid
   c) metal hydride
   d) all of the above

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SLR-TC – 512

Seat No.	

B.E. (E&E) (Part – I) (CGPA) Examination, 2018
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

   1) With neat sketch, explain working of solar cooker.

   2) What are the non-conventional sources of energy and explain briefly ?

   3) Write short note on India's energy production and energy alternatives.

   4) Write short note on solar thermal storage.

   5) Explain :

      i) Solar distillation

      ii) Solar still.

   6) Write short note on recent development in wind energy.

3. Attempt **any 2** questions : **(6 marks each)**

   1) With the help of a neat sketch, describe any two solar air heaters.

   2) With the help of a neat sketch, explain PV hybrid system.

   3) Explain briefly with neat sketch about :

      1) Horizontal wind mills.

      2) Vertical wind mills.

SECTION – II

4. Attempt **any 4** questions : **(4 marks each)**

   1) State and explain site selection criteria for biogas generation plant.

   2) Write a short note on utilization of biogas.

   3) Explain limitations and scope of tidal energy.

   4) Explain with neat sketch, open cycle and closed cycle Ocean Thermal Electric Conversion system.

   5) Discuss the various problems associated for storage and transportation of hydrogen gas.

   6) What is geothermal energy ? How can geothermal energy are utilized for electric power generation ?

5. Attempt **any 2** questions : **(6 marks each)**

   1) State various types of batteries and with neat sketch, explain different types of battery arrangements.

   2) With advantages and disadvantages, explain single basin and double basin tidal power plants.

   3) Explain with neat sketch, various part of geothermal energy system.

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SLR-TC – 512

Seat No.	

Set Q

B.E. (E&E) (Part – I) (CGPA) Examination, 2018
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1 mark each)**

1) What kind of energy does a wind turbine use ?
   a) kinetic energy b) potential energy
   c) chemical energy d) thermal energy

2) Geothermal energy is
   a) a renewable energy resource b) alternative energy source
   c) inexhaustible energy source d) any of the above

3) Geologists believe that below the earth's crust, the molten mass exists in the form of
   a) magma b) vent c) hot cell d) liquation

4) Tidal energy mainly utilises
   a) kinetic energy of water
   b) potential energy of water
   c) both kinetic as well as potential energy of water
   d) none of the above

5) A rotameter measures
   a) velocity of fluids b) viscosity of fluids
   c) density of fluids d) discharge of fluids

P.T.O.

6) Hydrogen is produced by
   a) Electrolysis b) Incineration
   c) Aerobic digestion d) Decomposting

7) Hydrogen can be stored as a
   a) compressed gas b) liquid
   c) metal hydride d) all of the above

8) Heliostats used for exploiting solar energy are called
   a) diffusers b) ponds
   c) reflecting mirrors d) mantle

9) For solar thermal electric plants, preferable area is
   a) mountain tops b) hot arid zones
   c) coastal areas d) high rainfall zones

10) Photovoltaic solar energy conversion system makes use of
   a) fuel cell b) solar cell
   c) solar pond d) none of the above

11) The output of a solar cell is of the order of
   a) 0.1 W b) 0.5 W c) 1 W d) 5 W

12) A module is a
   a) newly installed solar cell
   b) series parallel arrangement of solar cells
   c) a series of solar cells when not used for power generation
   d) none of the above

13) _____ is the major disadvantage of solar cells for power generation.
   a) lack of availability b) large area requirement
   c) variable power d) high cost

14) Local winds are created due to
   a) differential heating of land and water
   b) differential heating of plains and mountains
   c) any of the above
   d) none of the above

_____

SLR-TC – 512

Seat No.	

B.E. (E&E) (Part – I) (CGPA) Examination, 2018
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

   1) With neat sketch, explain working of solar cooker.

   2) What are the non-conventional sources of energy and explain briefly ?

   3) Write short note on India's energy production and energy alternatives.

   4) Write short note on solar thermal storage.

   5) Explain :

      i) Solar distillation

      ii) Solar still.

   6) Write short note on recent development in wind energy.

3. Attempt **any 2** questions : **(6 marks each)**

   1) With the help of a neat sketch, describe any two solar air heaters.

   2) With the help of a neat sketch, explain PV hybrid system.

   3) Explain briefly with neat sketch about :

      1) Horizontal wind mills.

      2) Vertical wind mills.

SECTION – II

4. Attempt **any 4** questions : **(4 marks each)**

   1) State and explain site selection criteria for biogas generation plant.

   2) Write a short note on utilization of biogas.

   3) Explain limitations and scope of tidal energy.

   4) Explain with neat sketch, open cycle and closed cycle Ocean Thermal Electric Conversion system.

   5) Discuss the various problems associated for storage and transportation of hydrogen gas.

   6) What is geothermal energy ? How can geothermal energy are utilized for electric power generation ?

5. Attempt **any 2** questions : **(6 marks each)**

   1) State various types of batteries and with neat sketch, explain different types of battery arrangements.

   2) With advantages and disadvantages, explain single basin and double basin tidal power plants.

   3) Explain with neat sketch, various part of geothermal energy system.

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SLR-TC – 512

Seat No.	

Set **R**

B.E. (E&E) (Part – I) (CGPA) Examination, 2018
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1 mark each)**

1) A module is a
   a) newly installed solar cell
   b) series parallel arrangement of solar cells
   c) a series of solar cells when not used for power generation
   d) none of the above

2) _____ is the major disadvantage of solar cells for power generation.
   a) lack of availability b) large area requirement
   c) variable power d) high cost

3) Local winds are created due to
   a) differential heating of land and water
   b) differential heating of plains and mountains
   c) any of the above
   d) none of the above

4) What kind of energy does a wind turbine use ?
   a) kinetic energy b) potential energy
   c) chemical energy d) thermal energy

5) Geothermal energy is
   a) a renewable energy resource b) alternative energy source
   c) inexhaustible energy source d) any of the above

6) Geologists believe that below the earth's crust, the molten mass exists in the form of
   a) magma b) vent c) hot cell d) liquation

7) Tidal energy mainly utilises
   a) kinetic energy of water
   b) potential energy of water
   c) both kinetic as well as potential energy of water
   d) none of the above

8) A rotameter measures
   a) velocity of fluids b) viscosity of fluids
   c) density of fluids d) discharge of fluids

9) Hydrogen is produced by
   a) Electrolysis b) Incineration
   c) Aerobic digestion d) Decomposting

10) Hydrogen can be stored as a
   a) compressed gas b) liquid
   c) metal hydride d) all of the above

11) Heliostats used for exploiting solar energy are called
   a) diffusers b) ponds
   c) reflecting mirrors d) mantle

12) For solar thermal electric plants, preferable area is
   a) mountain tops b) hot arid zones
   c) coastal areas d) high rainfall zones

13) Photovoltaic solar energy conversion system makes use of
   a) fuel cell b) solar cell
   c) solar pond d) none of the above

14) The output of a solar cell is of the order of
   a) 0.1 W b) 0.5 W c) 1 W d) 5 W

SLR-TC – 512

Seat No.	

B.E. (E&E) (Part – I) (CGPA) Examination, 2018
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

   1) With neat sketch, explain working of solar cooker.

   2) What are the non-conventional sources of energy and explain briefly ?

   3) Write short note on India's energy production and energy alternatives.

   4) Write short note on solar thermal storage.

   5) Explain :

      i) Solar distillation

      ii) Solar still.

   6) Write short note on recent development in wind energy.

3. Attempt **any 2** questions : **(6 marks each)**

   1) With the help of a neat sketch, describe any two solar air heaters.

   2) With the help of a neat sketch, explain PV hybrid system.

   3) Explain briefly with neat sketch about :

      1) Horizontal wind mills.

      2) Vertical wind mills.

Set R

SECTION – II

4. Attempt **any 4** questions : **(4 marks each)**

   1) State and explain site selection criteria for biogas generation plant.

   2) Write a short note on utilization of biogas.

   3) Explain limitations and scope of tidal energy.

   4) Explain with neat sketch, open cycle and closed cycle Ocean Thermal Electric Conversion system.

   5) Discuss the various problems associated for storage and transportation of hydrogen gas.

   6) What is geothermal energy ? How can geothermal energy are utilized for electric power generation ?

5. Attempt **any 2** questions : **(6 marks each)**

   1) State various types of batteries and with neat sketch, explain different types of battery arrangements.

   2) With advantages and disadvantages, explain single basin and double basin tidal power plants.

   3) Explain with neat sketch, various part of geothermal energy system.

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SLR-TC – 512

Seat No.	

Set S

B.E. (E&E) (Part – I) (CGPA) Examination, 2018
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Tuesday, 8-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1 mark each)**

1) Geologists believe that below the earth's crust, the molten mass exists in the form of
   a) magma b) vent c) hot cell d) liquation

2) Tidal energy mainly utilises
   a) kinetic energy of water
   b) potential energy of water
   c) both kinetic as well as potential energy of water
   d) none of the above

3) A rotameter measures
   a) velocity of fluids b) viscosity of fluids
   c) density of fluids d) discharge of fluids

4) Hydrogen is produced by
   a) Electrolysis b) Incineration
   c) Aerobic digestion d) Decomposting

P.T.O.

5) Hydrogen can be stored as a
   a) compressed gas b) liquid
   c) metal hydride d) all of the above

6) Heliostats used for exploiting solar energy are called
   a) diffusers b) ponds
   c) reflecting mirrors d) mantle

7) For solar thermal electric plants, preferable area is
   a) mountain tops b) hot arid zones
   c) coastal areas d) high rainfall zones

8) Photovoltaic solar energy conversion system makes use of
   a) fuel cell b) solar cell
   c) solar pond d) none of the above

9) The output of a solar cell is of the order of
   a) 0.1 W b) 0.5 W c) 1 W d) 5 W

10) A module is a
   a) newly installed solar cell
   b) series parallel arrangement of solar cells
   c) a series of solar cells when not used for power generation
   d) none of the above

11) _____ is the major disadvantage of solar cells for power generation.
   a) lack of availability b) large area requirement
   c) variable power d) high cost

12) Local winds are created due to
   a) differential heating of land and water
   b) differential heating of plains and mountains
   c) any of the above
   d) none of the above

13) What kind of energy does a wind turbine use ?
   a) kinetic energy b) potential energy
   c) chemical energy d) thermal energy

14) Geothermal energy is
   a) a renewable energy resource b) alternative energy source
   c) inexhaustible energy source d) any of the above

SLR-TC – 512

Seat No.	

