SLR-VB – 377

Seat No.	

Set P

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

Day and Date : Thursday 4-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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) Figure to the ***right*** *indicate* ***full*** *marks.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
5) Use of ***calculator*** *is allowed.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Select the correct alternative : **(14×1=14)**

1) The general solution of $(x^2D^2 + xD)\, y = 0$ is
a) $C_1 + C_2x$ b) $C_1 + C_2e^{-x}$ c) $C_1 + C_2\log x$ d) None

2) The solution of $\sqrt{p} + \sqrt{q} = 1$ is
a) $z = ax + \left(1 - \sqrt{a}\right)^2 y + c$ b) $z = \sqrt{a}x + by + c$
c) $z = ax + \sqrt{a}y + c$ d) $z = a^2x + b^2y + c$

3) The solution of $p + q = z$ is
a) $f(x \cdot y,\ y\log z) = 0$ b) $f(x + y,\ y + \log z) = 0$
c) $f(x - y,\ y - \log z) = 0$ d) $f\left(\frac{x}{y}, \frac{z}{y}\right) = 0$

4) The CF of the differential equation $(D^2 - 4D + 1)\, y$ is
a) $C_1 e^{(2+\sqrt{3})x} + C_2 e^{(2-\sqrt{3})x}$ b) $C_1 \cos\left(2 + \sqrt{3}\right)x + C_2 \sin\left(2 - \sqrt{3}\right)x$
c) $(C_1 + C_2x)\, e^{-2x}$ d) $(C_1 + C_2x)\, e^{(2+\sqrt{3})x}$

5) $\frac{1}{D+3} \sin 2x =$ _____
a) $\frac{1}{13}(3\sin 2x - 2\cos 2x)$ b) $(3\sin 2x - 2\cos 2x)$
c) $\frac{1}{5}\sin 2x$ d) $\frac{1}{13}(2\cos 2x + 3\sin 2x)$

P.T.O.

6) $z\left\{\frac{1}{3^k}\right\}$ $k \geq 0$

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

7) If $z\{x_k\} = F(z)$ then $z\{kx_k\} =$ _____

a) $\frac{d}{dz}F(z)$ b) $\frac{d}{dz}zF(z)$ c) $-z\frac{d}{dz}F(z)$ d) $\frac{1}{z}\frac{d}{dz}F(z)$

8) Which of the following functions cannot be expanded in Fourier series in the interval $(-\pi, \pi)$.

a) e^x b) $|x|$ c) cosecx d) x^2

9) In the cosine series expansion of sinx in $(0, \pi)$ the constant term is _____

a) $1/2$ b) $2/\pi$ c) π d) $\pi/2$

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

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

11) The value of the integral $\int_0^\infty e^{-3t}\, t^5 dt$ is _____

a) $\frac{1}{243}$ b) $\frac{4}{243}$ c) $\frac{40}{243}$ d) $\frac{80}{243}$

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

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

13) If $\phi(x, y, z) = c$ represents a level surface then which of the following is not true

a) $\nabla\phi$ is normal vector to the surface

b) $\nabla\phi$ is tangent vector to the surface

c) The directional derivative is maximum in the direction of $\nabla\phi$

d) $\nabla\phi$ is orthogonal to $d\bar{r}$ if $\bar{r} = xi + yj + zk$

14) If $\bar{F} = (x+3y)i + (y-2z)j + (x+az)k$ is solenoidal then a = _____

a) 0 b) 1 c) 2 d) -2

_____

SLR-VB – 377

Seat No.	

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

Day and Date : Thursday 4-5-2017 Max. Marks : 56

Time : 3.00 p.m. to 6.00 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. a) Solve $(D^2 - 4D + 4)\, y = e^{2x} \sin 3x$. **3**

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

   c) Solve $(D^3 + 3D^2 + 3D + 1)\, y = e^{-x} + 2^x$. **3**

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

   b) Solve $\left(1 + x^2\right)\frac{d^2y}{dx^2} + (1 + x)\frac{dy}{dx} + y = 2 \sin \log (1 + x)$. **3**

   c) A resistance of 100 ohms and inductance of 0.5 henries are connected in series with a battery of 20 volts. Find the current at t = 0 if the relation between L, R, E is $L\frac{di}{dt} + Ri = E$. **3**

4. a) Solve $z(p^2 - q^2) = x - y$. **3**

   b) Solve $y^2 zp + x^2 zq = xy^2$. **3**

   c) Solve the following differential equation by the method of separation of variables $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} = 0$. **3**

Set P

5. a) Find $z^{-1}\left[\frac{3z^2+2z}{z^2-3z+2}\right]$ $1<|z|<2$. **4**

b) Find z transform if $x_k = 4^k \quad k<0$ $= 3^k \quad k\geq 0$. **3**

c) Find z $\{\cosh 3k\}$ $k\geq 0$. **3**

OR

c) Find $z\left\{\frac{2^k-3^k}{k}\right\}$ $k\geq 0$. **3**

SECTION – II

6. a) Find the Fourier expansion for $f(x)=\sqrt{1-\cos x}$ in $(0, 2\pi)$. Hence deduce that, $\frac{1}{2}=\sum_{n=1}^{\infty}\frac{1}{4n^2-1}$. **5**

b) Find a cosine series of period 2π to represent sinx in $0\leq x\leq \pi$. **4**

7. a) Find $L\left[\frac{d}{dt}\left(\frac{1-\cos 2t}{t}\right)\right]$. **3**

b) Find $L^{-1}\left[\frac{1}{s(s^2-a^2)}\right]$. **3**

c) Find inverse Laplace transform of $\tan^{-1}\left(\frac{2}{s^2}\right)$. **4**

8. a) Find the Fourier transform of $f(x)=1, \quad |x|<k$ $=0, \quad |x|>k$ and hence, evaluate

$\int_0^{\infty}\frac{\sin(s)}{s}ds=\frac{\pi}{2}$. **5**

Set P

b) Find F(x) if its Fourier cosine transform is, $F_c(s) = \begin{cases} \frac{1}{\sqrt{2\pi}}\left(k - \frac{s}{2}\right), & s < 2k \\ 0, & s > 2k \end{cases}$. **4**

9. a) Show that $\overline{F} = (6xy + z^3)i + (3x^2 - z)j + (3xz^2 - y)k$ is irrotational. Find the function ϕ such that $\overline{F} = \nabla\phi$. **3**

b) Prove that $\nabla \cdot \left(r \nabla \frac{1}{r^3}\right) = \frac{3}{r^4}$. **3**

c) In what direction from the point (2, 1, – 1) is the directional derivative of $\phi = x^2yz^3$ a maximum ? What is its magnitude ? **3**

OR

c) Find directional derivative of $\phi = x^2 + y^2 + z^2$ in the direction of $\frac{x}{3} = \frac{y}{4} = \frac{z}{3}$ at (1, 2, 3). **3**

———————

Set P

SLR-VB – 377

Seat No.	

Set Q

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

Day and Date : Thursday 4-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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) Figure to the ***right*** *indicate* ***full*** *marks.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
5) Use of ***calculator*** *is allowed.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Select the correct alternative : **(14×1=14)**

1) Which of the following functions cannot be expanded in Fourier series in the interval $(-\pi, \pi)$.
a) e^x b) $|x|$ c) cosecx d) x^2

2) In the cosine series expansion of sinx in $(0, \pi)$ the constant term is _____
a) $1/2$ b) $2/\pi$ c) π d) $\pi/2$

3) The Fourier sine transform of $F(x) = e^{-x}$, $x \geq 0$ is _____
a) $\frac{s}{1+s^2}$ b) $\frac{2}{\pi} \cdot \frac{s}{1+s^2}$ c) $\frac{s}{1-s^2}$ d) $\sqrt{\frac{2}{\pi}} \cdot \frac{s}{1+s^2}$

4) The value of the integral $\int_0^\infty e^{-3t}\, t^5 dt$ is _____
a) $\frac{1}{243}$ b) $\frac{4}{243}$ c) $\frac{40}{243}$ d) $\frac{80}{243}$

5) $L^{-1}\{\phi(s+a)\} =$ _____
a) $e^{at}\, L^{-1}\{\phi(s)\}$ b) $e^{-at}\, L^{-1}\{\phi(s)\}$ c) $-t\, L^{-1}\{\phi(s)\}$ d) $t\, L^{-1}\{\phi(s)\}$

P.T.O.

6) If $\phi(x, y, z) = c$ represents a level surface then which of the following is not true
   a) $\nabla\phi$ is normal vector to the surface
   b) $\nabla\phi$ is tangent vector to the surface
   c) The directional derivative is maximum in the direction of $\nabla\phi$
   d) $\nabla\phi$ is orthogonal to $d\bar{r}$ if $\bar{r} = xi + yj + zk$

7) If $\bar{F} = (x + 3y)i + (y - 2z)j + (x + az)k$ is solenoidal then a = _____
   a) 0 b) 1 c) 2 d) -2

8) The general solution of $(x^2D^2 + xD)\, y = 0$ is
   a) $C_1 + C_2x$ b) $C_1 + C_2e^{-x}$ c) $C_1 + C_2\log x$ d) None

9) The solution of $\sqrt{p} + \sqrt{q} = 1$ is
   a) $z = ax + \left(1 - \sqrt{a}\right)^2 y + c$ b) $z = \sqrt{a}x + by + c$
   c) $z = ax + \sqrt{a}y + c$ d) $z = a^2x + b^2y + c$

10) The solution of $p + q = z$ is
   a) $f(x \cdot y, y\log z) = 0$ b) $f(x + y, y + \log z) = 0$
   c) $f(x - y, y - \log z) = 0$ d) $f\left(\frac{x}{y}, \frac{z}{y}\right) = 0$

11) The CF of the differential equation $(D^2 - 4D + 1)\, y$ is
   a) $C_1 e^{(2+\sqrt{3})x} + C_2 e^{(2-\sqrt{3})x}$ b) $C_1 \cos\left(2 + \sqrt{3}\right)x + C_2 \sin\left(2 - \sqrt{3}\right)x$
   c) $(C_1 + C_2x)e^{-2x}$ d) $(C_1 + C_2x)\, e^{(2+\sqrt{3})x}$

12) $\frac{1}{D+3}\sin 2x =$ _____
   a) $\frac{1}{13}(3\sin 2x - 2\cos 2x)$ b) $(3\sin 2x - 2\cos 2x)$
   c) $\frac{1}{5}\sin 2x$ d) $\frac{1}{13}(2\cos 2x + 3\sin 2x)$

13) $z\left\{\frac{1}{3^k}\right\}$ $k \geq 0$
   a) $\frac{3}{z-3}$ b) $\frac{1}{z-3}$ c) $\frac{3z}{3z-1}$ d) $\frac{1}{3z-1}$

14) If $z\{x_k\} = F(z)$ then $z\{kx_k\} =$ _____
   a) $\frac{d}{dz}F(z)$ b) $\frac{d}{dz}zF(z)$ c) $-z\frac{d}{dz}F(z)$ d) $\frac{1}{z}\frac{d}{dz}F(z)$

_____

SLR-VB – 377

Seat No.	

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

Day and Date : Thursday 4-5-2017 Max. Marks : 56

Time : 3.00 p.m. to 6.00 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. a) Solve $(D^2 - 4D + 4)\, y = e^{2x} \sin 3x$. **3**

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

   c) Solve $(D^3 + 3D^2 + 3D + 1)\, y = e^{-x} + 2^x$. **3**

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

   b) Solve $\left(1 + x^2\right)\frac{d^2y}{dx^2} + (1 + x)\frac{dy}{dx} + y = 2 \sin \log (1 + x)$. **3**

   c) A resistance of 100 ohms and inductance of 0.5 henries are connected in series with a battery of 20 volts. Find the current at t = 0 if the relation between L, R, E is $L\frac{di}{dt} + Ri = E$. **3**

4. a) Solve $z(p^2 - q^2) = x - y$. **3**

   b) Solve $y^2 zp + x^2 zq = xy^2$. **3**

   c) Solve the following differential equation by the method of separation of variables $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} = 0$. **3**

Set Q

5. a) Find $z^{-1}\left[\frac{3z^2+2z}{z^2-3z+2}\right]$ $1<|z|<2$. **4**

   b) Find z transform if $x_k = 4^k \quad k<0$ $= 3^k \quad k\geq 0$. **3**

   c) Find $z\{\cosh 3k\}$ $k\geq 0$. **3**

   OR

   c) Find $z\left\{\frac{2^k-3^k}{k}\right\}$ $k\geq 0$. **3**

SECTION – II

6. a) Find the Fourier expansion for $f(x)=\sqrt{1-\cos x}$ in $(0, 2\pi)$. Hence deduce that, $\frac{1}{2}=\sum_{n=1}^{\infty}\frac{1}{4n^2-1}$. **5**

   b) Find a cosine series of period 2π to represent sinx in $0\leq x\leq \pi$. **4**

7. a) Find $L\left[\frac{d}{dt}\left(\frac{1-\cos 2t}{t}\right)\right]$. **3**

   b) Find $L^{-1}\left[\frac{1}{s(s^2-a^2)}\right]$. **3**

   c) Find inverse Laplace transform of $\tan^{-1}\left(\frac{2}{s^2}\right)$. **4**

8. a) Find the Fourier transform of $f(x)=1, \quad |x|<k$ $=0, \quad |x|>k$ and hence, evaluate

   $\int_0^{\infty}\frac{\sin(s)}{s}ds=\frac{\pi}{2}$. **5**

Set Q

b) Find F(x) if its Fourier cosine transform is, $F_c(s) = \begin{cases} \frac{1}{\sqrt{2\pi}}\left(k - \frac{s}{2}\right), & s < 2k \\ 0, & s > 2k \end{cases}$. **4**

9. a) Show that $\overline{F} = (6xy + z^3)i + (3x^2 - z)j + (3xz^2 - y)k$ is irrotational. Find the function ϕ such that $\overline{F} = \nabla\phi$. **3**

b) Prove that $\nabla \cdot \left(r \nabla \frac{1}{r^3}\right) = \frac{3}{r^4}$. **3**

c) In what direction from the point (2, 1, – 1) is the directional derivative of $\phi = x^2yz^3$ a maximum ? What is its magnitude ? **3**

OR

c) Find directional derivative of $\phi = x^2 + y^2 + z^2$ in the direction of $\frac{x}{3} = \frac{y}{4} = \frac{z}{3}$ at (1, 2, 3). **3**

———————

Set Q

SLR-VB – 377

Seat No.	