B.E. (E&E) (Part – I) (CGPA) Examination, 2018
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Tuesday, 8-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

   1) With neat sketch, explain working of solar cooker.

   2) What are the non-conventional sources of energy and explain briefly ?

   3) Write short note on India's energy production and energy alternatives.

   4) Write short note on solar thermal storage.

   5) Explain :

      i) Solar distillation

      ii) Solar still.

   6) Write short note on recent development in wind energy.

3. Attempt **any 2** questions : **(6 marks each)**

   1) With the help of a neat sketch, describe any two solar air heaters.

   2) With the help of a neat sketch, explain PV hybrid system.

   3) Explain briefly with neat sketch about :

      1) Horizontal wind mills.

      2) Vertical wind mills.

SECTION – II

4. Attempt **any 4** questions : **(4 marks each)**

   1) State and explain site selection criteria for biogas generation plant.

   2) Write a short note on utilization of biogas.

   3) Explain limitations and scope of tidal energy.

   4) Explain with neat sketch, open cycle and closed cycle Ocean Thermal Electric Conversion system.

   5) Discuss the various problems associated for storage and transportation of hydrogen gas.

   6) What is geothermal energy ? How can geothermal energy are utilized for electric power generation ?

5. Attempt **any 2** questions : **(6 marks each)**

   1) State various types of batteries and with neat sketch, explain different types of battery arrangements.

   2) With advantages and disadvantages, explain single basin and double basin tidal power plants.

   3) Explain with neat sketch, various part of geothermal energy system.

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SLR-TC – 517

Seat No.	

Set P

B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018
FACTS AND HVDC

Day and Date : Tuesday, 15-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *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 answer : **14**

1) Shunt connected, thyristor switches inductor whose effective reactance is varied in a _____
   a) Stepwise manner b) Continuous manner
   c) Linear manner d) None of above

2) In single phase full converter, device 1 and 2 on, 3 and 4 off give _____
   a) + ve vtg, – ve current b) + ve vtg, + ve current
   c) – ve vtg, + ve current d) – ve vtg, – ve current

3) TSC – TCR type var generator is made for _____
   a) Dynamic compensation b) Minimizing standly losses
   c) Increasing operating flexibility d) All of the above

4) Reactive power a capacitive compensation is a _____
   a) $Q = 2v^2/X\ (1 - \cos \delta)$ b) $Q = v^2/X \sin \delta/2$
   c) $Q = E1\ E2/X \sin \delta$ d) $Q = 2V^2x/X_L\ (1 - \sin \delta/2)$

5) The dynamic compensator is type of _____
   a) Toppings of Transformer b) TCR
   c) FC-TCR d) TSC

6) The most fast operation of compensation is _____
   a) TSSC b) GCSC c) TCSC d) All of above

7) The type static compensator is equivalent to _____
   a) SSSC b) Tapping's of transformer
   c) QBT d) Synchronous motor

8) The first commercially used HVDC link was built in
   a) 2006 b) 1954 c) 1986 d) Yet to be built

9) Reactive power to HVDC system may be supplied from
   a) AC filters b) Shunt capacitors
   c) SVS d) All of the above

10) As compared to HVAC line, the corona and radio interference on a HVDC line are
   a) Lower b) More
   c) The same d) All of the above

11) A 12-pulse bridge is preferred in HVDC because
   a) It eliminates certain harmonics
   b) It results in better power factor
   c) Series connection of converters on D.C. side is better
   d) All of above

12) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 90°

13) Fault on a two terminal DC link is removed by
   a) Breakers on DC side b) Breakers on AC side
   c) Current control of converters d) All of above

14) A commutation group is defined as, group of valves in which only _____ valves conducts.
   a) One b) Two c) Three d) Four

_____

SLR-TC – 517

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA)
Examination, 2018
FACTS AND HVDC

Day and Date : Tuesday, 15-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain in detail basic types of FACTS Controller.

2) Explain merits and demerits of STATCOM.

3) Explain variable impedance type series compensator.

4) Explain GTO Thyristor Controlled Series Compensator.

5) Explain objective of a series compensator.

3. Solve **any two** : **(6×2=12)**

1) Draw block diagram and characteristics of TSC.

2) Explain in detail power flow in AC system.

3) Explain how stability margin is increased when series compensator is used for transmission line.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain modified Vd-Id converter control characteristics.

   2) Explain the IPC scheme of firing angle generation.

   3) Explain power control in HVDC system with neat block diagram.

   4) Explain with neat diagram the different types of DC links.

   5) Write a short note on current and extinction angle controls.

5. Solve **any two** : **(6×2=12)**

   1) Explain the analysis of bridge converter with overlap less than 60 degree.

   2) Give detailed comparison between HVDC and AC transmission.

   3) Explain layout of HVDC substation with neat diagram.

Seat No.	

SLR-TC – 517

Set **Q**

B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018
FACTS AND HVDC

Day and Date : Tuesday, 15-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *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 answer : **14**

1) The first commercially used HVDC link was built in
a) 2006 b) 1954 c) 1986 d) Yet to be built

2) Reactive power to HVDC system may be supplied from
a) AC filters b) Shunt capacitors
c) SVS d) All of the above

3) As compared to HVAC line, the corona and radio interference on a HVDC line are
a) Lower b) More
c) The same d) All of the above

4) A 12-pulse bridge is preferred in HVDC because
a) It eliminates certain harmonics
b) It results in better power factor
c) Series connection of converters on D.C. side is better
d) All of above

5) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 90°

6) Fault on a two terminal DC link is removed by
   a) Breakers on DC side b) Breakers on AC side
   c) Current control of converters d) All of above

7) A commutation group is defined as, group of valves in which only _____ valves conducts.
   a) One b) Two c) Three d) Four

8) Shunt connected, thyristor switches inductor whose effective reactance is varied in a _____
   a) Stepwise manner b) Continuous manner
   c) Linear manner d) None of above

9) In single phase full converter, device 1 and 2 on, 3 and 4 off give _____
   a) + ve vtg, – ve current b) + ve vtg, + ve current
   c) – ve vtg, + ve current d) – ve vtg, – ve current

10) TSC – TCR type var generator is made for _____
   a) Dynamic compensation b) Minimizing standly losses
   c) Increasing operating flexibility d) All of the above

11) Reactive power a capacitive compensation is a _____
   a) $Q = 2v^2/X (1 – \cos \delta)$ b) $Q = v^2/X \sin \delta/2$
   c) $Q = E1\ E2/X \sin \delta$ d) $Q = 2V^2x/X_L (1 – \sin \delta/2)$

12) The dynamic compensator is type of _____
   a) Toppings of Transformer b) TCR
   c) FC-TCR d) TSC

13) The most fast operation of compensation is _____
   a) TSSC b) GCSC c) TCSC d) All of above

14) The type static compensator is equivalent to _____
   a) SSSC b) Tapping's of transformer
   c) QBT d) Synchronous motor

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SLR-TC – 517

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA)
Examination, 2018
FACTS AND HVDC

Day and Date : Tuesday, 15-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain in detail basic types of FACTS Controller.

2) Explain merits and demerits of STATCOM.

3) Explain variable impedance type series compensator.

4) Explain GTO Thyristor Controlled Series Compensator.

5) Explain objective of a series compensator.

3. Solve **any two** : **(6×2=12)**

1) Draw block diagram and characteristics of TSC.

2) Explain in detail power flow in AC system.

3) Explain how stability margin is increased when series compensator is used for transmission line.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain modified Vd-Id converter control characteristics.

   2) Explain the IPC scheme of firing angle generation.

   3) Explain power control in HVDC system with neat block diagram.

   4) Explain with neat diagram the different types of DC links.

   5) Write a short note on current and extinction angle controls.

5. Solve **any two** : **(6×2=12)**

   1) Explain the analysis of bridge converter with overlap less than 60 degree.

   2) Give detailed comparison between HVDC and AC transmission.

   3) Explain layout of HVDC substation with neat diagram.

Seat No.	

SLR-TC – 517

Set **R**

B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018
FACTS AND HVDC

Day and Date : Tuesday, 15-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *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 answer : **14**

1) The dynamic compensator is type of _____
   a) Toppings of Transformer b) TCR
   c) FC-TCR d) TSC

2) The most fast operation of compensation is _____
   a) TSSC b) GCSC c) TCSC d) All of above

3) The type static compensator is equivalent to _____
   a) SSSC b) Tapping's of transformer
   c) QBT d) Synchronous motor

4) The first commercially used HVDC link was built in
   a) 2006 b) 1954 c) 1986 d) Yet to be built

5) Reactive power to HVDC system may be supplied from
   a) AC filters b) Shunt capacitors
   c) SVS d) All of the above

6) As compared to HVAC line, the corona and radio interference on a HVDC line are
   a) Lower b) More
   c) The same d) All of the above

7) A 12-pulse bridge is preferred in HVDC because
   a) It eliminates certain harmonics
   b) It results in better power factor
   c) Series connection of converters on D.C. side is better
   d) All of above

8) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 90°

9) Fault on a two terminal DC link is removed by
   a) Breakers on DC side b) Breakers on AC side
   c) Current control of converters d) All of above

10) A commutation group is defined as, group of valves in which only _____ valves conducts.
   a) One b) Two c) Three d) Four

11) Shunt connected, thyristor switches inductor whose effective reactance is varied in a _____
   a) Stepwise manner b) Continuous manner
   c) Linear manner d) None of above

12) In single phase full converter, device 1 and 2 on, 3 and 4 off give _____
   a) + ve vtg, – ve current b) + ve vtg, + ve current
   c) – ve vtg, + ve current d) – ve vtg, – ve current

13) TSC – TCR type var generator is made for _____
   a) Dynamic compensation b) Minimizing standly losses
   c) Increasing operating flexibility d) All of the above

14) Reactive power a capacitive compensation is a _____
   a) $Q = 2v^2/X (1 - \cos \delta)$ b) $Q = v^2/X \sin \delta/2$
   c) $Q = E1\ E2/X \sin \delta$ d) $Q = 2V^2x/X_L (1 - \sin \delta/2)$

_____

SLR-TC – 517

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA)

Examination, 2018

FACTS AND HVDC

Day and Date : Tuesday, 15-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain in detail basic types of FACTS Controller.

2) Explain merits and demerits of STATCOM.

3) Explain variable impedance type series compensator.

4) Explain GTO Thyristor Controlled Series Compensator.

5) Explain objective of a series compensator.

3. Solve **any two** : **(6×2=12)**

1) Draw block diagram and characteristics of TSC.

2) Explain in detail power flow in AC system.

3) Explain how stability margin is increased when series compensator is used for transmission line.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain modified Vd-Id converter control characteristics.

   2) Explain the IPC scheme of firing angle generation.

   3) Explain power control in HVDC system with neat block diagram.

   4) Explain with neat diagram the different types of DC links.

   5) Write a short note on current and extinction angle controls.

5. Solve **any two** : **(6×2=12)**

   1) Explain the analysis of bridge converter with overlap less than 60 degree.

   2) Give detailed comparison between HVDC and AC transmission.

   3) Explain layout of HVDC substation with neat diagram.

Seat No.	

SLR-TC – 517

Set **S**

B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2018
FACTS AND HVDC

Day and Date : Tuesday, 15-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***full*** *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 answer : **14**

1) As compared to HVAC line, the corona and radio interference on a HVDC line are
   a) Lower b) More
   c) The same d) All of the above

2) A 12-pulse bridge is preferred in HVDC because
   a) It eliminates certain harmonics
   b) It results in better power factor
   c) Series connection of converters on D.C. side is better
   d) All of above

3) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 90°

4) Fault on a two terminal DC link is removed by
   a) Breakers on DC side b) Breakers on AC side
   c) Current control of converters d) All of above

5) A commutation group is defined as, group of valves in which only _____ valves conducts.
   a) One b) Two c) Three d) Four

6) Shunt connected, thyristor switches inductor whose effective reactance is varied in a _____
   a) Stepwise manner b) Continuous manner
   c) Linear manner d) None of above

7) In single phase full converter, device 1 and 2 on, 3 and 4 off give _____
   a) + ve vtg, – ve current b) + ve vtg, + ve current
   c) – ve vtg, + ve current d) – ve vtg, – ve current

8) TSC – TCR type var generator is made for _____
   a) Dynamic compensation b) Minimizing standly losses
   c) Increasing operating flexibility d) All of the above

9) Reactive power a capacitive compensation is a _____
   a) $Q = 2v^2/X (1 - \cos \delta)$ b) $Q = v^2/X \sin \delta/2$
   c) $Q = E1\ E2/X \sin \delta$ d) $Q = 2V^2x/X_L (1 - \sin \delta/2)$

10) The dynamic compensator is type of _____
   a) Toppings of Transformer b) TCR
   c) FC-TCR d) TSC

11) The most fast operation of compensation is _____
   a) TSSC b) GCSC c) TCSC d) All of above

12) The type static compensator is equivalent to _____
   a) SSSC b) Tapping's of transformer
   c) QBT d) Synchronous motor

13) The first commercially used HVDC link was built in
   a) 2006 b) 1954 c) 1986 d) Yet to be built

14) Reactive power to HVDC system may be supplied from
   a) AC filters b) Shunt capacitors
   c) SVS d) All of the above

_____

SLR-TC – 517

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA)
Examination, 2018
FACTS AND HVDC

Day and Date : Tuesday, 15-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain in detail basic types of FACTS Controller.

2) Explain merits and demerits of STATCOM.

3) Explain variable impedance type series compensator.

4) Explain GTO Thyristor Controlled Series Compensator.

5) Explain objective of a series compensator.

3. Solve **any two** : **(6×2=12)**

1) Draw block diagram and characteristics of TSC.

2) Explain in detail power flow in AC system.

3) Explain how stability margin is increased when series compensator is used for transmission line.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain modified Vd-Id converter control characteristics.

   2) Explain the IPC scheme of firing angle generation.

   3) Explain power control in HVDC system with neat block diagram.

   4) Explain with neat diagram the different types of DC links.

   5) Write a short note on current and extinction angle controls.

5. Solve **any two** : **(6×2=12)**

   1) Explain the analysis of bridge converter with overlap less than 60 degree.

   2) Give detailed comparison between HVDC and AC transmission.

   3) Explain layout of HVDC substation with neat diagram.

Seat No.	

SLR-TC – 518

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – II) (New) (CGPA) Examination, 2018
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the 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 material used for making permanent magnet is
A) Cast iron B) Soft steel C) Hard steel D) Silicon steel

2) The power factor of the induction motor will be _____ if the magnetizing current is _____
A) Low, low B) High, high C) High, low D) Low, high

3) Turbo-alternators are of
A) Salient B) Non-Salient C) Circular D) None of the above

4) Iron losses of a machine are
A) Directly proportional to flux density
B) Directly proportional to the square of flux density
C) Inversely proportional to flux density
D) Inversely proportional to the square of flux density

5) Which is non-magnetic material ?
A) Nickel B) Cobalt C) Aluminium D) Gadolinium

6) In electrical machines, the material preferred for pole shoes of electro-magnets is

A) Pure iron B) Aluminium C) Copper D) Lead

7) The percentage of silicon in transformer stampings is usually limited to

A) 0.4% B) 1.4% C) 4% D) 14%

8) In an alternator, which of the following coils will have EMF closer to sine waveform ?

A) Concentrated winding in full pitch coils

B) Concentrated winding in short pitch coils

C) Distributed winding in full pitch coils

D) Distributed winding in short pitch coils

9) In transformers, the cylindrical winding with rectangular conductors is generally used for

A) Low voltage winding B) High voltage winding

C) Tertiary voltage winding D) Any of the above

10) The dimensions of a dc machine primarily depend on

A) KW output B) Work done per revolution

C) Exposed surface D) None of the above

11) The heat generated in the transformer is dissipated to the surroundings mainly by

A) Conduction B) Convection C) Radiation D) All of the above

12) Larger values of air gap flux density can be adopted while designing induction motors of

A) Larger output B) Larger diameter of rotor

C) Both A) and B) above D) None of the above

13) When D is the diameter and L is the length of rotor of an induction motor, the best power factor can be obtained when (P = no. of poles)

A) D = L B) D = PF C) D = $\sqrt{(PL)}$ D) D = 1.35 P$\sqrt{L}$

14) The average value of specific electric loading of induction motors is in the range

A) 5000 to 45000 ampere conductors/meter

B) 50 to 450 ampere conductors/meter

C) 500 to 4500 ampere conductors/meter

D) 5 to 50 ampere conductors/meter

SLR-TC – 518

Seat No.	

B.E. (Electrical and Elctronics Engg.) (Part – II) (New) (CGPA) Examination, 2018
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) Explain the different magnetic materials used for electrical machines.
   b) Explain various types of windings used in transformer.
   c) Estimate no load current per phase for 6600/400 V, 50 Hz, single phase core type transformer from following data :
      Net cross section area of iron = 130 cm^2, maximum flux density = 1.2 wb/m^2, mean length of flux path = 270 cm, specific iron loss = 2.1 W/kg, specific gravity of iron = 7.5 gm/cc, effect of joints = air gap of 1 mm.
   d) Explain the choice of flux density and choice of current density in designing of transformer.
   e) Derive an output equation of 1 phase shell type transformer.

3. Solve **any two** : **(6×2=12)**
   a) Estimate the main dimensions of core for a 100 KVA, 11 KV/415 V, 50 Hz, three phase core transformer. EMF/turn = 5 V, stacking factor = 0.9, a flux density of 1.4 wb/m^2, current density of 2.6A/Sq. mm, window space factor of 0.3, use three stepped core.
   b) Design cooling arrangement for 250 KVA, 6600/400 V, 50 Hz, three phase delta/star oil immersed natural cooled transformer with the following data :
      i) Winding temperature rise not be exceed 50°C
      ii) Total losses at 90°C are 5 KW
      iii) Tank dimensions H × W × L = 125 × 100 × 50 (all in cm)
      iv) Oil level = 1.15 cm.
      Sketch the diagram to show the cooling arrangement.
   c) Why stepped cores are used in transformer ? Explain different core section used for transformer.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) What are different factors for making the choice of specific loading for an alternator ?

   b) Derive an expression for Dispersion coefficient in an induction motor.

   c) An 11 KW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing a 9 conductors. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machine has the efficiency of 0.86 and power factor of 0.82. The rotor MMF = 85% stator MMF. Also find the bar and end ring section if current density is $5A/mm^2$.

   d) Explain the concept of B60 in an induction motor.

   e) Discuss the factors that determine the choice of air gap length in induction motor.

5. Solve **any two** : **(6×2=12)**

   a) Explain procedure to draw circle diagram of 3ϕ induction motor.

   b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor. D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 mWb, current density = 4 A/mm^2, winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.

   c) Derive the expression for bar current and end ring current for a three phase induction motor.

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Seat No.	

SLR-TC – 518

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – II) (New) (CGPA) Examination, 2018
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the 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 an alternator, which of the following coils will have EMF closer to sine waveform ?
   A) Concentrated winding in full pitch coils
   B) Concentrated winding in short pitch coils
   C) Distributed winding in full pitch coils
   D) Distributed winding in short pitch coils

2) In transformers, the cylindrical winding with rectangular conductors is generally used for
   A) Low voltage winding B) High voltage winding
   C) Tertiary voltage winding D) Any of the above

3) The dimensions of a dc machine primarily depend on
   A) KW output B) Work done per revolution
   C) Exposed surface D) None of the above

4) The heat generated in the transformer is dissipated to the surroundings mainly by
   A) Conduction B) Convection C) Radiation D) All of the above

P.T.O.