Set R

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

Day and Date : Thursday 4-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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) Figure to the ***right*** *indicate* ***full*** *marks.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
5) Use of ***calculator*** *is allowed.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Select the correct alternative : **(14×1=14)**

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

a) $\frac{1}{13}(3\sin 2x - 2\cos 2x)$ b) $(3\sin 2x - 2\cos 2x)$

c) $\frac{1}{5}\sin 2x$ d) $\frac{1}{13}(2\cos 2x + 3\sin 2x)$

2) $z\left\{\frac{1}{3^k}\right\}$ $k \geq 0$

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

3) If $z\{x_k\} = F(z)$ then $z\{kx_k\} =$ _____

a) $\frac{d}{dz}F(z)$ b) $\frac{d}{dz}zF(z)$ c) $-z\frac{d}{dz}F(z)$ d) $\frac{1}{z}\frac{d}{dz}F(z)$

4) Which of the following functions cannot be expanded in Fourier series in the interval $(-\pi, \pi)$.

a) e^x b) $|x|$ c) cosecx d) x^2

5) In the cosine series expansion of sinx in $(0, \pi)$ the constant term is _____

a) $1/2$ b) $2/\pi$ c) π d) $\pi/2$

6) The Fourier sine transform of $F(x) = e^{-x}$, $x \geq 0$ is _____

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

7) The value of the integral $\int_0^\infty e^{-3t}\, t^5 dt$ is _____

a) $\frac{1}{243}$ b) $\frac{4}{243}$ c) $\frac{40}{243}$ d) $\frac{80}{243}$

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

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

9) If $\phi(x, y, z) = c$ represents a level surface then which of the following is not true

a) $\nabla\phi$ is normal vector to the surface
b) $\nabla\phi$ is tangent vector to the surface
c) The directional derivative is maximum in the direction of $\nabla\phi$
d) $\nabla\phi$ is orthogonal to $d\bar{r}$ if $\bar{r} = xi + yj + zk$

10) If $\bar{F} = (x + 3y)i + (y - 2z)j + (x + az)k$ is solenoidal then a = _____

a) 0 b) 1 c) 2 d) -2

11) The general solution of $(x^2D^2 + xD)\, y = 0$ is

a) $C_1 + C_2x$ b) $C_1 + C_2e^{-x}$ c) $C_1 + C_2\log x$ d) None

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

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

13) The solution of $p + q = z$ is

a) $f(x \cdot y, y \log z) = 0$ b) $f(x + y, y + \log z) = 0$
c) $f(x - y, y - \log z) = 0$ d) $f\left(\frac{x}{y}, \frac{z}{y}\right) = 0$

14) The CF of the differential equation $(D^2 - 4D + 1)\, y$ is

a) $C_1 e^{(2+\sqrt{3})x} + C_2 e^{(2-\sqrt{3})x}$ b) $C_1 \cos(2 + \sqrt{3})x + C_2 \sin(2 - \sqrt{3})x$
c) $(C_1 + C_2x)e^{-2x}$ d) $(C_1 + C_2x)\, e^{(2+\sqrt{3})x}$

_____

SLR-VB – 377

Seat No.	

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

Day and Date : Thursday 4-5-2017 Max. Marks : 56

Time : 3.00 p.m. to 6.00 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. a) Solve $(D^2 - 4D + 4)\, y = e^{2x} \sin 3x$. **3**

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

   c) Solve $(D^3 + 3D^2 + 3D + 1)\, y = e^{-x} + 2^x$. **3**

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

   b) Solve $\left(1 + x^2\right)\frac{d^2y}{dx^2} + (1 + x)\frac{dy}{dx} + y = 2 \sin \log (1 + x)$. **3**

   c) A resistance of 100 ohms and inductance of 0.5 henries are connected in series with a battery of 20 volts. Find the current at t = 0 if the relation between L, R, E is $L\frac{di}{dt} + Ri = E$. **3**

4. a) Solve $z(p^2 - q^2) = x - y$. **3**

   b) Solve $y^2 zp + x^2 zq = xy^2$. **3**

   c) Solve the following differential equation by the method of separation of variables $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} = 0$. **3**

Set R

5. a) Find $z^{-1}\left[\frac{3z^2+2z}{z^2-3z+2}\right]$ $1<|z|<2$. **4**

   b) Find z transform if $x_k = 4^k \quad k<0$ $= 3^k \quad k\geq 0$. **3**

   c) Find $z\{\cosh 3k\}$ $k\geq 0$. **3**

   OR

   c) Find $z\left\{\frac{2^k-3^k}{k}\right\}$ $k\geq 0$. **3**

SECTION – II

6. a) Find the Fourier expansion for $f(x)=\sqrt{1-\cos x}$ in $(0, 2\pi)$. Hence deduce that, $\frac{1}{2}=\sum_{n=1}^{\infty}\frac{1}{4n^2-1}$. **5**

   b) Find a cosine series of period 2π to represent sinx in $0\leq x\leq\pi$. **4**

7. a) Find $L\left[\frac{d}{dt}\left(\frac{1-\cos 2t}{t}\right)\right]$. **3**

   b) Find $L^{-1}\left[\frac{1}{s(s^2-a^2)}\right]$. **3**

   c) Find inverse Laplace transform of $\tan^{-1}\left(\frac{2}{s^2}\right)$. **4**

8. a) Find the Fourier transform of $f(x)=1, \quad |x|<k$ $=0, \quad |x|>k$ and hence, evaluate

   $\int_0^{\infty}\frac{\sin(s)}{s}ds=\frac{\pi}{2}$. **5**

Set R

b) Find F(x) if its Fourier cosine transform is, $F_c(s) = \begin{cases} \frac{1}{\sqrt{2\pi}}\left(k - \frac{s}{2}\right), & s < 2k \\ 0, & s > 2k \end{cases}$. **4**

9. a) Show that $\overline{F} = (6xy + z^3)i + (3x^2 - z)j + (3xz^2 - y)k$ is irrotational. Find the function ϕ such that $\overline{F} = \nabla\phi$. **3**

b) Prove that $\nabla \cdot \left(r \nabla \frac{1}{r^3}\right) = \frac{3}{r^4}$. **3**

c) In what direction from the point (2, 1, – 1) is the directional derivative of $\phi = x^2yz^3$ a maximum ? What is its magnitude ? **3**

OR

c) Find directional derivative of $\phi = x^2 + y^2 + z^2$ in the direction of $\frac{x}{3} = \frac{y}{4} = \frac{z}{3}$ at (1, 2, 3). **3**

———————

Set R

SLR-VB – 377

Seat No.	

Set S

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

Day and Date : Thursday 4-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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) Figure to the ***right*** *indicate* ***full*** *marks.*
4) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
5) Use of ***calculator*** *is allowed.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Select the correct alternative : **(14×1=14)**

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

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

2) The value of the integral $\int_0^\infty e^{-3t}\ t^5 dt$ is _____

a) $\frac{1}{243}$ b) $\frac{4}{243}$ c) $\frac{40}{243}$ d) $\frac{80}{243}$

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

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

4) If $\phi(x, y, z) = c$ represents a level surface then which of the following is not true

a) $\nabla\phi$ is normal vector to the surface
b) $\nabla\phi$ is tangent vector to the surface
c) The directional derivative is maximum in the direction of $\nabla\phi$
d) $\nabla\phi$ is orthogonal to $d\bar{r}$ if $\bar{r} = xi + yj + zk$

5) If $\bar{F} = (x+3y)i + (y-2z)j + (x+az)k$ is solenoidal then a = _____

a) 0 b) 1 c) 2 d) -2

P.T.O.

6) The general solution of $(x^2D^2 + xD)\, y = 0$ is
a) $C_1 + C_2x$ b) $C_1 + C_2e^{-x}$ c) $C_1 + C_2\log x$ d) None

7) The solution of $\sqrt{p} + \sqrt{q} = 1$ is
a) $z = ax + \left(1 - \sqrt{a}\right)^2 y + c$ b) $z = \sqrt{a}x + by + c$
c) $z = ax + \sqrt{a}y + c$ d) $z = a^2x + b^2y + c$

8) The solution of $p + q = z$ is
a) $f(x \cdot y,\ y\log z) = 0$ b) $f(x + y,\ y + \log z) = 0$
c) $f(x - y,\ y - \log z) = 0$ d) $f\left(\frac{x}{y}, \frac{z}{y}\right) = 0$

9) The CF of the differential equation $(D^2 - 4D + 1)\, y$ is
a) $C_1\, e^{(2+\sqrt{3})x} + C_2\, e^{(2-\sqrt{3})x}$ b) $C_1 \cos\left(2 + \sqrt{3}\right)x + C_2 \sin\left(2 - \sqrt{3}\right)x$
c) $(C_1 + C_2x)\, e^{-2x}$ d) $(C_1 + C_2x)\ e^{(2+\sqrt{3})x}$

10) $\frac{1}{D+3} \sin 2x =$ _____
a) $\frac{1}{13}(3\sin 2x - 2\cos 2x)$ b) $(3\sin 2x - 2\cos 2x)$
c) $\frac{1}{5}\sin 2x$ d) $\frac{1}{13}(2\cos 2x + 3\sin 2x)$

11) $z\left\{\frac{1}{3^k}\right\}$ $k \geq 0$
a) $\frac{3}{z-3}$ b) $\frac{1}{z-3}$ c) $\frac{3z}{3z-1}$ d) $\frac{1}{3z-1}$

12) If $z\{x_k\} = F(z)$ then $z\{kx_k\} =$ _____
a) $\frac{d}{dz}F(z)$ b) $\frac{d}{dz}zF(z)$ c) $-z\frac{d}{dz}F(z)$ d) $\frac{1}{z}\frac{d}{dz}F(z)$

13) Which of the following functions cannot be expanded in Fourier series in the interval $(-\pi, \pi)$.
a) e^x b) $|x|$ c) cosecx d) x^2

14) In the cosine series expansion of sinx in $(0, \pi)$ the constant term is _____
a) $1/2$ b) $2/\pi$ c) π d) $\pi/2$

_____

Set S

SLR-VB – 377

Seat No.	

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

Day and Date : Thursday 4-5-2017 Max. Marks : 56

Time : 3.00 p.m. to 6.00 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. a) Solve $(D^2 - 4D + 4)\, y = e^{2x} \sin 3x$. **3**

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

   c) Solve $(D^3 + 3D^2 + 3D + 1)\, y = e^{-x} + 2^x$. **3**

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

   b) Solve $\left(1 + x^2\right)\frac{d^2y}{dx^2} + (1 + x)\frac{dy}{dx} + y = 2 \sin \log (1 + x)$. **3**

   c) A resistance of 100 ohms and inductance of 0.5 henries are connected in series with a battery of 20 volts. Find the current at t = 0 if the relation between L, R, E is $L\frac{di}{dt} + Ri = E$. **3**

4. a) Solve $z(p^2 - q^2) = x - y$. **3**

   b) Solve $y^2 zp + x^2 zq = xy^2$. **3**

   c) Solve the following differential equation by the method of separation of variables $x^2 \frac{\partial u}{\partial x} + y^2 \frac{\partial u}{\partial y} = 0$. **3**

Set S

5. a) Find $z^{-1}\left[\frac{3z^2+2z}{z^2-3z+2}\right]$ $1<|z|<2$. **4**

b) Find z transform if $x_k = 4^k \quad k<0$ $= 3^k \quad k\geq 0$. **3**

c) Find z $\{\cosh 3k\}$ $k\geq 0$. **3**

OR

c) Find $z\left\{\frac{2^k-3^k}{k}\right\}$ $k\geq 0$. **3**

SECTION – II

6. a) Find the Fourier expansion for $f(x)=\sqrt{1-\cos x}$ in $(0, 2\pi)$. Hence deduce that, $\frac{1}{2}=\sum_{n=1}^{\infty}\frac{1}{4n^2-1}$. **5**

b) Find a cosine series of period 2π to represent sinx in $0\leq x\leq \pi$. **4**

7. a) Find $L\left[\frac{d}{dt}\left(\frac{1-\cos 2t}{t}\right)\right]$. **3**

b) Find $L^{-1}\left[\frac{1}{s(s^2-a^2)}\right]$. **3**

c) Find inverse Laplace transform of $\tan^{-1}\left(\frac{2}{s^2}\right)$. **4**

8. a) Find the Fourier transform of $f(x)=1, \quad |x|<k$ $=0, \quad |x|>k$ and hence, evaluate

$\int_0^{\infty}\frac{\sin(s)}{s}ds=\frac{\pi}{2}$. **5**

Set S

b) Find F(x) if its Fourier cosine transform is, $F_c(s) = \begin{cases} \frac{1}{\sqrt{2\pi}}\left(k - \frac{s}{2}\right), & s < 2k \\ 0, & s > 2k \end{cases}$. **4**

9. a) Show that $\overline{F} = (6xy + z^3)i + (3x^2 - z)j + (3xz^2 - y)k$ is irrotational. Find the function ϕ such that $\overline{F} = \nabla\phi$. **3**

b) Prove that $\nabla \cdot \left(r \nabla \frac{1}{r^3}\right) = \frac{3}{r^4}$. **3**

c) In what direction from the point (2, 1, – 1) is the directional derivative of $\phi = x^2yz^3$ a maximum ? What is its magnitude ? **3**

OR

c) Find directional derivative of $\phi = x^2 + y^2 + z^2$ in the direction of $\frac{x}{3} = \frac{y}{4} = \frac{z}{3}$ at (1, 2, 3). **3**

———————

Set S

SLR-VB – 378

Seat No.	