5) Larger values of air gap flux density can be adopted while designing induction motors of
   A) Larger output B) Larger diameter of rotor
   C) Both A) and B) above D) None of the above

6) When D is the diameter and L is the length of rotor of an induction motor, the best power factor can be obtained when (P = no. of poles)
   A) D = L B) D = PF C) D = $\sqrt{(PL)}$ D) D = 1.35 P$\sqrt{L}$

7) The average value of specific electric loading of induction motors is in the range
   A) 5000 to 45000 ampere conductors/meter
   B) 50 to 450 ampere conductors/meter
   C) 500 to 4500 ampere conductors/meter
   D) 5 to 50 ampere conductors/meter

8) The material used for making permanent magnet is
   A) Cast iron B) Soft steel C) Hard steel D) Silicon steel

9) The power factor of the induction motor will be _____ if the magnetizing current is _____
   A) Low, low B) High, high C) High, low D) Low, high

10) Turbo-alternators are of
   A) Salient B) Non-Salient C) Circular D) None of the above

11) Iron losses of a machine are
   A) Directly proportional to flux density
   B) Directly proportional to the square of flux density
   C) Inversely proportional to flux density
   D) Inversely proportional to the square of flux density

12) Which is non-magnetic material ?
   A) Nickel B) Cobalt C) Aluminium D) Gadolinium

13) In electrical machines, the material preferred for pole shoes of electro-magnets is
   A) Pure iron B) Aluminium C) Copper D) Lead

14) The percentage of silicon in transformer stampings is usually limited to
   A) 0.4% B) 1.4% C) 4% D) 14%

SLR-TC – 518

Seat No.	

B.E. (Electrical and Elctronics Engg.) (Part – II) (New) (CGPA) Examination, 2018
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) Explain the different magnetic materials used for electrical machines.
   b) Explain various types of windings used in transformer.
   c) Estimate no load current per phase for 6600/400 V, 50 Hz, single phase core type transformer from following data :
      Net cross section area of iron = 130 cm^2, maximum flux density = 1.2 wb/m^2, mean length of flux path = 270 cm, specific iron loss = 2.1 W/kg, specific gravity of iron = 7.5 gm/cc, effect of joints = air gap of 1 mm.
   d) Explain the choice of flux density and choice of current density in designing of transformer.
   e) Derive an output equation of 1 phase shell type transformer.

3. Solve **any two** : **(6×2=12)**
   a) Estimate the main dimensions of core for a 100 KVA, 11 KV/415 V, 50 Hz, three phase core transformer. EMF/turn = 5 V, stacking factor = 0.9, a flux density of 1.4 wb/m^2, current density of 2.6A/Sq. mm, window space factor of 0.3, use three stepped core.
   b) Design cooling arrangement for 250 KVA, 6600/400 V, 50 Hz, three phase delta/star oil immersed natural cooled transformer with the following data :
      i) Winding temperature rise not be exceed 50°C
      ii) Total losses at 90°C are 5 KW
      iii) Tank dimensions H × W × L = 125 × 100 × 50 (all in cm)
      iv) Oil level = 1.15 cm.
      Sketch the diagram to show the cooling arrangement.
   c) Why stepped cores are used in transformer ? Explain different core section used for transformer.

Set Q

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) What are different factors for making the choice of specific loading for an alternator ?

   b) Derive an expression for Dispersion coefficient in an induction motor.

   c) An 11 KW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing a 9 conductors. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machine has the efficiency of 0.86 and power factor of 0.82. The rotor MMF = 85% stator MMF. Also find the bar and end ring section if current density is $5A/mm^2$.

   d) Explain the concept of B60 in an induction motor.

   e) Discuss the factors that determine the choice of air gap length in induction motor.

5. Solve **any two** : **(6×2=12)**

   a) Explain procedure to draw circle diagram of 3ϕ induction motor.

   b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor. D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 mWb, current density = 4 A/mm^2, winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.

   c) Derive the expression for bar current and end ring current for a three phase induction motor.

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Seat No.	

SLR-TC – 518

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – II) (New) (CGPA) Examination, 2018
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the 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) Which is non-magnetic material ?
A) Nickel B) Cobalt C) Aluminium D) Gadolinium

2) In electrical machines, the material preferred for pole shoes of electro-magnets is
A) Pure iron B) Aluminium C) Copper D) Lead

3) The percentage of silicon in transformer stampings is usually limited to
A) 0.4% B) 1.4% C) 4% D) 14%

4) In an alternator, which of the following coils will have EMF closer to sine waveform ?
A) Concentrated winding in full pitch coils
B) Concentrated winding in short pitch coils
C) Distributed winding in full pitch coils
D) Distributed winding in short pitch coils

5) In transformers, the cylindrical winding with rectangular conductors is generally used for
   A) Low voltage winding B) High voltage winding
   C) Tertiary voltage winding D) Any of the above

6) The dimensions of a dc machine primarily depend on
   A) KW output B) Work done per revolution
   C) Exposed surface D) None of the above

7) The heat generated in the transformer is dissipated to the surroundings mainly by
   A) Conduction B) Convection C) Radiation D) All of the above

8) Larger values of air gap flux density can be adopted while designing induction motors of
   A) Larger output B) Larger diameter of rotor
   C) Both A) and B) above D) None of the above

9) When D is the diameter and L is the length of rotor of an induction motor, the best power factor can be obtained when (P = no. of poles)
   A) D = L B) D = PF C) D = $\sqrt{(PL)}$ D) D = 1.35 P$\sqrt{L}$

10) The average value of specific electric loading of induction motors is in the range
   A) 5000 to 45000 ampere conductors/meter
   B) 50 to 450 ampere conductors/meter
   C) 500 to 4500 ampere conductors/meter
   D) 5 to 50 ampere conductors/meter

11) The material used for making permanent magnet is
   A) Cast iron B) Soft steel C) Hard steel D) Silicon steel

12) The power factor of the induction motor will be _____ if the magnetizing current is _____
   A) Low, low B) High, high C) High, low D) Low,high

13) Turbo-alternators are of
   A) Salient B) Non-Salient C) Circular D) None of the above

14) Iron losses of a machine are
   A) Directly proportional to flux density
   B) Directly proportional to the square of flux density
   C) Inversely proportional to flux density
   D) Inversely proportional to the square of flux density

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SLR-TC – 518

Seat No.	

B.E. (Electrical and Elctronics Engg.) (Part – II) (New) (CGPA) Examination, 2018
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) Explain the different magnetic materials used for electrical machines.
   b) Explain various types of windings used in transformer.
   c) Estimate no load current per phase for 6600/400 V, 50 Hz, single phase core type transformer from following data :
      Net cross section area of iron = 130 cm^2, maximum flux density = 1.2 wb/m^2, mean length of flux path = 270 cm, specific iron loss = 2.1 W/kg, specific gravity of iron = 7.5 gm/cc, effect of joints = air gap of 1 mm.
   d) Explain the choice of flux density and choice of current density in designing of transformer.
   e) Derive an output equation of 1 phase shell type transformer.

3. Solve **any two** : **(6×2=12)**
   a) Estimate the main dimensions of core for a 100 KVA, 11 KV/415 V, 50 Hz, three phase core transformer. EMF/turn = 5 V, stacking factor = 0.9, a flux density of 1.4 wb/m^2, current density of 2.6A/Sq. mm, window space factor of 0.3, use three stepped core.
   b) Design cooling arrangement for 250 KVA, 6600/400 V, 50 Hz, three phase delta/star oil immersed natural cooled transformer with the following data :
      i) Winding temperature rise not be exceed 50°C
      ii) Total losses at 90°C are 5 KW
      iii) Tank dimensions H × W × L = 125 × 100 × 50 (all in cm)
      iv) Oil level = 1.15 cm.
      Sketch the diagram to show the cooling arrangement.
   c) Why stepped cores are used in transformer ? Explain different core section used for transformer.

Set R

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) What are different factors for making the choice of specific loading for an alternator ?

   b) Derive an expression for Dispersion coefficient in an induction motor.

   c) An 11 KW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing a 9 conductors. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machine has the efficiency of 0.86 and power factor of 0.82. The rotor MMF = 85% stator MMF. Also find the bar and end ring section if current density is $5A/mm^2$.

   d) Explain the concept of B60 in an induction motor.

   e) Discuss the factors that determine the choice of air gap length in induction motor.

5. Solve **any two** : **(6×2=12)**

   a) Explain procedure to draw circle diagram of 3ϕ induction motor.

   b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor. D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 mWb, current density = 4 A/mm^2, winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.

   c) Derive the expression for bar current and end ring current for a three phase induction motor.

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Seat No.	

SLR-TC – 518

Set S

B.E. (Electrical and Electronics Engg.) (Part – II) (New) (CGPA) Examination, 2018
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the 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 dimensions of a dc machine primarily depend on
A) KW output B) Work done per revolution
C) Exposed surface D) None of the above

2) The heat generated in the transformer is dissipated to the surroundings mainly by
A) Conduction B) Convection C) Radiation D) All of the above

3) Larger values of air gap flux density can be adopted while designing induction motors of
A) Larger output B) Larger diameter of rotor
C) Both A) and B) above D) None of the above

4) When D is the diameter and L is the length of rotor of an induction motor, the best power factor can be obtained when (P = no. of poles)
A) D = L B) D = PF C) D = $\sqrt{(PL)}$ D) D = 1.35 P$\sqrt{L}$

5) The average value of specific electric loading of induction motors is in the range
   A) 5000 to 45000 ampere conductors/meter
   B) 50 to 450 ampere conductors/meter
   C) 500 to 4500 ampere conductors/meter
   D) 5 to 50 ampere conductors/meter

6) The material used for making permanent magnet is
   A) Cast iron B) Soft steel C) Hard steel D) Silicon steel

7) The power factor of the induction motor will be _____ if the magnetizing current is _____
   A) Low, low B) High, high C) High, low D) Low,high

8) Turbo-alternators are of
   A) Salient B) Non-Salient C) Circular D) None of the above

9) Iron losses of a machine are
   A) Directly proportional to flux density
   B) Directly proportional to the square of flux density
   C) Inversely proportional to flux density
   D) Inversely proportional to the square of flux density

10) Which is non-magnetic material ?
   A) Nickel B) Cobalt C) Aluminium D) Gadolinium

11) In electrical machines, the material preferred for pole shoes of electro-magnets is
   A) Pure iron B) Aluminium C) Copper D) Lead

12) The percentage of silicon in transformer stampings is usually limited to
   A) 0.4% B) 1.4% C) 4% D) 14%

13) In an alternator, which of the following coils will have EMF closer to sine waveform ?
   A) Concentrated winding in full pitch coils
   B) Concentrated winding in short pitch coils
   C) Distributed winding in full pitch coils
   D) Distributed winding in short pitch coils

14) In transformers, the cylindrical winding with rectangular conductors is generally used for
   A) Low voltage winding B) High voltage winding
   C) Tertiary voltage winding D) Any of the above

SLR-TC – 518

Seat No.	

B.E. (Electrical and Elctronics Engg.) (Part – II) (New) (CGPA) Examination, 2018
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 17-5-2018 Marks : 56
Time : 2.30 p.m. to 5.30 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) Explain the different magnetic materials used for electrical machines.
   b) Explain various types of windings used in transformer.
   c) Estimate no load current per phase for 6600/400 V, 50 Hz, single phase core type transformer from following data :
      Net cross section area of iron = 130 cm^2, maximum flux density = 1.2 wb/m^2, mean length of flux path = 270 cm, specific iron loss = 2.1 W/kg, specific gravity of iron = 7.5 gm/cc, effect of joints = air gap of 1 mm.
   d) Explain the choice of flux density and choice of current density in designing of transformer.
   e) Derive an output equation of 1 phase shell type transformer.

3. Solve **any two** : **(6×2=12)**
   a) Estimate the main dimensions of core for a 100 KVA, 11 KV/415 V, 50 Hz, three phase core transformer. EMF/turn = 5 V, stacking factor = 0.9, a flux density of 1.4 wb/m^2, current density of 2.6A/Sq. mm, window space factor of 0.3, use three stepped core.
   b) Design cooling arrangement for 250 KVA, 6600/400 V, 50 Hz, three phase delta/star oil immersed natural cooled transformer with the following data :
      i) Winding temperature rise not be exceed 50°C
      ii) Total losses at 90°C are 5 KW
      iii) Tank dimensions H × W × L = 125 × 100 × 50 (all in cm)
      iv) Oil level = 1.15 cm.
      Sketch the diagram to show the cooling arrangement.
   c) Why stepped cores are used in transformer ? Explain different core section used for transformer.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) What are different factors for making the choice of specific loading for an alternator ?

   b) Derive an expression for Dispersion coefficient in an induction motor.

   c) An 11 KW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing a 9 conductors. Calculate the value of bar and end ring current. The number of rotor bars is 64. The machine has the efficiency of 0.86 and power factor of 0.82. The rotor MMF = 85% stator MMF. Also find the bar and end ring section if current density is $5A/mm^2$.

   d) Explain the concept of B60 in an induction motor.

   e) Discuss the factors that determine the choice of air gap length in induction motor.

5. Solve **any two** : **(6×2=12)**

   a) Explain procedure to draw circle diagram of 3ϕ induction motor.

   b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor. D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 mWb, current density = 4 A/mm^2, winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.

   c) Derive the expression for bar current and end ring current for a three phase induction motor.

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SLR-TC – 519

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 answer : **(1×14=14)**

1) _____ industries are run by family members.
a) Cottage b) SSI
c) Tiny d) Large scale industries

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

3) Under perfect competition, price is determined by the interaction of total demand and
a) Total supply b) Total cost
c) Total utility d) Total production

4) The short run Average Cost Curve is _____ shaped.
a) V b) U c) L d) Any of the above

5) In _____ function of management the actual performance of sub-ordinates is guided towards common goal.
   a) Staffing b) Controlling
   c) Leadership d) Directing

6) When a firm's average revenue is equal to its average cost, it gets _____
   a) Super profit b) Normal profit
   c) Sub-normal profit d) None of the above

7) _____ are called as mini industries.
   a) SSI b) Cottage c) Tiny d) None of these

8) _____ are qualities of Entrepreneur.
   a) Self-confidence b) Risk takeover
   c) Foresightness d) All of these

9) The main disadvantage of line organisation is
   a) Top level executives have to do excessive work
   b) Structure is rigid
   c) Communication delays occur
   d) All of the above

10) The most popular type of organisation used for Civil Engineering Constructions is
   a) Line organization b) Line and staff organisation
   c) Functional organization d) Effective organization

11) Routing prescribes the
   a) Flow of material in the plant b) Proper utilization of man power
   c) Proper utilization of machines d) Inspection of final product

12) In inventory control, the economic order quantity is the
   a) Optimum lot size
   b) Highest level of inventory
   c) Lot corresponding to break-even point
   d) Capability of a plant to produce

13) The appellate authority for an industrial dispute is
   a) Management b) Labour court
   c) High court/Supreme Court d) Board of directors

14) The management of the _____ form of business organization is totalitarian in nature.
   a) Cooperative b) Partnership
   c) Individual proprietorship d) All of the above

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SLR-TC – 519

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 19-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

2) Figure to the ***right*** *indicates* ***maximum*** *marks.*

3) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain in detail line and staff organization.

2) Explain Partnership Organization.

3) Explain make and buy decision.

4) Write short notes on economic lot size.

5) Explain the Science and Technological Development of Country.

3. Solve **any two** : **(6×2=12)**

1) Explain macro and micro economy in brief.

2) Explain the Science and Technological Development of Country.

3) Define value engineering and value analysis in brief along with advantages.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Explain rules and advantages of industrial safety.
   2) Explain staffing and controlling in the organization.
   3) Describe importance of industrial management.
   4) Write a short note on project planning tools.
   5) State and explain the qualities of entrepreneur in brief.

5. Solve **any two** : **(6×2=12)**
   1) Write the salient features of Indian Electricity Act, 2003.
   2) Explain detail procedure for formation of public limited company.
   3) Explain the management information system in detail.

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Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 answer : **(1×14=14)**

1) _____ are qualities of Entrepreneur.
   a) Self-confidence b) Risk takeover
   c) Foresightness d) All of these

2) The main disadvantage of line organisation is
   a) Top level executives have to do excessive work
   b) Structure is rigid
   c) Communication delays occur
   d) All of the above

3) The most popular type of organisation used for Civil Engineering Constructions is
   a) Line organization b) Line and staff organisation
   c) Functional organization d) Effective organization

4) Routing prescribes the
   a) Flow of material in the plant
   b) Proper utilization of man power
   c) Proper utilization of machines
   d) Inspection of final product

5) In inventory control, the economic order quantity is the
   a) Optimum lot size
   b) Highest level of inventory
   c) Lot corresponding to break-even point
   d) Capability of a plant to produce

6) The appellate authority for an industrial dispute is
   a) Management
   b) Labour court
   c) High court/Supreme Court
   d) Board of directors

7) The management of the _____ form of business organization is totalitarian in nature.
   a) Cooperative
   b) Partnership
   c) Individual proprietorship
   d) All of the above

8) _____ industries are run by family members.
   a) Cottage
   b) SSI
   c) Tiny
   d) Large scale industries

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

10) Under perfect competition, price is determined by the interaction of total demand and
   a) Total supply
   b) Total cost
   c) Total utility
   d) Total production

11) The short run Average Cost Curve is _____ shaped.
   a) V b) U c) L d) Any of the above

12) In _____ function of management the actual performance of sub-ordinates is guided towards common goal.
   a) Staffing
   b) Controlling
   c) Leadership
   d) Directing

13) When a firm's average revenue is equal to its average cost, it gets _____
   a) Super profit
   b) Normal profit
   c) Sub-normal profit
   d) None of the above

14) _____ are called as mini industries.
   a) SSI b) Cottage c) Tiny d) None of these

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Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 19-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

2) Figure to the ***right*** *indicates* ***maximum*** *marks.*

3) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain in detail line and staff organization.

2) Explain Partnership Organization.

3) Explain make and buy decision.

4) Write short notes on economic lot size.

5) Explain the Science and Technological Development of Country.

3. Solve **any two** : **(6×2=12)**

1) Explain macro and micro economy in brief.

2) Explain the Science and Technological Development of Country.

3) Define value engineering and value analysis in brief along with advantages.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Explain rules and advantages of industrial safety.
   2) Explain staffing and controlling in the organization.
   3) Describe importance of industrial management.
   4) Write a short note on project planning tools.
   5) State and explain the qualities of entrepreneur in brief.

5. Solve **any two** : **(6×2=12)**
   1) Write the salient features of Indian Electricity Act, 2003.
   2) Explain detail procedure for formation of public limited company.
   3) Explain the management information system in detail.

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Seat No.	

Set **R**

B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 answer : **(1×14=14)**

1) In _____ function of management the actual performance of sub-ordinates is guided towards common goal.
a) Staffing b) Controlling
c) Leadership d) Directing

2) When a firm's average revenue is equal to its average cost, it gets _____
a) Super profit b) Normal profit
c) Sub-normal profit d) None of the above

3) _____ are called as mini industries.
a) SSI b) Cottage c) Tiny d) None of these

4) _____ are qualities of Entrepreneur.
a) Self-confidence b) Risk takeover
c) Foresightness d) All of these

5) The main disadvantage of line organisation is
   a) Top level executives have to do excessive work
   b) Structure is rigid
   c) Communication delays occur
   d) All of the above

6) The most popular type of organisation used for Civil Engineering Constructions is
   a) Line organization
   b) Line and staff organisation
   c) Functional organization
   d) Effective organization

7) Routing prescribes the
   a) Flow of material in the plant
   b) Proper utilization of man power
   c) Proper utilization of machines
   d) Inspection of final product

8) In inventory control, the economic order quantity is the
   a) Optimum lot size
   b) Highest level of inventory
   c) Lot corresponding to break-even point
   d) Capability of a plant to produce

9) The appellate authority for an industrial dispute is
   a) Management
   b) Labour court
   c) High court/Supreme Court
   d) Board of directors

10) The management of the _____ form of business organization is totalitarian in nature.
   a) Cooperative
   b) Partnership
   c) Individual proprietorship
   d) All of the above

11) _____ industries are run by family members.
   a) Cottage
   b) SSI
   c) Tiny
   d) Large scale industries

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

13) Under perfect competition, price is determined by the interaction of total demand and
   a) Total supply
   b) Total cost
   c) Total utility
   d) Total production

14) The short run Average Cost Curve is _____ shaped.
   a) V b) U c) L d) Any of the above

_____

SLR-TC – 519

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 19-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

2) Figure to the ***right*** *indicates* ***maximum*** *marks.*

3) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain in detail line and staff organization.