Set P

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

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

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

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) DC series motors are used in those applications where_____ is required.
   a) High starting torque b) Constant speed
   c) Low no load speed d) None of the above

2) The primary reason for providing compensating winding in DC generator is to
   a) Compensate for decrease in main flux
   b) Neutralize cross magnetizing flux
   c) Neutralize armature mmf
   d) Maintain uniform flux distribution

3) A wave winding must go at least _____around the armature before it closes back where it started.
   a) Once b) Twice c) Thrice d) Four times

4) The constant losses in DC machines are
   a) Shunt field losses b) Windage losses
   c) Iron and friction losses d) All of the above

5) In DC generator the generated E.M.F. is directly proportional to the
   a) Pole flux b) Number of armature parallel paths
   c) Field current d) Number of dummy coil

P.T.O.

6) The current drawn by 240V DC motor of Ra = 0.5 Ω and E_b = 210 V is _____ A.
   a) 30 b) 60 c) 20 d) 15

7) When DC generator carries no armature current
   a) MNA coincides with GNA b) MNA is behind GNA
   c) MNA is ahead of GNA d) None of the above

8) In O.C. test of transformer Wattmeter gives
   a) Core loss b) Copper loss
   c) Friction loss d) Stray loss

9) A universal motor is one which has
   a) Constant speed
   b) Constant output
   c) Capability to operate both on AC & DC
   d) Maximum efficiency

10) A step up transformer increases _____ and decreases_____
   a) Current, Voltage b) Voltage, Frequency
   c) Voltage, Current d) Voltage, Power

11) The main purpose to carry out back to back test on transformer is to find out
   a) Efficiency b) Temperature rise
   c) Efficiency and Temperature rise d) Regulation

12) The maximum efficiency of transformer of 100 KVA having iron loss of 900 KW and full load Cu loss of 1600 KW, occurs at _____KVA.
   a) 56.3 b) 133.3 c) 75 d) 177.7

13) A transformer works on
   a) AC only b) DC only
   c) Both on AC and DC d) None of the above

14) A transformer has negative voltage regulation when its load power factor is
   a) Zero b) Unity c) Leading d) Lagging

_____

SLR-VB – 378

Seat No.	

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

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

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

   a) Explain the significance of back E.M.F. in DC motor.

   b) A 250 V, 14.9 KW, 8 pole D.C. 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) Draw the neat diagram and explain three point starter.

   d) List out and explain different types of losses in DC motor.

   e) A 250 V, 4 pole, wave wound series, motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 Ω. 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) A 100 KW, 500 V shunt generator was run as a motor on no load at its rated voltage and speed. The total current taken was 9.5 A including a shunt field current of 2.5 A. The resistance of the armature circuit is 0.1 Ω. Calculate the efficiency of the generator at (i) full load (ii) half load.

   OR

   b) Explain the speed control methods of DC series motor.

   c) Explain with neat diagrams Swinburne's test on a d.c. shunt motor. State its advantages and disadvantages over brake load test.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) Write down expression for efficiency of a transformer and then find condition for maximum efficiency.

   b) Find expression for approximate voltage drop in transformer with the help of vector diagram.

   c) Draw and explain YD1 & YD11 connections of 3-ϕ transformer.

   d) Derive E.M.F. equation for single phase transformer.

   e) The primary and secondary windings of a 40 KVA, 6600/250V single phase transformer have resistances of 10 Ω & 0.02 Ω respectively. The equivalent leakage reactance of the transformer referred to the primary side is 35 Ω. Calculate the percentage voltage regulation of the transformer when supplying full load current at a p.f. of 0.8 lagging.

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

   a) Explain the principle of working of a transformer and draw an equivalent circuit of a single phase transformer showing all parameters.

   b) A 50 KVA, 6360/240V transformer gave the following test result :

   O.C. test : Primary voltage 6360V ; primary current 1A ; power input 2 KW.

   S.C. test : Voltage across secondary winding 50 V, current in secondary winding 175 A, power input 2 KW.

   Find the efficiency of the transformer when supplying full load at a power factor of 0.8 Lagging.

   OR

   b) 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

   iii) The output power at the maximum level of efficiency. Assume unity power factor.

SLR-VB – 378

Seat No.	

Set Q

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

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

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

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In O.C. test of transformer Wattmeter gives
   a) Core loss b) Copper loss
   c) Friction loss d) Stray loss

2) A universal motor is one which has
   a) Constant speed
   b) Constant output
   c) Capability to operate both on AC & DC
   d) Maximum efficiency

3) A step up transformer increases _____ and decreases_____
   a) Current, Voltage b) Voltage, Frequency
   c) Voltage, Current d) Voltage, Power

4) The main purpose to carry out back to back test on transformer is to find out
   a) Efficiency b) Temperature rise
   c) Efficiency and Temperature rise d) Regulation

5) The maximum efficiency of transformer of 100 KVA having iron loss of 900 KW and full load Cu loss of 1600 KW, occurs at _____KVA.
   a) 56.3 b) 133.3 c) 75 d) 177.7

P.T.O.

6) A transformer works on
   a) AC only b) DC only
   c) Both on AC and DC d) None of the above

7) A transformer has negative voltage regulation when its load power factor is
   a) Zero b) Unity c) Leading d) Lagging

8) DC series motors are used in those applications where_____ is required.
   a) High starting torque b) Constant speed
   c) Low no load speed d) None of the above

9) The primary reason for providing compensating winding in DC generator is to
   a) Compensate for decrease in main flux
   b) Neutralize cross magnetizing flux
   c) Neutralize armature mmf
   d) Maintain uniform flux distribution

10) A wave winding must go at least _____around the armature before it closes back where it started.
   a) Once b) Twice c) Thrice d) Four times

11) The constant losses in DC machines are
   a) Shunt field losses b) Windage losses
   c) Iron and friction losses d) All of the above

12) In DC generator the generated E.M.F. is directly proportional to the
   a) Pole flux b) Number of armature parallel paths
   c) Field current d) Number of dummy coil

13) The current drawn by 240V DC motor of Ra = 0.5Ω and E_b = 210 V is _____A.
   a) 30 b) 60 c) 20 d) 15

14) When DC generator carries no armature current
   a) MNA coincides with GNA b) MNA is behind GNA
   c) MNA is ahead of GNA d) None of the above

_____

SLR-VB – 378

Seat No.	

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

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

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

   a) Explain the significance of back E.M.F. in DC motor.

   b) A 250 V, 14.9 KW, 8 pole D.C. 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) Draw the neat diagram and explain three point starter.

   d) List out and explain different types of losses in DC motor.

   e) A 250 V, 4 pole, wave wound series, motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 Ω. 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) A 100 KW, 500 V shunt generator was run as a motor on no load at its rated voltage and speed. The total current taken was 9.5 A including a shunt field current of 2.5 A. The resistance of the armature circuit is 0.1 Ω. Calculate the efficiency of the generator at (i) full load (ii) half load.

   OR

   b) Explain the speed control methods of DC series motor.

   c) Explain with neat diagrams Swinburne's test on a d.c. shunt motor. State its advantages and disadvantages over brake load test.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) Write down expression for efficiency of a transformer and then find condition for maximum efficiency.

   b) Find expression for approximate voltage drop in transformer with the help of vector diagram.

   c) Draw and explain YD1 & YD11 connections of 3-ϕ transformer.

   d) Derive E.M.F. equation for single phase transformer.

   e) The primary and secondary windings of a 40 KVA, 6600/250V single phase transformer have resistances of 10 Ω & 0.02 Ω respectively. The equivalent leakage reactance of the transformer referred to the primary side is 35 Ω. Calculate the percentage voltage regulation of the transformer when supplying full load current at a p.f. of 0.8 lagging.

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

   a) Explain the principle of working of a transformer and draw an equivalent circuit of a single phase transformer showing all parameters.

   b) A 50 KVA, 6360/240V transformer gave the following test result :

   O.C. test : Primary voltage 6360V ; primary current 1A ; power input 2 KW.

   S.C. test : Voltage across secondary winding 50 V, current in secondary winding 175 A, power input 2 KW.

   Find the efficiency of the transformer when supplying full load at a power factor of 0.8 Lagging.

   OR

   b) 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

   iii) The output power at the maximum level of efficiency. Assume unity power factor.

SLR-VB – 378

Seat No.	

Set R

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

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

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

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In DC generator the generated E.M.F. is directly proportional to the
   a) Pole flux
   b) Number of armature parallel paths
   c) Field current
   d) Number of dummy coil

2) The current drawn by 240V DC motor of Ra = 0.5 Ω and E_b = 210 V is _____ A.
   a) 30 b) 60 c) 20 d) 15

3) When DC generator carries no armature current
   a) MNA coincides with GNA
   b) MNA is behind GNA
   c) MNA is ahead of GNA
   d) None of the above

4) In O.C. test of transformer Wattmeter gives
   a) Core loss
   b) Copper loss
   c) Friction loss
   d) Stray loss

5) A universal motor is one which has
   a) Constant speed
   b) Constant output
   c) Capability to operate both on AC & DC
   d) Maximum efficiency

P.T.O.

6) A step up transformer increases _____ and decreases_____
   a) Current, Voltage
   b) Voltage, Frequency
   c) Voltage, Current
   d) Voltage, Power

7) The main purpose to carry out back to back test on transformer is to find out
   a) Efficiency
   b) Temperature rise
   c) Efficiency and Temperature rise
   d) Regulation

8) The maximum efficiency of transformer of 100 KVA having iron loss of 900 KW and full load Cu loss of 1600 KW, occurs at _____KVA.
   a) 56.3 b) 133.3 c) 75 d) 177.7

9) A transformer works on
   a) AC only
   b) DC only
   c) Both on AC and DC
   d) None of the above

10) A transformer has negative voltage regulation when its load power factor is
   a) Zero b) Unity c) Leading d) Lagging

11) DC series motors are used in those applications where_____ is required.
   a) High starting torque
   b) Constant speed
   c) Low no load speed
   d) None of the above

12) The primary reason for providing compensating winding in DC generator is to
   a) Compensate for decrease in main flux
   b) Neutralize cross magnetizing flux
   c) Neutralize armature mmf
   d) Maintain uniform flux distribution

13) A wave winding must go at least _____around the armature before it closes back where it started.
   a) Once b) Twice c) Thrice d) Four times

14) The constant losses in DC machines are
   a) Shunt field losses
   b) Windage losses
   c) Iron and friction losses
   d) All of the above

_____

SLR-VB – 378

Seat No.	

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

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

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

   a) Explain the significance of back E.M.F. in DC motor.

   b) A 250 V, 14.9 KW, 8 pole D.C. 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) Draw the neat diagram and explain three point starter.

   d) List out and explain different types of losses in DC motor.

   e) A 250 V, 4 pole, wave wound series, motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 Ω. 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) A 100 KW, 500 V shunt generator was run as a motor on no load at its rated voltage and speed. The total current taken was 9.5 A including a shunt field current of 2.5 A. The resistance of the armature circuit is 0.1 Ω. Calculate the efficiency of the generator at (i) full load (ii) half load.

   OR

   b) Explain the speed control methods of DC series motor.

   c) Explain with neat diagrams Swinburne's test on a d.c. shunt motor. State its advantages and disadvantages over brake load test.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) Write down expression for efficiency of a transformer and then find condition for maximum efficiency.

   b) Find expression for approximate voltage drop in transformer with the help of vector diagram.

   c) Draw and explain YD1 & YD11 connections of 3-ϕ transformer.

   d) Derive E.M.F. equation for single phase transformer.

   e) The primary and secondary windings of a 40 KVA, 6600/250V single phase transformer have resistances of 10 Ω & 0.02 Ω respectively. The equivalent leakage reactance of the transformer referred to the primary side is 35 Ω. Calculate the percentage voltage regulation of the transformer when supplying full load current at a p.f. of 0.8 lagging.