2) Explain Partnership Organization.

3) Explain make and buy decision.

4) Write short notes on economic lot size.

5) Explain the Science and Technological Development of Country.

3. Solve **any two** : **(6×2=12)**

1) Explain macro and micro economy in brief.

2) Explain the Science and Technological Development of Country.

3) Define value engineering and value analysis in brief along with advantages.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Explain rules and advantages of industrial safety.
   2) Explain staffing and controlling in the organization.
   3) Describe importance of industrial management.
   4) Write a short note on project planning tools.
   5) State and explain the qualities of entrepreneur in brief.

5. Solve **any two** : **(6×2=12)**
   1) Write the salient features of Indian Electricity Act, 2003.
   2) Explain detail procedure for formation of public limited company.
   3) Explain the management information system in detail.

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SLR-TC – 519

Seat No.	

Set S

B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 19-5-2018 Total Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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 answer : **(1×14=14)**

1) The most popular type of organisation used for Civil Engineering Constructions is
   a) Line organization
   b) Line and staff organisation
   c) Functional organization
   d) Effective organization

2) Routing prescribes the
   a) Flow of material in the plant
   b) Proper utilization of man power
   c) Proper utilization of machines
   d) Inspection of final product

3) In inventory control, the economic order quantity is the
   a) Optimum lot size
   b) Highest level of inventory
   c) Lot corresponding to break-even point
   d) Capability of a plant to produce

4) The appellate authority for an industrial dispute is
   a) Management b) Labour court
   c) High court/Supreme Court d) Board of directors

5) The management of the _____ form of business organization is totalitarian in nature.
   a) Cooperative b) Partnership
   c) Individual proprietorship d) All of the above

6) _____ industries are run by family members.
   a) Cottage b) SSI
   c) Tiny d) Large scale industries

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

8) Under perfect competition, price is determined by the interaction of total demand and
   a) Total supply b) Total cost
   c) Total utility d) Total production

9) The short run Average Cost Curve is _____ shaped.
   a) V b) U c) L d) Any of the above

10) In _____ function of management the actual performance of sub-ordinates is guided towards common goal.
   a) Staffing b) Controlling
   c) Leadership d) Directing

11) When a firm's average revenue is equal to its average cost, it gets _____
   a) Super profit b) Normal profit
   c) Sub-normal profit d) None of the above

12) _____ are called as mini industries.
   a) SSI b) Cottage c) Tiny d) None of these

13) _____ are qualities of Entrepreneur.
   a) Self-confidence b) Risk takeover
   c) Foresightness d) All of these

14) The main disadvantage of line organisation is
   a) Top level executives have to do excessive work
   b) Structure is rigid
   c) Communication delays occur
   d) All of the above

_____

SLR-TC – 519

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (New CGPA) Examination, 2018
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 19-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

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

2) Figure to the ***right*** *indicates* ***maximum*** *marks.*

3) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Explain in detail line and staff organization.

2) Explain Partnership Organization.

3) Explain make and buy decision.

4) Write short notes on economic lot size.

5) Explain the Science and Technological Development of Country.

3. Solve **any two** : **(6×2=12)**

1) Explain macro and micro economy in brief.

2) Explain the Science and Technological Development of Country.

3) Define value engineering and value analysis in brief along with advantages.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Explain rules and advantages of industrial safety.
   2) Explain staffing and controlling in the organization.
   3) Describe importance of industrial management.
   4) Write a short note on project planning tools.
   5) State and explain the qualities of entrepreneur in brief.

5. Solve **any two** : **(6×2=12)**
   1) Write the salient features of Indian Electricity Act, 2003.
   2) Explain detail procedure for formation of public limited company.
   3) Explain the management information system in detail.

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SLR-TC – 521

Seat No.	

Set P

B.E. (E&E) (Part – II) (New CGPA) Examination, 2018
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The judicious and effective use of energy to maximise profit and enhance competitive positions this can be the definition of _____
   a) Energy conservation b) Energy management
   c) Energy policy d) Energy audit

2) Which of the following would be of importance in the success of an energy management programme ?
   a) Communication b) Awareness c) Motivation d) All of these

3) Which of the following is not considered for external bench marking ?
   a) Scale of operation b) Vintage of technology
   c) Energy price d) Quality of raw material and products

4) The legal frame work for energy efficiency in India is given by _____
   a) Electricity Act, 2003 b) Electricity Conservation Act, 2001
   c) Electricity Act, 1958 d) Indian Electricity Act, 1910

5) The ratio of current year's production to the reference year's production is _____
   a) Demand factor b) Production factor
   c) Utilization factor d) Load factor

P.T.O.

6) What does the concept of true value of money imply ?
   a) Present value of money
   b) Future value of money
   c) Discounting of cash flows
   d) All of these

7) The major source of electrical power generation in India is _____
   a) Thermal b) Hydel c) Nuclear d) Wind

8) One unit of Electricity is equivalent to _____ Kcal heat units.
   a) 800 b) 860 c) 400 d) 680

9) An Energy policy provides the _____ for setting performance goal and integrating energy management in to an organization's culture.
   a) Budget
   b) Delivery mechanism
   c) Action plan
   d) Foundation

10) One tonne of oil equivalent is _____
   a) 10,000 Kcal b) 1000 Kcal c) 1000 kg. of oil d) 10,000 Mcal

11) When the current lags the voltage in an alternating current system it is caused mainly due to _____
   a) Resistive load
   b) Capacitive load
   c) Inductive load
   d) None of the above

12) The proposed international standard for energy management is _____
   a) ISO 9001 b) ISO 14000 c) ISO 14001 d) ISO 5001

13) Energy intensity is the ratio of _____
   a) Fuel consumption/GDP
   b) GDP/Fuel consumption
   c) GDP/Energy consumption
   d) Energy consumption/GDP

14) Name plate KW or HP rating of a motor indicates _____
   a) Input KW to the motor
   b) Output KW of the motor
   c) Minimum input KW to the motor
   d) Maximum input KW to the motor

_____

SLR-TC – 521

Seat No.	

B.E. (E&E) (Part – II) (New CGPA) Examination, 2018

Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Tuesday, 22-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

***Instruction** : Attempt **any two** questions from **each** Section.*

SECTION – I

2. Solve **any three** questions : **(3×4=12)**

   1) What is the difference between commercial and non-commercial energy ? Give examples.

   2) Explain the Bachat lamp Yojana Scheme.

   3) What is meant by Energy bench marking ? How it is helpful for energy audit ?

   4) Explain the difference between Energy Conservation and Energy efficiency with a suitable example.

3. Solve **any two** questions : **(2×8=16)**

   1) List ten strategic measures for meeting the future energy requirements in India.

   2) Explain the difference between Standards and Labeling.

   3) Write short note on :

      a) Thermography

      b) Smart metering.

SECTION – II

4. Answer **any three** questions : **(3×4=12)**

   1) Explain ways by which employees can be motivated on energy management.

   2) Explain briefly the operation of ESCO.

   3) What is the essential difference between CPM and PERT ?

   4) Explain the steps involved in project development cycle.

5. Answer **any two** questions : **(2×8=16)**

   1) List the duties and responsibilities of an energy manager.

   2) Explain in detail the project budget planning process.

   3) Explain what you understand by energy monitoring and targeting.

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SLR-TC – 521

Seat No.	

Set Q

B.E. (E&E) (Part – II) (New CGPA) Examination, 2018
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) One unit of Electricity is equivalent to _____ Kcal heat units.
   a) 800 b) 860 c) 400 d) 680

2) An Energy policy provides the _____ for setting performance goal and integrating energy management in to an organization's culture.
   a) Budget b) Delivery mechanism
   c) Action plan d) Foundation

3) One tonne of oil equivalent is _____
   a) 10,000 Kcal b) 1000 Kcal c) 1000 kg. of oil d) 10,000 Mcal

4) When the current lags the voltage in an alternating current system it is caused mainly due to _____
   a) Resistive load b) Capacitive load
   c) Inductive load d) None of the above

5) The proposed international standard for energy management is _____
   a) ISO 9001 b) ISO 14000 c) ISO 14001 d) ISO 5001

6) Energy intensity is the ratio of _____
   a) Fuel consumption/GDP b) GDP/Fuel consumption
   c) GDP/Energy consumption d) Energy consumption/GDP

P.T.O.

7) Name plate KW or HP rating of a motor indicates _____
   a) Input KW to the motor
   b) Output KW of the motor
   c) Minimum input KW to the motor
   d) Maximum input KW to the motor

8) The judicious and effective use of energy to maximise profit and enhance competitive positions this can be the definition of _____
   a) Energy conservation
   b) Energy management
   c) Energy policy
   d) Energy audit

9) Which of the following would be of importance in the success of an energy management programme ?
   a) Communication b) Awareness c) Motivation d) All of these

10) Which of the following is not considered for external bench marking ?
   a) Scale of operation
   b) Vintage of technology
   c) Energy price
   d) Quality of raw material and products

11) The legal frame work for energy efficiency in India is given by _____
   a) Electricity Act, 2003
   b) Electricity Conservation Act, 2001
   c) Electricity Act, 1958
   d) Indian Electricity Act, 1910

12) The ratio of current year's production to the reference year's production is _____
   a) Demand factor
   b) Production factor
   c) Utilization factor
   d) Load factor

13) What does the concept of true value of money imply ?
   a) Present value of money
   b) Future value of money
   c) Discounting of cash flows
   d) All of these

14) The major source of electrical power generation in India is _____
   a) Thermal b) Hydel c) Nuclear d) Wind

_____

SLR-TC – 521

Seat No.	

B.E. (E&E) (Part – II) (New CGPA) Examination, 2018

Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Tuesday, 22-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

***Instruction** : Attempt **any two** questions from **each** Section.*

SECTION – I

2. Solve **any three** questions : **(3×4=12)**

   1) What is the difference between commercial and non-commercial energy ? Give examples.

   2) Explain the Bachat lamp Yojana Scheme.