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

   a) Explain the principle of working of a transformer and draw an equivalent circuit of a single phase transformer showing all parameters.

   b) A 50 KVA, 6360/240V transformer gave the following test result :

   O.C. test : Primary voltage 6360V ; primary current 1A ; power input 2 KW.

   S.C. test : Voltage across secondary winding 50 V, current in secondary winding 175 A, power input 2 KW.

   Find the efficiency of the transformer when supplying full load at a power factor of 0.8 Lagging.

   OR

   b) 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

   iii) The output power at the maximum level of efficiency. Assume unity power factor.

SLR-VB – 378

Seat No.	

Set S

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

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

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

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A step up transformer increases _____ and decreases_____
   a) Current, Voltage b) Voltage, Frequency
   c) Voltage, Current d) Voltage, Power

2) The main purpose to carry out back to back test on transformer is to find out
   a) Efficiency b) Temperature rise
   c) Efficiency and Temperature rise d) Regulation

3) The maximum efficiency of transformer of 100 KVA having iron loss of 900 KW and full load Cu loss of 1600 KW, occurs at _____KVA.
   a) 56.3 b) 133.3 c) 75 d) 177.7

4) A transformer works on
   a) AC only b) DC only
   c) Both on AC and DC d) None of the above

5) A transformer has negative voltage regulation when its load power factor is
   a) Zero b) Unity c) Leading d) Lagging

6) DC series motors are used in those applications where_____ is required.
   a) High starting torque b) Constant speed
   c) Low no load speed d) None of the above

P.T.O.

7) The primary reason for providing compensating winding in DC generator is to
   a) Compensate for decrease in main flux
   b) Neutralize cross magnetizing flux
   c) Neutralize armature mmf
   d) Maintain uniform flux distribution

8) A wave winding must go at least _____around the armature before it closes back where it started.
   a) Once b) Twice c) Thrice d) Four times

9) The constant losses in DC machines are
   a) Shunt field losses b) Windage losses
   c) Iron and friction losses d) All of the above

10) In DC generator the generated E.M.F. is directly proportional to the
   a) Pole flux b) Number of armature parallel paths
   c) Field current d) Number of dummy coil

11) The current drawn by 240V DC motor of Ra = 0.5Ω and E_b = 210 V is _____A.
   a) 30 b) 60 c) 20 d) 15

12) When DC generator carries no armature current
   a) MNA coincides with GNA b) MNA is behind GNA
   c) MNA is ahead of GNA d) None of the above

13) In O.C. test of transformer Wattmeter gives
   a) Core loss b) Copper loss
   c) Friction loss d) Stray loss

14) A universal motor is one which has
   a) Constant speed
   b) Constant output
   c) Capability to operate both on AC & DC
   d) Maximum efficiency

_____

SLR-VB – 378

Seat No.	

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

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

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

   a) Explain the significance of back E.M.F. in DC motor.

   b) A 250 V, 14.9 KW, 8 pole D.C. 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) Draw the neat diagram and explain three point starter.

   d) List out and explain different types of losses in DC motor.

   e) A 250 V, 4 pole, wave wound series, motor has 782 conductors on its armature. It has armature and series field resistance of 0.75 Ω. 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) A 100 KW, 500 V shunt generator was run as a motor on no load at its rated voltage and speed. The total current taken was 9.5 A including a shunt field current of 2.5 A. The resistance of the armature circuit is 0.1 Ω. Calculate the efficiency of the generator at (i) full load (ii) half load.

   OR

   b) Explain the speed control methods of DC series motor.

   c) Explain with neat diagrams Swinburne's test on a d.c. shunt motor. State its advantages and disadvantages over brake load test.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) Write down expression for efficiency of a transformer and then find condition for maximum efficiency.

   b) Find expression for approximate voltage drop in transformer with the help of vector diagram.

   c) Draw and explain YD1 & YD11 connections of 3-ϕ transformer.

   d) Derive E.M.F. equation for single phase transformer.

   e) The primary and secondary windings of a 40 KVA, 6600/250V single phase transformer have resistances of 10 Ω & 0.02 Ω respectively. The equivalent leakage reactance of the transformer referred to the primary side is 35 Ω. Calculate the percentage voltage regulation of the transformer when supplying full load current at a p.f. of 0.8 lagging.

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

   a) Explain the principle of working of a transformer and draw an equivalent circuit of a single phase transformer showing all parameters.

   b) A 50 KVA, 6360/240V transformer gave the following test result :

   O.C. test : Primary voltage 6360V ; primary current 1A ; power input 2 KW.

   S.C. test : Voltage across secondary winding 50 V, current in secondary winding 175 A, power input 2 KW.

   Find the efficiency of the transformer when supplying full load at a power factor of 0.8 Lagging.

   OR

   b) 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

   iii) The output power at the maximum level of efficiency. Assume unity power factor.

SLR-VB – 379

Seat No.	

Set P

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

Day and Date : Saturday, 6-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

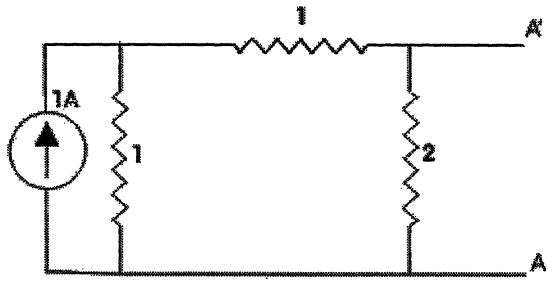
1. Choose the correct answer. **(1×14=14)**

1) What is the unit of measure for electrical pressure or electromotive force ?
a) amps b) ohms c) volts d) watts

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) The number of branches in a tree is _____ the number of branches in the graph.
a) less than b) more than c) equal to d) same as

4) In the figure shown, what will be the current passing through 2 Ω resistor ?



a) 0.25 A b) 0.75 A c) 0.5 A d) 1 A

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

P.T.O.

6) A 12 mA current source has an internal resistance, RS, of 1.2 k. The equivalent voltage source is
   a) 144 V b) 14.4 V c) 7.2 V d) 72 mV

7) Superposition theorem can be applicable only to circuits having _____ elements.
   a) non-linear b) passive
   c) resistive d) linear bilateral

8) The power factor at resonance in R-L-C series circuit is
   a) zero b) 0.08 lagging c) 0.8 leading d) unity

9) The transient response occurs
   a) only in resistive networks b) only in capacitive circuits
   c) only in inductive circuits d) both in 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) The transient currents are associated with the
   a) Changes in the stored energy in the inductors and capacitors
   b) Impedance of the circuit
   c) Applied voltage to the circuit
   d) Resistance of the circuit

12) Second order circuit is under damped when
   a) $\alpha > \omega_0$ b) $\alpha = \omega_0$
   c) $\alpha < \omega_0$ d) none of the above

13) The inverse Laplace transform of $6/s^4$ is
   a) 3 b) t^2 c) 3t d) none

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-VB – 379

Seat No.	

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

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

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

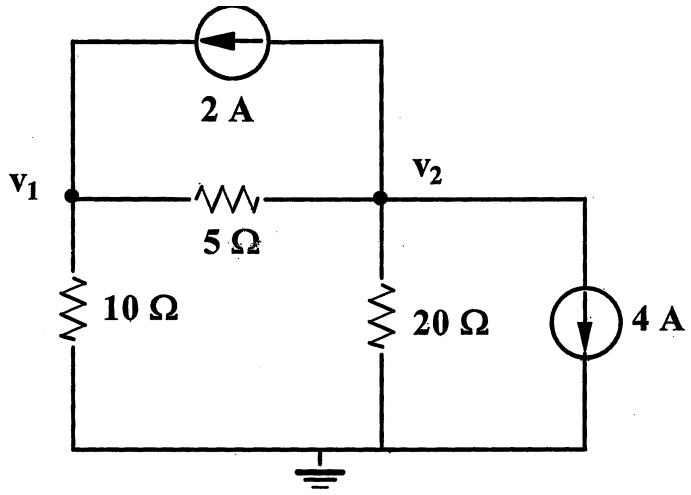
Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume suitable data ***whenever*** *necessary.*

SECTION – I

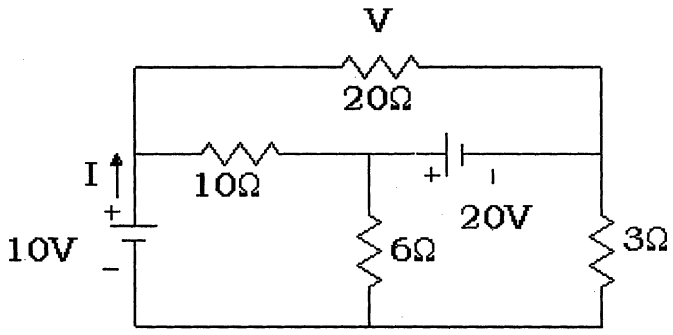
2. Solve **any three** of the followings : **(4×3=12)**

1) State and explain maximum power transfer theorem for DC circuit.

2) Determine V1 and V2

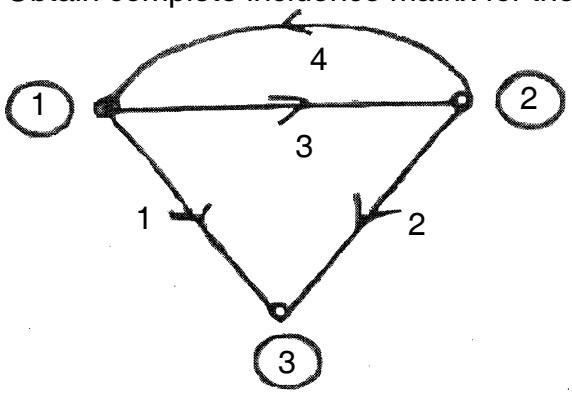


3) Find the voltage V using superposition.



Set P

4) Obtain complete incidence matrix for the graph shown below.

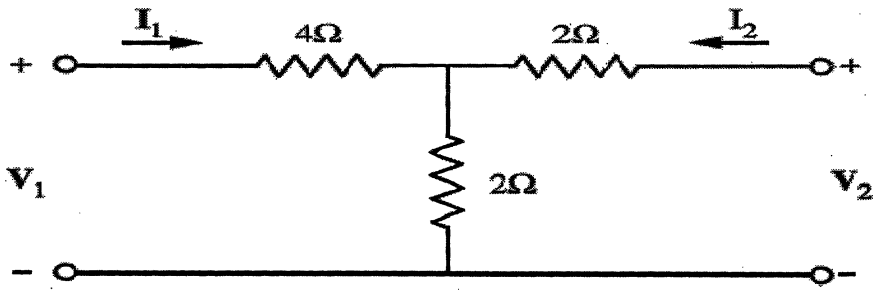


3. Solve **any two** of the followings : **(8×2=16)**
   1) Define the terms : Tree, Cotree, Incidence matrix, Twigs and Links.
   2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance $R_s + JX_s$ to a load $R_L + JX_L$. What is the value of power transferred in this case ?
   3) What is dual of a network ? Explain the pairs of dual terms along with the steps to draw dual of any network with one example.

SECTION – II

4. Solve **any three** of the followings : **(4×3=12)**
   1) Derive Y parameters with suitable diagram.
   2) Differentiate between series and parallel resonance.
   3) Obtain the Y parameters in terms of Z parameters.
   4) Obtain the values of R, L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50 W from a 50 V AC source operating at resonance frequency. The Bandwidth is 0.75 KHz.

5. Solve **any two** of the followings : **(8×2=16)**
   1) What is series resonance ? State the properties of series resonance. Define bandwidth and hence prove that $Q = \frac{Fr}{F2 - F1}$.
   2) Find Y= parameter for the network shown.



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

Set P

SLR-VB – 379

Seat No.	

Set Q

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

Day and Date : Saturday, 6-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

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

iii) Figures to ***right*** *indicate* ***full*** *marks.*

iv) Assume suitable data ***whenever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The power factor at resonance in R-L-C series circuit is
   a) zero b) 0.08 lagging c) 0.8 leading d) unity

2) The transient response occurs
   a) only in resistive networks b) only in capacitive circuits
   c) only in inductive circuits d) both in 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) The transient currents are associated with the
   a) Changes in the stored energy in the inductors and capacitors
   b) Impedance of the circuit
   c) Applied voltage to the circuit
   d) Resistance of the circuit

5) Second order circuit is under damped when
   a) $\alpha > \omega_0$ b) $\alpha = \omega_0$
   c) $\alpha < \omega_0$ d) none of the above

P.T.O.

6) The inverse Laplace transform of $6/s^4$ is
   a) 3 b) t^2 c) 3t d) none

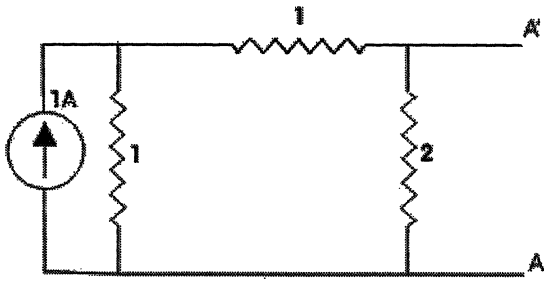
7) In series RLC circuit if C is increased what happens to resonance frequency ?
   a) it increases b) it remains same
   c) it decreases d) it is zero

8) What is the unit of measure for electrical pressure or electromotive force ?
   a) amps b) ohms c) volts d) watts

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) The number of branches in a tree is _____ the number of branches in the graph.
   a) less than b) more than c) equal to d) same as

11) In the figure shown, what will be the current passing through 2Ω resistor ?



   a) 0.25 A b) 0.75 A c) 0.5 A d) 1 A

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

13) A 12 mA current source has an internal resistance, RS, of 1.2 k. The equivalent voltage source is
   a) 144 V b) 14.4 V c) 7.2 V d) 72 mV

14) Superposition theorem can be applicable only to circuits having _____ elements.
   a) non-linear b) passive
   c) resistive d) linear bilateral

_____

SLR-VB – 379

Seat No.	

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

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

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

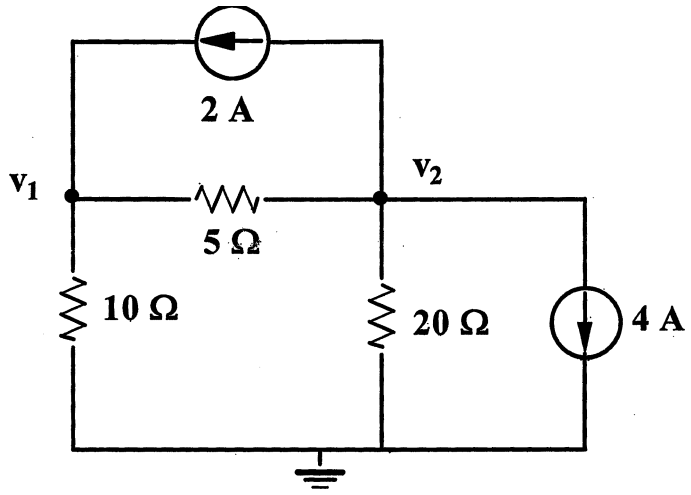
Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume suitable data ***whenever*** *necessary.*

SECTION – I

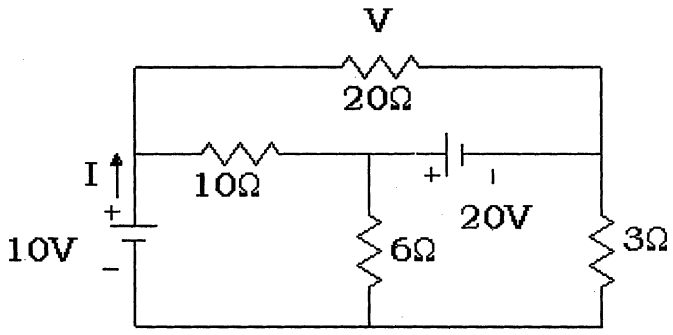
2. Solve **any three** of the followings : **(4×3=12)**

1) State and explain maximum power transfer theorem for DC circuit.

2) Determine V1 and V2

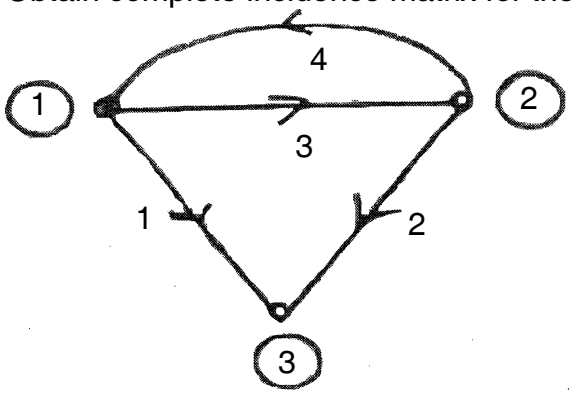


3) Find the voltage V using superposition.



Set Q

4) Obtain complete incidence matrix for the graph shown below.

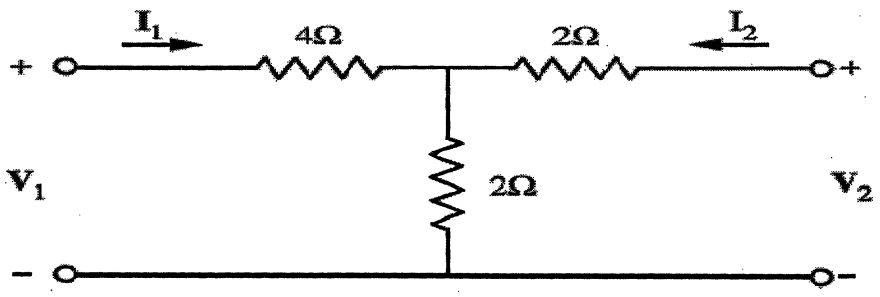


3. Solve **any two** of the followings : **(8×2=16)**
   1) Define the terms : Tree, Cotree, Incidence matrix, Twigs and Links.
   2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance $R_s + JX_s$ to a load $R_L + JX_L$. What is the value of power transferred in this case ?
   3) What is dual of a network ? Explain the pairs of dual terms along with the steps to draw dual of any network with one example.

SECTION – II

4. Solve **any three** of the followings : **(4×3=12)**
   1) Derive Y parameters with suitable diagram.
   2) Differentiate between series and parallel resonance.
   3) Obtain the Y parameters in terms of Z parameters.
   4) Obtain the values of R, L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50 W from a 50 V AC source operating at resonance frequency. The Bandwidth is 0.75 KHz.

5. Solve **any two** of the followings : **(8×2=16)**
   1) What is series resonance ? State the properties of series resonance. Define bandwidth and hence prove that $Q = \frac{Fr}{F2 - F1}$.
   2) Find Y= parameter for the network shown.



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

Set Q

SLR-VB – 379

Seat No.	

Set R

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

Day and Date : Saturday, 6-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

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

2) A 12 mA current source has an internal resistance, RS, of 1.2 k. The equivalent voltage source is
   a) 144 V b) 14.4 V c) 7.2 V d) 72 mV

3) Superposition theorem can be applicable only to circuits having _____ elements.
   a) non-linear b) passive
   c) resistive d) linear bilateral

4) The power factor at resonance in R-L-C series circuit is
   a) zero b) 0.08 lagging c) 0.8 leading d) unity

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

6) 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

P.T.O.

7) The transient currents are associated with the
   a) Changes in the stored energy in the inductors and capacitors
   b) Impedance of the circuit
   c) Applied voltage to the circuit
   d) Resistance of the circuit

8) Second order circuit is under damped when
   a) $\alpha > \omega_0$ b) $\alpha = \omega_0$
   c) $\alpha < \omega_0$ d) none of the above

9) The inverse Laplace transform of $6/s^4$ is
   a) 3 b) t^2 c) 3t d) none

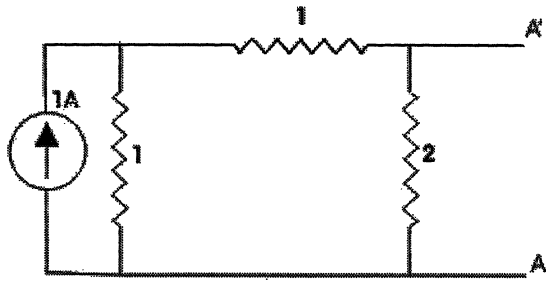
10) In series RLC circuit if C is increased what happens to resonance frequency ?
   a) it increases b) it remains same
   c) it decreases d) it is zero

11) What is the unit of measure for electrical pressure or electromotive force ?
   a) amps b) ohms c) volts d) watts

12) 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

13) The number of branches in a tree is _____ the number of branches in the graph.
   a) less than b) more than c) equal to d) same as

14) In the figure shown, what will be the current passing through 2Ω resistor ?



   a) 0.25 A b) 0.75 A c) 0.5 A d) 1 A

_____

SLR-VB – 379

Seat No.	

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

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

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

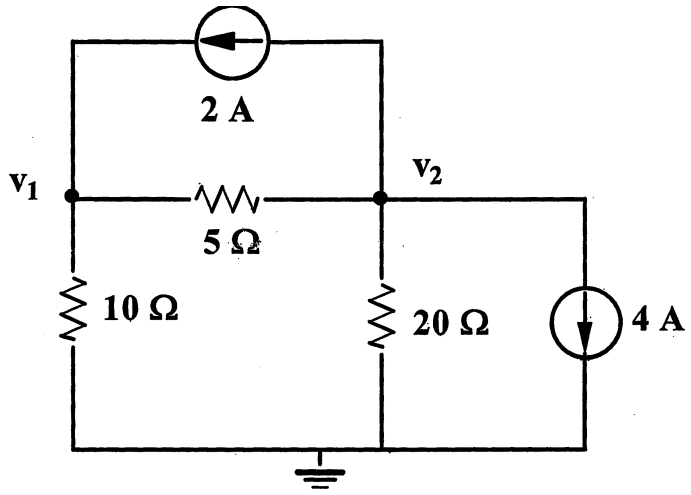
Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume suitable data ***whenever*** *necessary.*

SECTION – I

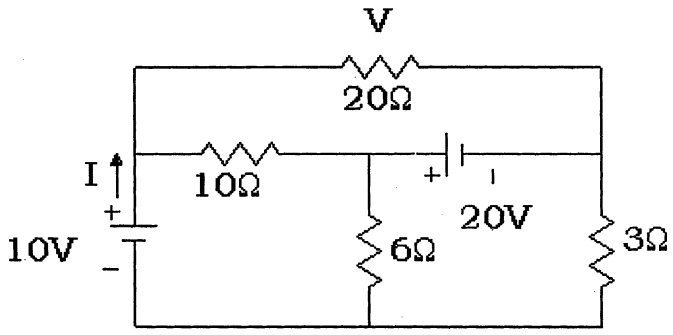
2. Solve **any three** of the followings : **(4×3=12)**

1) State and explain maximum power transfer theorem for DC circuit.

2) Determine V1 and V2

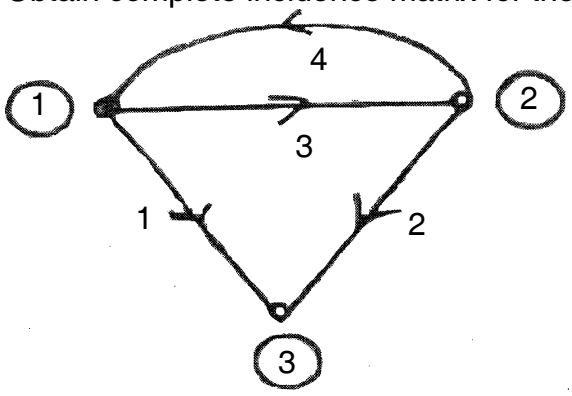


3) Find the voltage V using superposition.



Set R

4) Obtain complete incidence matrix for the graph shown below.

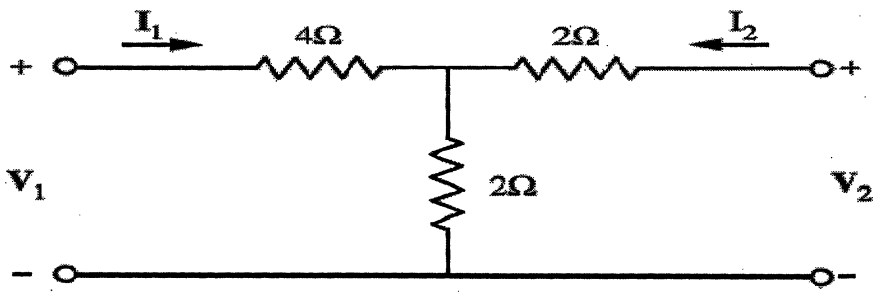


3. Solve **any two** of the followings : **(8×2=16)**
   1) Define the terms : Tree, Cotree, Incidence matrix, Twigs and Links.
   2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance $R_s + JX_s$ to a load $R_L + JX_L$. What is the value of power transferred in this case ?
   3) What is dual of a network ? Explain the pairs of dual terms along with the steps to draw dual of any network with one example.

SECTION – II

4. Solve **any three** of the followings : **(4×3=12)**
   1) Derive Y parameters with suitable diagram.
   2) Differentiate between series and parallel resonance.
   3) Obtain the Y parameters in terms of Z parameters.
   4) Obtain the values of R, L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50 W from a 50 V AC source operating at resonance frequency. The Bandwidth is 0.75 KHz.

5. Solve **any two** of the followings : **(8×2=16)**
   1) What is series resonance ? State the properties of series resonance. Define bandwidth and hence prove that $Q = \frac{Fr}{F2 - F1}$.
   2) Find Y= parameter for the network shown.



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

Set R

SLR-VB – 379

Seat No.	

Set S

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

Day and Date : Saturday, 6-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer. **(1×14=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) The transient currents are associated with the
   a) Changes in the stored energy in the inductors and capacitors
   b) Impedance of the circuit
   c) Applied voltage to the circuit
   d) Resistance of the circuit

3) Second order circuit is under damped when
   a) $\alpha > \omega_0$ b) $\alpha = \omega_0$
   c) $\alpha < \omega_0$ d) none of the above

4) The inverse Laplace transform of $6/s^4$ is
   a) 3 b) t^2 c) 3t d) none

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

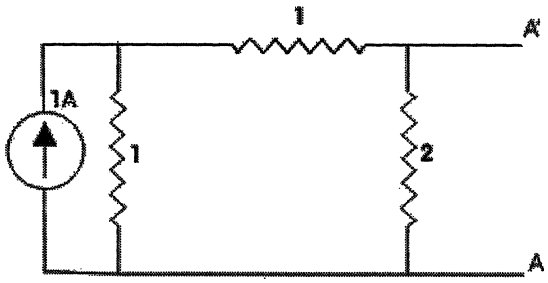
6) What is the unit of measure for electrical pressure or electromotive force ?
   a) amps b) ohms c) volts d) watts

P.T.O.