   3) What is meant by Energy bench marking ? How it is helpful for energy audit ?

   4) Explain the difference between Energy Conservation and Energy efficiency with a suitable example.

3. Solve **any two** questions : **(2×8=16)**

   1) List ten strategic measures for meeting the future energy requirements in India.

   2) Explain the difference between Standards and Labeling.

   3) Write short note on :

      a) Thermography

      b) Smart metering.

SECTION – II

4. Answer **any three** questions : **(3×4=12)**

   1) Explain ways by which employees can be motivated on energy management.

   2) Explain briefly the operation of ESCO.

   3) What is the essential difference between CPM and PERT ?

   4) Explain the steps involved in project development cycle.

5. Answer **any two** questions : **(2×8=16)**

   1) List the duties and responsibilities of an energy manager.

   2) Explain in detail the project budget planning process.

   3) Explain what you understand by energy monitoring and targeting.

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Seat No.	

SLR-TC – 521

Set R

B.E. (E&E) (Part – II) (New CGPA) Examination, 2018
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The ratio of current year's production to the reference year's production is _____

a) Demand factor b) Production factor
c) Utilization factor d) Load factor

2) What does the concept of true value of money imply ?

a) Present value of money b) Future value of money
c) Discounting of cash flows d) All of these

3) The major source of electrical power generation in India is _____

a) Thermal b) Hydel c) Nuclear d) Wind

4) One unit of Electricity is equivalent to _____ Kcal heat units.

a) 800 b) 860 c) 400 d) 680

5) An Energy policy provides the _____ for setting performance goal and integrating energy management in to an organization's culture.

a) Budget b) Delivery mechanism
c) Action plan d) Foundation

6) One tonne of oil equivalent is _____
   a) 10,000 Kcal b) 1000 Kcal c) 1000 kg. of oil d) 10,000 Mcal

7) When the current lags the voltage in an alternating current system it is caused mainly due to _____
   a) Resistive load b) Capacitive load
   c) Inductive load d) None of the above

8) The proposed international standard for energy management is _____
   a) ISO 9001 b) ISO 14000 c) ISO 14001 d) ISO 5001

9) Energy intensity is the ratio of _____
   a) Fuel consumption/GDP b) GDP/Fuel consumption
   c) GDP/Energy consumption d) Energy consumption/GDP

10) Name plate KW or HP rating of a motor indicates _____
   a) Input KW to the motor b) Output KW of the motor
   c) Minimum input KW to the motor d) Maximum input KW to the motor

11) The judicious and effective use of energy to maximise profit and enhance competitive positions this can be the definition of _____
   a) Energy conservation b) Energy management
   c) Energy policy d) Energy audit

12) Which of the following would be of importance in the success of an energy management programme ?
   a) Communication b) Awareness c) Motivation d) All of these

13) Which of the following is not considered for external bench marking ?
   a) Scale of operation b) Vintage of technology
   c) Energy price d) Quality of raw material and products

14) The legal frame work for energy efficiency in India is given by _____
   a) Electricity Act, 2003 b) Electricity Conservation Act, 2001
   c) Electricity Act, 1958 d) Indian Electricity Act, 1910

_____

SLR-TC – 521

Seat No.	

B.E. (E&E) (Part – II) (New CGPA) Examination, 2018

Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Tuesday, 22-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

***Instruction** : Attempt **any two** questions from **each** Section.*

SECTION – I

2. Solve **any three** questions : **(3×4=12)**

   1) What is the difference between commercial and non-commercial energy ? Give examples.

   2) Explain the Bachat lamp Yojana Scheme.

   3) What is meant by Energy bench marking ? How it is helpful for energy audit ?

   4) Explain the difference between Energy Conservation and Energy efficiency with a suitable example.

3. Solve **any two** questions : **(2×8=16)**

   1) List ten strategic measures for meeting the future energy requirements in India.

   2) Explain the difference between Standards and Labeling.

   3) Write short note on :

      a) Thermography

      b) Smart metering.

SECTION – II

4. Answer **any three** questions : **(3×4=12)**

   1) Explain ways by which employees can be motivated on energy management.

   2) Explain briefly the operation of ESCO.

   3) What is the essential difference between CPM and PERT ?

   4) Explain the steps involved in project development cycle.

5. Answer **any two** questions : **(2×8=16)**

   1) List the duties and responsibilities of an energy manager.

   2) Explain in detail the project budget planning process.

   3) Explain what you understand by energy monitoring and targeting.

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SLR-TC – 521

Seat No.	

Set S

B.E. (E&E) (Part – II) (New CGPA) Examination, 2018
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Tuesday, 22-5-2018 Max. Marks : 70
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) One tonne of oil equivalent is _____
   a) 10,000 Kcal b) 1000 Kcal c) 1000 kg. of oil d) 10,000 Mcal

2) When the current lags the voltage in an alternating current system it is caused mainly due to _____
   a) Resistive load b) Capacitive load
   c) Inductive load d) None of the above

3) The proposed international standard for energy management is _____
   a) ISO 9001 b) ISO 14000 c) ISO 14001 d) ISO 5001

4) Energy intensity is the ratio of _____
   a) Fuel consumption/GDP
   b) GDP/Fuel consumption
   c) GDP/Energy consumption
   d) Energy consumption/GDP

5) Name plate KW or HP rating of a motor indicates _____
   a) Input KW to the motor b) Output KW of the motor
   c) Minimum input KW to the motor d) Maximum input KW to the motor

P.T.O.

6) The judicious and effective use of energy to maximise profit and enhance competitive positions this can be the definition of _____
   a) Energy conservation b) Energy management
   c) Energy policy d) Energy audit

7) Which of the following would be of importance in the success of an energy management programme ?
   a) Communication b) Awareness c) Motivation d) All of these

8) Which of the following is not considered for external bench marking ?
   a) Scale of operation b) Vintage of technology
   c) Energy price d) Quality of raw material and products

9) The legal frame work for energy efficiency in India is given by _____
   a) Electricity Act, 2003 b) Electricity Conservation Act, 2001
   c) Electricity Act, 1958 d) Indian Electricity Act, 1910

10) The ratio of current year's production to the reference year's production is _____
   a) Demand factor b) Production factor
   c) Utilization factor d) Load factor

11) What does the concept of true value of money imply ?
   a) Present value of money b) Future value of money
   c) Discounting of cash flows d) All of these

12) The major source of electrical power generation in India is _____
   a) Thermal b) Hydel c) Nuclear d) Wind

13) One unit of Electricity is equivalent to _____ Kcal heat units.
   a) 800 b) 860 c) 400 d) 680

14) An Energy policy provides the _____ for setting performance goal and integrating energy management in to an organization's culture.
   a) Budget b) Delivery mechanism
   c) Action plan d) Foundation

_____

SLR-TC – 521

Seat No.	

B.E. (E&E) (Part – II) (New CGPA) Examination, 2018

Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Tuesday, 22-5-2018 Marks : 56

Time : 2.30 p.m. to 5.30 p.m.

***Instruction** : Attempt **any two** questions from **each** Section.*

SECTION – I

2. Solve **any three** questions : **(3×4=12)**

   1) What is the difference between commercial and non-commercial energy ? Give examples.

   2) Explain the Bachat lamp Yojana Scheme.

   3) What is meant by Energy bench marking ? How it is helpful for energy audit ?

   4) Explain the difference between Energy Conservation and Energy efficiency with a suitable example.

3. Solve **any two** questions : **(2×8=16)**

   1) List ten strategic measures for meeting the future energy requirements in India.

   2) Explain the difference between Standards and Labeling.

   3) Write short note on :

      a) Thermography

      b) Smart metering.

SECTION – II

4. Answer **any three** questions : **(3×4=12)**

   1) Explain ways by which employees can be motivated on energy management.

   2) Explain briefly the operation of ESCO.

   3) What is the essential difference between CPM and PERT ?

   4) Explain the steps involved in project development cycle.

5. Answer **any two** questions : **(2×8=16)**

   1) List the duties and responsibilities of an energy manager.

   2) Explain in detail the project budget planning process.

   3) Explain what you understand by energy monitoring and targeting.

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SLR-TC – 526

Seat No.	

Set P

B.E. (E&E) (Old) (Part – II) Examination, 2018
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) 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

2) 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

3) Modern HVDC systems are all
   a) 3-pulse converters b) 6-pluse converters
   c) 24-pluse converters d) 12-pulse converters

4) 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

5) If a angle of advance is 30° and overlap angle is 12°, the extension angle will be
   a) 42° b) (30/2)° c) 18° d) 21°

6) 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

7) Which of the following is a series connected FACTS device ?
   a) UPFC b) STATCOM c) TCSC d) TCPST

8) Series compensation is primarily resorted to
   a) improve voltage profile b) improve stability
   c) reduce fault currents d) all of the above

P.T.O.

9) Multi terminal systems are
   a) Series connected b) Parallel connected
   c) Ring connected d) All of above`
10) HVDC transmission commercially began in the year,
   a) 1935 b) 1950 c) 1954 d) 1970
11) 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
12) Filters used in 12-pulse converters usually on the AC side are
   a) 5^{th}, 7^{th} and high-pass b) 11^{th}, 13^{th} and high-pass
   c) 6^{th}, 12^{th} and high-pass d) only high-pass filter
13) Characteristic of a converter is the relation between
   a) AC voltage and Id b) DC output voltage and Id
   c) DC power and Id d) None of these
14) The initial HVDC valves were
   a) IGATS b) Thyristors
   c) Mercury arc rectifiers d) None of above
15) In a monopolar system usually the pole is
   a) Positive
   b) Negative
   c) Positive and negative
   d) Alternatively positive and negative
16) Thyristor valves came into operation in the year
   a) 1950 b) 1954 c) 1972 d) 2000
17) 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)
18) 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
19) 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
20) HVDC-VSC scheme employs
   a) IGBT valves
   b) Light or optically triggered thyristor valves
   c) Mercury arc valves
   d) MOSFET's and GTO valves

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SLR-TC – 526

Seat No.	