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) The number of branches in a tree is _____ the number of branches in the graph.
   a) less than b) more than c) equal to d) same as

9) In the figure shown, what will be the current passing through 2Ω resistor ?



   a) 0.25 A b) 0.75 A c) 0.5 A d) 1 A

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

11) A 12 mA current source has an internal resistance, RS, of 1.2 k. The equivalent voltage source is
   a) 144 V b) 14.4 V c) 7.2 V d) 72 mV

12) Superposition theorem can be applicable only to circuits having _____ elements.
   a) non-linear b) passive
   c) resistive d) linear bilateral

13) The power factor at resonance in R-L-C series circuit is
   a) zero b) 0.08 lagging c) 0.8 leading d) unity

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

_____

SLR-VB – 379

Seat No.	

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

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

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

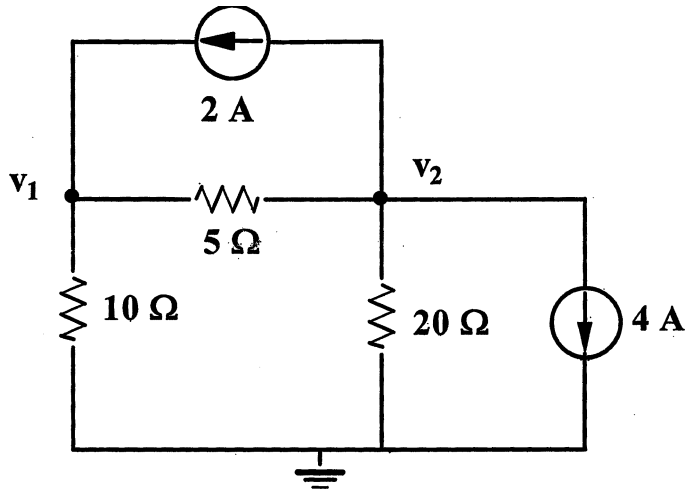
Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume suitable data ***whenever*** *necessary.*

SECTION – I

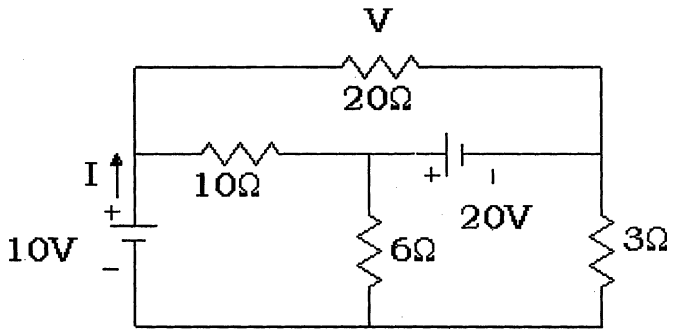
2. Solve **any three** of the followings : **(4×3=12)**

1) State and explain maximum power transfer theorem for DC circuit.

2) Determine V1 and V2

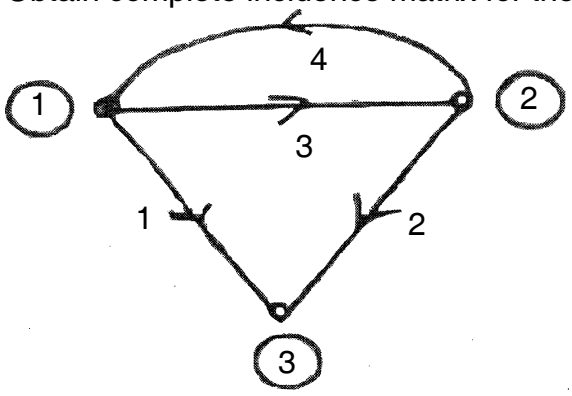


3) Find the voltage V using superposition.



Set S

4) Obtain complete incidence matrix for the graph shown below.

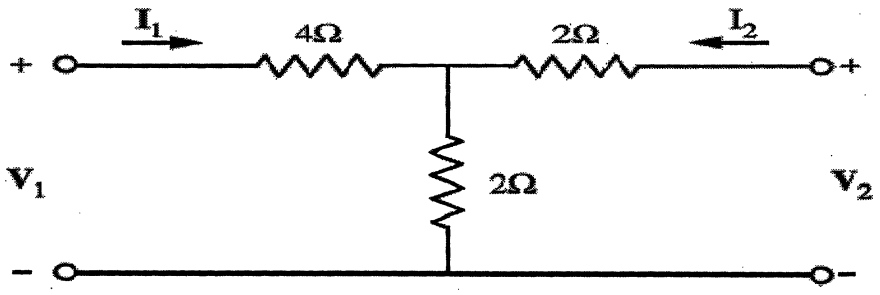


3. Solve **any two** of the followings : **(8×2=16)**
   1) Define the terms : Tree, Cotree, Incidence matrix, Twigs and Links.
   2) Derive necessary and sufficient condition for maximum power transfer condition from a voltage source with source impedance $R_s + JX_s$ to a load $R_L + JX_L$. What is the value of power transferred in this case ?
   3) What is dual of a network ? Explain the pairs of dual terms along with the steps to draw dual of any network with one example.

SECTION – II

4. Solve **any three** of the followings : **(4×3=12)**
   1) Derive Y parameters with suitable diagram.
   2) Differentiate between series and parallel resonance.
   3) Obtain the Y parameters in terms of Z parameters.
   4) Obtain the values of R, L and C in a series RLC circuit that resonates at 1.5 KHz and consumes 50 W from a 50 V AC source operating at resonance frequency. The Bandwidth is 0.75 KHz.

5. Solve **any two** of the followings : **(8×2=16)**
   1) What is series resonance ? State the properties of series resonance. Define bandwidth and hence prove that $Q = \frac{Fr}{F2 - F1}$.
   2) Find Y= parameter for the network shown.



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

Set S

SLR-VB – 380

Seat No.	

Set P

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

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **14**

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

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

3) The superbeta transistor is a _____ connection.
   a) Feedback pair b) Darlington c) Cascade d) Cascode

4) If β_{dc} is 49, the value of α_{dc} is
   a) 50 b) 0.98 c) 49/50 d) None of these

5) The main job of current mirror circuit is to provide _____ output current.
   a) Sinusoidal b) Constant
   c) Smooth d) Fluctuating

6) Which of the following acts like one diode and two resistors ?
   a) SCR b) Triac c) Diac d) UJT

P.T.O.

7) The main function of clipping circuit is to
   a) Remove certain portion of input signal above or below certain level
   b) Remove dc level of signal
   c) Suppress amplitude variations in input voltage
   d) Both a) and c)

8) An ideal op-amp has
   a) Infinite input and output impedance
   b) Zero input and infinite output impedance
   c) Infinite input and zero output impedance
   d) Zero input and output impedance

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

10) For cosine input, output of a differentiator is
   a) Sine wave b) Pulse
   c) Triangular wave d) Square wave

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

12) CMRR is
   a) Center Mode Ratio Rate b) Common Mode Rejection
   c) Common Mode Ratio Rejection d) Common Mode Ratio Rate

13) The number of comparators available in IC 555 are
   a) Three b) Two c) Four d) One

14) For astable multivibrator T =
   a) $t_c + t_d$ b) t_c c) t_d d) $t_c - t_d$

———————

SLR-VB – 380

Seat No.	

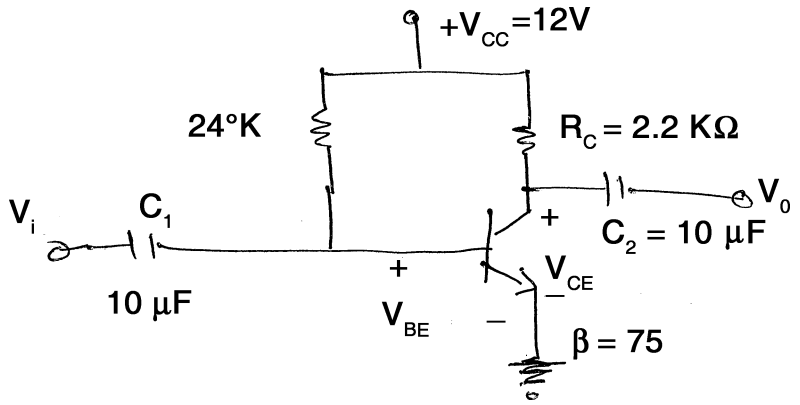
S.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2017
ANALOG ELECTRONICS

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any three** : **(4×3=12)**
   1) Define rectifier. Draw and explain half wave rectifier.
   2) What are the various types of power amplifier ? Explain types of distortions in amplifier.
   3) What are types of clamper ? Explain any one.
   4) Determine the following terms for circuit shown below.
      a) I_B
      b) I_C
      c) V_{CE}
      d) V_E



Set P

3. Solve **any two** : **(2×8=16)**
   1) What are basic types of MOSFET ? Explain working of any one type.
   2) Explain working of unijunction transistor. Also discuss its VI characteristics.
   3) Compare types of rectifier.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) Draw and explain general block diagram of op-amp.
   2) Explain window detector with circuit diagram.
   3) Explain sample and hold circuit using op-amp.
   4) Draw and explain inverting configuration of op-amp that can used as summing, scaling and averaging amplifier.

5. Solve **any two** : **(2×8=16)**
   1) What are the types of multivibrator ? Explain astable multivibrator using IC 555.
   2) Explain the following terms :
      a) CMRR
      b) PSRR
      c) Slew rate
      d) Input offset current.
   3) What are the various applications of op-amp ? Explain op-amp as integrator.

———————————

SLR-VB – 380

Seat No.	

Set Q

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

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **14**

1) An ideal op-amp has
   a) Infinite input and output impedance
   b) Zero input and infinite output impedance
   c) Infinite input and zero output impedance
   d) Zero input and output impedance

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

3) For cosine input, output of a differentiator is
   a) Sine wave b) Pulse
   c) Triangular wave d) Square wave

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

5) CMRR is
   a) Center Mode Ratio Rate b) Common Mode Rejection
   c) Common Mode Ratio Rejection d) Common Mode Ratio Rate

P.T.O.

6) The number of comparators available in IC 555 are
   a) Three b) Two c) Four d) One

7) For astable multivibrator T =
   a) $t_c + t_d$ b) t_c c) t_d d) $t_c - t_d$

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

10) The superbeta transistor is a _____ connection.
   a) Feedback pair b) Darlington c) Cascade d) Cascode

11) If β_{dc} is 49, the value of α_{dc} is
   a) 50 b) 0.98 c) 49/50 d) None of these

12) The main job of current mirror circuit is to provide _____ output current.
   a) Sinusoidal b) Constant
   c) Smooth d) Fluctuating

13) Which of the following acts like one diode and two resistors ?
   a) SCR b) Triac c) Diac d) UJT

14) The main function of clipping circuit is to
   a) Remove certain portion of input signal above or below certain level
   b) Remove dc level of signal
   c) Suppress amplitude variations in input voltage
   d) Both a) and c)

_____

SLR-VB – 380

Seat No.	

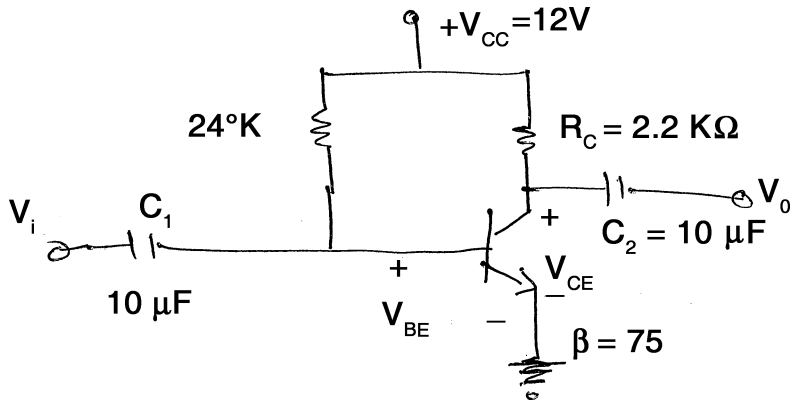
S.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2017
ANALOG ELECTRONICS

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any three** : **(4×3=12)**
   1) Define rectifier. Draw and explain half wave rectifier.
   2) What are the various types of power amplifier ? Explain types of distortions in amplifier.
   3) What are types of clamper ? Explain any one.
   4) Determine the following terms for circuit shown below.
      a) I_B
      b) I_C
      c) V_{CE}
      d) V_E



Set Q

3. Solve **any two** : **(2×8=16)**
   1) What are basic types of MOSFET ? Explain working of any one type.
   2) Explain working of unijunction transistor. Also discuss its VI characteristics.
   3) Compare types of rectifier.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) Draw and explain general block diagram of op-amp.
   2) Explain window detector with circuit diagram.
   3) Explain sample and hold circuit using op-amp.
   4) Draw and explain inverting configuration of op-amp that can used as summing, scaling and averaging amplifier.