B.E. (E&E) (Old) (Part – II) Examination, 2018
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** questions : **(4×5=20)**

   a) Write the advantages and disadvantages of HVDC transmission system.

   b) Explain the requirements of firing angle scheme and explain IPC scheme.

   c) What is misfire ? Explain its causes and remedies.

   d) Explain EPC scheme in detail.

   e) Explain with neat diagram the different types of DC links.

   f) Draw and explain over current protection.

3. Answer **any two** questions : **(10×2=20)**

   a) Draw and explain typical HVDC converter station in detail.

   b) Compare EHVAC and HVDC transmission with suitable comments.

   c) Explain the over voltage protection of converter in detail.

SECTION – II

4. Answer **any four** questions : **(5×4=20)**

   a) Explain the current margin method for protection of MTDC system.

   b) Write short note on AC filters.

   c) Explain the voltage limiting control for MTDC system.

Set P

d) Explain with neat diagram the working of FC-TCR.

e) Write a short note on SVC.

f) Explain DC filters.

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) Derive an expression for characteristic harmonics.

c) Explain the concept of reactive power compensation.

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Seat No.	

Set **Q**

B.E. (E&E) (Old) (Part – II) Examination, 2018
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) Thyristor valves came into operation in the year
   a) 1950 b) 1954 c) 1972 d) 2000
2) 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)
3) 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
4) 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
5) HVDC-VSC scheme employs
   a) IGBT valves
   b) Light or optically triggered thyristor valves
   c) Mercury arc valves
   d) MOSFET's and GTO valves
6) 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

P.T.O.

7) 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
8) Modern HVDC systems are all
   a) 3-pulse converters b) 6-pluse converters
   c) 24-pluse converters d) 12-pulse converters
9) 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
10) If a angle of advance is 30° and overlap angle is 12°, the extension angle will be
   a) 42° b) (30/2)° c) 18° d) 21°
11) 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
12) Which of the following is a series connected FACTS device ?
   a) UPFC b) STATCOM c) TCSC d) TCPST
13) Series compensation is primarily resorted to
   a) improve voltage profile b) improve stability
   c) reduce fault currents d) all of the above
14) Multi terminal systems are
   a) Series connected b) Parallel connected
   c) Ring connected d) All of above`
15) HVDC transmission commercially began in the year,
   a) 1935 b) 1950 c) 1954 d) 1970
16) 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
17) Filters used in 12-pulse converters usually on the AC side are
   a) 5^{th}, 7^{th} and high-pass b) 11^{th}, 13^{th} and high-pass
   c) 6^{th}, 12^{th} and high-pass d) only high-pass filter
18) Characteristic of a converter is the relation between
   a) AC voltage and Id b) DC output voltage and Id
   c) DC power and Id d) None of these
19) The initial HVDC valves were
   a) IGATS b) Thyristors
   c) Mercury arc rectifiers d) None of above
20) In a monopolar system usually the pole is
   a) Positive
   b) Negative
   c) Positive and negative
   d) Alternatively positive and negative

SLR-TC – 526

Seat No.	

B.E. (E&E) (Old) (Part – II) Examination, 2018
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** questions : **(4×5=20)**

   a) Write the advantages and disadvantages of HVDC transmission system.

   b) Explain the requirements of firing angle scheme and explain IPC scheme.

   c) What is misfire ? Explain its causes and remedies.

   d) Explain EPC scheme in detail.

   e) Explain with neat diagram the different types of DC links.

   f) Draw and explain over current protection.

3. Answer **any two** questions : **(10×2=20)**

   a) Draw and explain typical HVDC converter station in detail.

   b) Compare EHVAC and HVDC transmission with suitable comments.

   c) Explain the over voltage protection of converter in detail.

SECTION – II

4. Answer **any four** questions : **(5×4=20)**

   a) Explain the current margin method for protection of MTDC system.

   b) Write short note on AC filters.

   c) Explain the voltage limiting control for MTDC system.

Set Q

d) Explain with neat diagram the working of FC-TCR.

e) Write a short note on SVC.

f) Explain DC filters.

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) Derive an expression for characteristic harmonics.

c) Explain the concept of reactive power compensation.

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Seat No.	

Set **R**

B.E. (E&E) (Old) (Part – II) Examination, 2018
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**
   1) 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
   2) Filters used in 12-pulse converters usually on the AC side are
      a) 5^{th}, 7^{th} and high-pass b) 11^{th}, 13^{th} and high-pass
      c) 6^{th}, 12^{th} and high-pass d) only high-pass filter
   3) Characteristic of a converter is the relation between
      a) AC voltage and ld b) DC output voltage and ld
      c) DC power and ld d) None of these
   4) The initial HVDC valves were
      a) IGATS b) Thyristors
      c) Mercury arc rectifiers d) None of above
   5) In a monopolar system usually the pole is
      a) Positive
      b) Negative
      c) Positive and negative
      d) Alternatively positive and negative
   6) Thyristor valves came into operation in the year
      a) 1950 b) 1954 c) 1972 d) 2000
   7) 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)

P.T.O.

8) 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
9) 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
10) HVDC-VSC scheme employs
   a) IGBT valves
   b) Light or optically triggered thyristor valves
   c) Mercury arc valves
   d) MOSFET's and GTO valves
11) 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
12) 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
13) Modern HVDC systems are all
   a) 3-pulse converters b) 6-pluse converters
   c) 24-pluse converters d) 12-pulse converters
14) 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
15) If a angle of advance is 30° and overlap angle is 12°, the extension angle will be
   a) 42° b) (30/2)° c) 18° d) 21°
16) 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
17) Which of the following is a series connected FACTS device ?
   a) UPFC b) STATCOM c) TCSC d) TCPST
18) Series compensation is primarily resorted to
   a) improve voltage profile b) improve stability
   c) reduce fault currents d) all of the above
19) Multi terminal systems are
   a) Series connected b) Parallel connected
   c) Ring connected d) All of above
20) HVDC transmission commercially began in the year,
   a) 1935 b) 1950 c) 1954 d) 1970

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SLR-TC – 526

Seat No.	

B.E. (E&E) (Old) (Part – II) Examination, 2018
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** questions : **(4×5=20)**

   a) Write the advantages and disadvantages of HVDC transmission system.

   b) Explain the requirements of firing angle scheme and explain IPC scheme.

   c) What is misfire ? Explain its causes and remedies.

   d) Explain EPC scheme in detail.

   e) Explain with neat diagram the different types of DC links.

   f) Draw and explain over current protection.

3. Answer **any two** questions : **(10×2=20)**

   a) Draw and explain typical HVDC converter station in detail.

   b) Compare EHVAC and HVDC transmission with suitable comments.

   c) Explain the over voltage protection of converter in detail.

SECTION – II

4. Answer **any four** questions : **(5×4=20)**

   a) Explain the current margin method for protection of MTDC system.

   b) Write short note on AC filters.

   c) Explain the voltage limiting control for MTDC system.

Set R

d) Explain with neat diagram the working of FC-TCR.

e) Write a short note on SVC.

f) Explain DC filters.

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) Derive an expression for characteristic harmonics.

c) Explain the concept of reactive power compensation.

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Seat No.	

Set S

B.E. (E&E) (Old) (Part – II) Examination, 2018
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date : Saturday, 12-5-2018 Max. Marks : 100
Time : 2.30 p.m. to 5.30 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(20×1=20)**

1) 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
2) Which of the following is a series connected FACTS device ?
   a) UPFC b) STATCOM c) TCSC d) TCPST
3) Series compensation is primarily resorted to
   a) improve voltage profile b) improve stability
   c) reduce fault currents d) all of the above
4) Multi terminal systems are
   a) Series connected b) Parallel connected
   c) Ring connected d) All of above`
5) HVDC transmission commercially began in the year,
   a) 1935 b) 1950 c) 1954 d) 1970
6) 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
7) Filters used in 12-pulse converters usually on the AC side are
   a) 5^{th}, 7^{th} and high-pass b) 11^{th}, 13^{th} and high-pass
   c) 6^{th}, 12^{th} and high-pass d) only high-pass filter
8) Characteristic of a converter is the relation between
   a) AC voltage and Id b) DC output voltage and Id
   c) DC power and Id d) None of these
9) The initial HVDC valves were
   a) IGATS b) Thyristors
   c) Mercury arc rectifiers d) None of above

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10) In a monopolar system usually the pole is
    a) Positive
    b) Negative
    c) Positive and negative
    d) Alternatively positive and negative
11) Thyristor valves came into operation in the year
    a) 1950 b) 1954 c) 1972 d) 2000
12) 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)
13) 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
14) 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
15) HVDC-VSC scheme employs
    a) IGBT valves
    b) Light or optically triggered thyristor valves
    c) Mercury arc valves
    d) MOSFET's and GTO valves
16) 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
17) 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
18) Modern HVDC systems are all
    a) 3-pulse converters b) 6-pluse converters
    c) 24-pluse converters d) 12-pulse converters
19) 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
20) If a angle of advance is 30° and overlap angle is 12°, the extension angle will be
    a) 42° b) (30/2)° c) 18° d) 21°

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B.E. (E&E) (Old) (Part – II) Examination, 2018
Elective – II : HIGH VOLTAGE DC TRANSMISSION (HVDC)

Day and Date : Saturday, 12-5-2018 Marks : 80
Time : 2.30 p.m. to 5.30 p.m.

SECTION – I

2. Answer **any four** questions : **(4×5=20)**

   a) Write the advantages and disadvantages of HVDC transmission system.

   b) Explain the requirements of firing angle scheme and explain IPC scheme.

   c) What is misfire ? Explain its causes and remedies.

   d) Explain EPC scheme in detail.

   e) Explain with neat diagram the different types of DC links.

   f) Draw and explain over current protection.

3. Answer **any two** questions : **(10×2=20)**

   a) Draw and explain typical HVDC converter station in detail.

   b) Compare EHVAC and HVDC transmission with suitable comments.

   c) Explain the over voltage protection of converter in detail.

SECTION – II

4. Answer **any four** questions : **(5×4=20)**

   a) Explain the current margin method for protection of MTDC system.

   b) Write short note on AC filters.

   c) Explain the voltage limiting control for MTDC system.

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d) Explain with neat diagram the working of FC-TCR.

e) Write a short note on SVC.

f) Explain DC filters.

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) Derive an expression for characteristic harmonics.

c) Explain the concept of reactive power compensation.