5. Solve **any two** : **(2×8=16)**
   1) What are the types of multivibrator ? Explain astable multivibrator using IC 555.
   2) Explain the following terms :
      a) CMRR
      b) PSRR
      c) Slew rate
      d) Input offset current.
   3) What are the various applications of op-amp ? Explain op-amp as integrator.

———————————

SLR-VB – 380

Seat No.	

Set R

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

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **14**

1) The main job of current mirror circuit is to provide _____ output current.
   a) Sinusoidal b) Constant
   c) Smooth d) Fluctuating

2) Which of the following acts like one diode and two resistors ?
   a) SCR b) Triac c) Diac d) UJT

3) The main function of clipping circuit is to
   a) Remove certain portion of input signal above or below certain level
   b) Remove dc level of signal
   c) Suppress amplitude variations in input voltage
   d) Both a) and c)

4) An ideal op-amp has
   a) Infinite input and output impedance
   b) Zero input and infinite output impedance
   c) Infinite input and zero output impedance
   d) Zero input and output impedance

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

6) For cosine input, output of a differentiator is
   a) Sine wave b) Pulse
   c) Triangular wave d) Square wave

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

8) CMRR is
   a) Center Mode Ratio Rate b) Common Mode Rejection
   c) Common Mode Ratio Rejection d) Common Mode Ratio Rate

9) The number of comparators available in IC 555 are
   a) Three b) Two c) Four d) One

10) For astable multivibrator T =
   a) $t_c + t_d$ b) t_c c) t_d d) $t_c - t_d$

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

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

13) The superbeta transistor is a _____ connection.
   a) Feedback pair b) Darlington c) Cascade d) Cascode

14) If β_{dc} is 49, the value of α_{dc} is
   a) 50 b) 0.98 c) 49/50 d) None of these

_____

SLR-VB – 380

Seat No.	

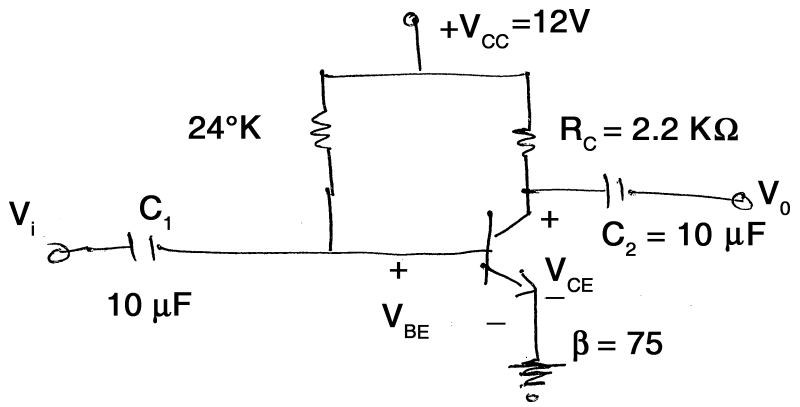
S.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2017
ANALOG ELECTRONICS

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any three** : **(4×3=12)**
   1) Define rectifier. Draw and explain half wave rectifier.
   2) What are the various types of power amplifier ? Explain types of distortions in amplifier.
   3) What are types of clamper ? Explain any one.
   4) Determine the following terms for circuit shown below.
      a) I_B
      b) I_C
      c) V_{CE}
      d) V_E



Set R

3. Solve **any two** : **(2×8=16)**
   1) What are basic types of MOSFET ? Explain working of any one type.
   2) Explain working of unijunction transistor. Also discuss its VI characteristics.
   3) Compare types of rectifier.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) Draw and explain general block diagram of op-amp.
   2) Explain window detector with circuit diagram.
   3) Explain sample and hold circuit using op-amp.
   4) Draw and explain inverting configuration of op-amp that can used as summing, scaling and averaging amplifier.

5. Solve **any two** : **(2×8=16)**
   1) What are the types of multivibrator ? Explain astable multivibrator using IC 555.
   2) Explain the following terms :
      a) CMRR
      b) PSRR
      c) Slew rate
      d) Input offset current.
   3) What are the various applications of op-amp ? Explain op-amp as integrator.

———————————

SLR-VB – 380

Seat No.	

Set **S**

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

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct alternative : **14**

1) For cosine input, output of a differentiator is
   a) Sine wave b) Pulse
   c) Triangular wave d) Square wave

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

3) CMRR is
   a) Center Mode Ratio Rate b) Common Mode Rejection
   c) Common Mode Ratio Rejection d) Common Mode Ratio Rate

4) The number of comparators available in IC 555 are
   a) Three b) Two c) Four d) One

5) For astable multivibrator T =
   a) $t_c + t_d$ b) t_c c) t_d d) $t_c - t_d$

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

P.T.O.

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

8) The superbeta transistor is a _____ connection.
   a) Feedback pair b) Darlington c) Cascade d) Cascode

9) If β_{dc} is 49, the value of α_{dc} is
   a) 50 b) 0.98 c) 49/50 d) None of these

10) The main job of current mirror circuit is to provide _____ output current.
   a) Sinusoidal b) Constant
   c) Smooth d) Fluctuating

11) Which of the following acts like one diode and two resistors ?
   a) SCR b) Triac c) Diac d) UJT

12) The main function of clipping circuit is to
   a) Remove certain portion of input signal above or below certain level
   b) Remove dc level of signal
   c) Suppress amplitude variations in input voltage
   d) Both a) and c)

13) An ideal op-amp has
   a) Infinite input and output impedance
   b) Zero input and infinite output impedance
   c) Infinite input and zero output impedance
   d) Zero input and output impedance

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

_____

SLR-VB – 380

Seat No.	

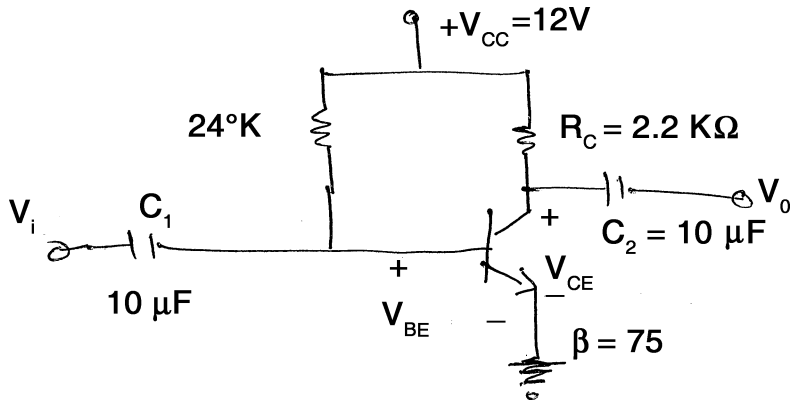
S.E. (Electrical and Electronics Engineering) (Part – I) (CGPA) Examination, 2017
ANALOG ELECTRONICS

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any three** : **(4×3=12)**
   1) Define rectifier. Draw and explain half wave rectifier.
   2) What are the various types of power amplifier ? Explain types of distortions in amplifier.
   3) What are types of clamper ? Explain any one.
   4) Determine the following terms for circuit shown below.
      a) I_B
      b) I_C
      c) V_{CE}
      d) V_E



3. Solve **any two** : **(2×8=16)**
   1) What are basic types of MOSFET ? Explain working of any one type.
   2) Explain working of unijunction transistor. Also discuss its VI characteristics.
   3) Compare types of rectifier.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) Draw and explain general block diagram of op-amp.
   2) Explain window detector with circuit diagram.
   3) Explain sample and hold circuit using op-amp.
   4) Draw and explain inverting configuration of op-amp that can used as summing, scaling and averaging amplifier.

5. Solve **any two** : **(2×8=16)**
   1) What are the types of multivibrator ? Explain astable multivibrator using IC 555.
   2) Explain the following terms :
      a) CMRR
      b) PSRR
      c) Slew rate
      d) Input offset current.
   3) What are the various applications of op-amp ? Explain op-amp as integrator.

———————————

SLR-VB – 381

Seat No.	

Set **P**

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

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Equipment used for pulverizing the coal is known as
A) Ball Mill B) Hopper C) Burner D) Stoker

2) As steam expands in turbine
A) Its pressure increases B) Its specific volume increases
C) Its boiling point increases D) Its temperature increases

3) Standard frequency usually for electric supply is
A) 50 Hz B) 60 Hz C) 50 to 60 Hz D) 50 to 55 Hz

4) In power station practice "spinning reserve" is
A) Reserve generating capacity that is in operation but not in service
B) Reserve generating capacity that is connected to bus and ready to take the load
C) Reserve generating capacity that is available for service but not in operation
D) Capacity of the part of the plant that remains under maintenance

5) For low head and high discharge, the hydraulic turbine used is
A) Kaplan turbine B) Francis turbine
C) Pelton wheel D) Jonual turbine

6) In a hydro-electric plant a conduct system for taking water from the intake works to the turbine is known as
A) Dam B) Reservoir
C) Penstock D) Surge tank

7) Particles having the same atomic number but different mass numbers are called
   A) Positrons B) Beta particles
   C) Isotopes D) Decayed panicles

8) Which of the following material can be used as moderator ?
   A) Graphite B) Heavy water
   C) Beryllium D) Any of the above

9) Which of the following is not a part of diesel engine power plant ?
   A) Cooling tower B) Penstock C) Oil Pump D) Strainer

10) The disadvantage of renewable sources of energy is
   A) Lack of decidability B) Availability in low energy densities
   C) Intermittency D) All of the above

11) Tidal energy mainly makes use of
   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 photovoltaic cell converts
   A) Heat energy into mechanical energy
   B) Chemical energy into electrical energy
   C) Solar energy into electrical energy
   D) Electrical energy into chemical energy

13) The ratio of average load to maximum demand is defined as
   A) Demand Factor B) Load factor
   C) Diversity factor D) Maximum Demand

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

———————

SLR-VB – 381

Seat No.	

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

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

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

   1) Write a short note on present energy scenario.

   2) Explain function of economizer used in thermal power plant.

   3) Give classification of hydroelectric power plant on the basis of head.

   4) Explain boiling water reactor with neat diagram.

   5) Explain the process of nuclear fission.

3. Solve **any two** : **(6×2=12)**

   1) Explain function of air-preheater used in thermal power plant.

   2) With a neat diagram explain working of nuclear power plant.

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

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain construction and working of fuel cells.

   2) Discuss the factors which should be considered for wind power plant.

   3) Write a short note on load curve.

   4) State application of diesel power stations.

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

5. Solve **any two** : **(6×2=12)**

   1) What is operating principle of wind power plant ? With the help of block diagram explain wind power plant.

   2) Explain the working of four stroke diesel engine with neat diagram.

   3) Define bio-gas and explain common circular fixed dome digester (China) with neat diagram.

SLR-VB – 381

Seat No.	

Set Q

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

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Which of the following material can be used as moderator ?
A) Graphite B) Heavy water
C) Beryllium D) Any of the above

2) Which of the following is not a part of diesel engine power plant ?
A) Cooling tower B) Penstock C) Oil Pump D) Strainer

3) The disadvantage of renewable sources of energy is
A) Lack of decidability B) Availability in low energy densities
C) Intermittency D) All of the above

4) Tidal energy mainly makes use of
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 photovoltaic cell converts
A) Heat energy into mechanical energy
B) Chemical energy into electrical energy
C) Solar energy into electrical energy
D) Electrical energy into chemical energy

6) The ratio of average load to maximum demand is defined as
A) Demand Factor B) Load factor
C) Diversity factor D) Maximum Demand

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

8) Equipment used for pulverizing the coal is known as
   A) Ball Mill B) Hopper C) Burner D) Stoker

9) As steam expands in turbine
   A) Its pressure increases B) Its specific volume increases
   C) Its boiling point increases D) Its temperature increases

10) Standard frequency usually for electric supply is
   A) 50 Hz B) 60 Hz C) 50 to 60 Hz D) 50 to 55 Hz

11) In power station practice “spinning reserve” is
   A) Reserve generating capacity that is in operation but not in service
   B) Reserve generating capacity that is connected to bus and ready to take the load
   C) Reserve generating capacity that is available for service but not in operation
   D) Capacity of the part of the plant that remains under maintenance

12) For low head and high discharge, the hydraulic turbine used is
   A) Kaplan turbine B) Francis turbine
   C) Pelton wheel D) Jonual turbine

13) In a hydro-electric plant a conduct system for taking water from the intake works to the turbine is known as
   A) Dam B) Reservoir
   C) Penstock D) Surge tank

14) Particles having the same atomic number but different mass numbers are called
   A) Positrons B) Beta particles
   C) Isotopes D) Decayed panicles

———————

SLR-VB – 381

Seat No.	

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

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

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

   1) Write a short note on present energy scenario.

   2) Explain function of economizer used in thermal power plant.

   3) Give classification of hydroelectric power plant on the basis of head.

   4) Explain boiling water reactor with neat diagram.

   5) Explain the process of nuclear fission.

3. Solve **any two** : **(6×2=12)**

   1) Explain function of air-preheater used in thermal power plant.

   2) With a neat diagram explain working of nuclear power plant.

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

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain construction and working of fuel cells.

   2) Discuss the factors which should be considered for wind power plant.

   3) Write a short note on load curve.

   4) State application of diesel power stations.

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

5. Solve **any two** : **(6×2=12)**

   1) What is operating principle of wind power plant ? With the help of block diagram explain wind power plant.

   2) Explain the working of four stroke diesel engine with neat diagram.

   3) Define bio-gas and explain common circular fixed dome digester (China) with neat diagram.

SLR-VB – 381

Seat No.	

Set **R**

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

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) For low head and high discharge, the hydraulic turbine used is
   A) Kaplan turbine B) Francis turbine
   C) Pelton wheel D) Jonual turbine

2) In a hydro-electric plant a conduct system for taking water from the intake works to the turbine is known as
   A) Dam B) Reservoir
   C) Penstock D) Surge tank

3) Particles having the same atomic number but different mass numbers are called
   A) Positrons B) Beta particles
   C) Isotopes D) Decayed panicles

4) Which of the following material can be used as moderator ?
   A) Graphite B) Heavy water
   C) Beryllium D) Any of the above

5) Which of the following is not a part of diesel engine power plant ?
   A) Cooling tower B) Penstock C) Oil Pump D) Strainer

6) The disadvantage of renewable sources of energy is
   A) Lack of decidability B) Availability in low energy densities
   C) Intermittency D) All of the above

7) Tidal energy mainly makes use of
   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

P.T.O.

8) A photovoltaic cell converts
   A) Heat energy into mechanical energy
   B) Chemical energy into electrical energy
   C) Solar energy into electrical energy
   D) Electrical energy into chemical energy

9) The ratio of average load to maximum demand is defined as
   A) Demand Factor B) Load factor
   C) Diversity factor D) Maximum Demand

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

11) Equipment used for pulverizing the coal is known as
   A) Ball Mill B) Hopper C) Burner D) Stoker

12) As steam expands in turbine
   A) Its pressure increases B) Its specific volume increases
   C) Its boiling point increases D) Its temperature increases

13) Standard frequency usually for electric supply is
   A) 50 Hz B) 60 Hz C) 50 to 60 Hz D) 50 to 55 Hz

14) In power station practice “spinning reserve” is
   A) Reserve generating capacity that is in operation but not in service
   B) Reserve generating capacity that is connected to bus and ready to take the load
   C) Reserve generating capacity that is available for service but not in operation
   D) Capacity of the part of the plant that remains under maintenance

———————

SLR-VB – 381

Seat No.	

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

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

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

   1) Write a short note on present energy scenario.

   2) Explain function of economizer used in thermal power plant.

   3) Give classification of hydroelectric power plant on the basis of head.

   4) Explain boiling water reactor with neat diagram.

   5) Explain the process of nuclear fission.

3. Solve **any two** : **(6×2=12)**

   1) Explain function of air-preheater used in thermal power plant.

   2) With a neat diagram explain working of nuclear power plant.

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

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain construction and working of fuel cells.

   2) Discuss the factors which should be considered for wind power plant.

   3) Write a short note on load curve.

   4) State application of diesel power stations.

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

5. Solve **any two** : **(6×2=12)**

   1) What is operating principle of wind power plant ? With the help of block diagram explain wind power plant.

   2) Explain the working of four stroke diesel engine with neat diagram.

   3) Define bio-gas and explain common circular fixed dome digester (China) with neat diagram.

SLR-VB – 381

Seat No.	

Set **S**

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

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The disadvantage of renewable sources of energy is
   A) Lack of decidability B) Availability in low energy densities
   C) Intermittency D) All of the above

2) Tidal energy mainly makes use of
   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 photovoltaic cell converts
   A) Heat energy into mechanical energy
   B) Chemical energy into electrical energy
   C) Solar energy into electrical energy
   D) Electrical energy into chemical energy

4) The ratio of average load to maximum demand is defined as
   A) Demand Factor B) Load factor
   C) Diversity factor D) Maximum Demand

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

6) Equipment used for pulverizing the coal is known as
   A) Ball Mill B) Hopper C) Burner D) Stoker

7) As steam expands in turbine
   A) Its pressure increases
   B) Its specific volume increases
   C) Its boiling point increases
   D) Its temperature increases

8) Standard frequency usually for electric supply is
   A) 50 Hz B) 60 Hz C) 50 to 60 Hz D) 50 to 55 Hz

9) In power station practice “spinning reserve” is
   A) Reserve generating capacity that is in operation but not in service
   B) Reserve generating capacity that is connected to bus and ready to take the load
   C) Reserve generating capacity that is available for service but not in operation
   D) Capacity of the part of the plant that remains under maintenance

10) For low head and high discharge, the hydraulic turbine used is
   A) Kaplan turbine
   B) Francis turbine
   C) Pelton wheel
   D) Jonual turbine

11) In a hydro-electric plant a conduct system for taking water from the intake works to the turbine is known as
   A) Dam
   B) Reservoir
   C) Penstock
   D) Surge tank

12) Particles having the same atomic number but different mass numbers are called
   A) Positrons
   B) Beta particles
   C) Isotopes
   D) Decayed panicles

13) Which of the following material can be used as moderator ?
   A) Graphite
   B) Heavy water
   C) Beryllium
   D) Any of the above

14) Which of the following is not a part of diesel engine power plant ?
   A) Cooling tower B) Penstock C) Oil Pump D) Strainer

_____

SLR-VB – 381

Seat No.	

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

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

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

   1) Write a short note on present energy scenario.

   2) Explain function of economizer used in thermal power plant.

   3) Give classification of hydroelectric power plant on the basis of head.

   4) Explain boiling water reactor with neat diagram.

   5) Explain the process of nuclear fission.

3. Solve **any two** : **(6×2=12)**

   1) Explain function of air-preheater used in thermal power plant.

   2) With a neat diagram explain working of nuclear power plant.

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

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Explain construction and working of fuel cells.

   2) Discuss the factors which should be considered for wind power plant.

   3) Write a short note on load curve.

   4) State application of diesel power stations.

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

5. Solve **any two** : **(6×2=12)**

   1) What is operating principle of wind power plant ? With the help of block diagram explain wind power plant.

   2) Explain the working of four stroke diesel engine with neat diagram.

   3) Define bio-gas and explain common circular fixed dome digester (China) with neat diagram.

SLR-VB – 382

Seat No.	

Set **P**

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

Day and Date : Monday, 15-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1) **All** questions are **compulsory**.*
*2) Figures to **right** indicate **full** marks.*
*3) **Assume** suitable data 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 : **(20×1=20)**

1) Recursive function can be implemented by using
a) stack b) queue c) linked list d) none

2) Fibonacci series contains integer
a) 1,1,3,5,7,9,11 b) 0,1,1,2,3,5,8,13
c) 0,1,2,3,4,7,11 d) none

3) Queue in which we can insert item or delete from any position based on some property are known as
a) deque b) circular queue c) priority queue d) none

4) Queue elements are added at
a) rear end b) front end c) top end d) none

5) Elements of stacks are called
a) ordered b) unordered c) sequential d) none

6) Push operation on stack push element at location
a) top + 1 b) top – 1 c) rear + 1 d) rear – 1

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

P.T.O.

8) We can check the empty condition of linked list by checking whether the external pointer is
   a) –1 b) + 1 c) 0 d) Null

9) Free function is used to
   a) release memory for node b) to unlink the node
   c) to unlink first and last node d) none

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) Deq. operation of queue, makes,
   a) rear=rear – 1 b) front=front – 1 c) top=top – 1 d) front=front + 1

12) If character 'D', 'C', 'B', 'A' are placed in a queue and are removed one at a time which order they will be removed
   a) ABCD b) ABDC c) DCAB d) DCBA

13) Overflow condition of stack is
   a) front=max–1 b) front=0 c) top=max – 1 d) none

14) The conversion of B*C – D infix expression to postfix is
   a) BC*D – b) B – C*D c) BC* – D d) None

15) The function that is used for memory allocation in implementation of linked list is
   a) malloc () b) calloc () c) realloc () d) Both a) and b)

16) Which of the following data structures are indexed structures ?
   a) linear arrays b) linked lists
   c) both of a) and b) d) None of these

17) The term "push" and "pop" is related to the
   a) array b) lists c) stacks d) all of above

18) The situation when in a linked list START=NULL is
   a) underflow b) overflow
   c) houseful d) saturated

19) Which of the following data structure store the homogenous data elements ?
   a) arrays b) Records c) Pointers d) None

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

SLR-VB – 382

Seat No.	

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

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

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

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

SECTION – I

2. Solve **any four** : **(5×4=20)**

a) Write a short note on 'C' operators.

b) Write in brief about structure as an ADT.

c) Write a short note on :

i) Structures and Unions

ii) File Handling in 'C'.

d) Explain types of functions in detail.

e) Write a short note on conversion of Infix to Postfix with example.

3. a) Solve **any one** : **(1×10=10)**

i) Write a program to perform insertion, deletion and display on stack.

ii) Give detail explanation about applications of stack.

b) Write a short note on : **(2×5=10)**

i) ADT (Abstract Data Types)

ii) Conversion of Infix to Postfix with example.

SECTION – II

4. Write a short note on (solve **any four**) : **(4×5=20)**

   i) Recursion

   ii) Josephus Problem

   iii) Avail list

   iv) Deque

   v) Sorting Techniques

   vi) Binary Search.

5. a) Solve **any one** : **(1×10=10)**

   i) Explain in brief about Linear Search.

   ii) Write a short note on :

   A) Inserting node into singly linked list

   B) Deleting node from singly linked list.

   b) Explain in brief implementation of Queue. **(1×10=10)**

SLR-VB – 382

Seat No.	

Set Q

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

Day and Date : Monday, 15-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data 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 : **(20×1=20)**

1) Which of the following data structures are indexed structures ?
a) linear arrays b) linked lists
c) both of a) and b) d) None of these

2) The term "push" and "pop" is related to the
a) array b) lists c) stacks d) all of above

3) The situation when in a linked list START=NULL is
a) underflow b) overflow
c) houseful d) saturated

4) Which of the following data structure store the homogenous data elements ?
a) arrays b) Records c) Pointers d) None

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

6) Recursive function can be implemented by using
a) stack b) queue c) linked list d) none

7) Fibonacci series contains integer
a) 1,1,3,5,7,9,11 b) 0,1,1,2,3,5,8,13
c) 0,1,2,3,4,7,11 d) none

P.T.O.

8) Queue in which we can insert item or delete from any position based on some property are known as
a) deque b) circular queue c) priority queue d) none

9) Queue elements are added at
a) rear end b) front end c) top end d) none

10) Elements of stacks are called
a) ordered b) unordered c) sequential d) none

11) Push operation on stack push element at location
a) top + 1 b) top – 1 c) rear + 1 d) rear – 1

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

13) We can check the empty condition of linked list by checking whether the external pointer is
a) –1 b) + 1 c) 0 d) Null

14) Free function is used to
a) release memory for node b) to unlink the node
c) to unlink first and last node d) none

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) Deq. operation of queue, makes,
a) rear=rear – 1 b) front=front – 1 c) top=top – 1 d) front=front + 1

17) If character 'D', 'C', 'B', 'A' are placed in a queue and are removed one at a time which order they will be removed
a) ABCD b) ABDC c) DCAB d) DCBA

18) Overflow condition of stack is
a) front=max–1 b) front=0 c) top=max – 1 d) none

19) The conversion of B*C – D infix expression to postfix is
a) BC*D – b) B – C*D c) BC* – D d) None

20) The function that is used for memory allocation in implementation of linked list is
a) malloc () b) calloc () c) realloc () d) Both a) and b)

SLR-VB – 382

Seat No.	

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

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

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

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

SECTION – I

2. Solve **any four** : **(5×4=20)**

a) Write a short note on 'C' operators.

b) Write in brief about structure as an ADT.

c) Write a short note on :

i) Structures and Unions

ii) File Handling in 'C'.

d) Explain types of functions in detail.

e) Write a short note on conversion of Infix to Postfix with example.

3. a) Solve **any one** : **(1×10=10)**

i) Write a program to perform insertion, deletion and display on stack.

ii) Give detail explanation about applications of stack.

b) Write a short note on : **(2×5=10)**

i) ADT (Abstract Data Types)

ii) Conversion of Infix to Postfix with example.

SECTION – II

4. Write a short note on (solve **any four**) : **(4×5=20)**

   i) Recursion

   ii) Josephus Problem

   iii) Avail list

   iv) Deque

   v) Sorting Techniques

   vi) Binary Search.

5. a) Solve **any one** : **(1×10=10)**

   i) Explain in brief about Linear Search.

   ii) Write a short note on :

   A) Inserting node into singly linked list

   B) Deleting node from singly linked list.

   b) Explain in brief implementation of Queue. **(1×10=10)**

SLR-VB – 382

Seat No.	

Set R

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

Day and Date : Monday, 15-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data 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 : **(20×1=20)**

1) Deq. operation of queue, makes,
a) rear=rear – 1 b) front=front – 1 c) top=top – 1 d) front=front + 1

2) If character 'D', 'C', 'B', 'A' are placed in a queue and are removed one at a time which order they will be removed
a) ABCD b) ABDC c) DCAB d) DCBA

3) Overflow condition of stack is
a) front=max–1 b) front=0 c) top=max – 1 d) none

4) The conversion of B*C – D infix expression to postfix is
a) BC*D – b) B – C*D c) BC* – D d) None

5) The function that is used for memory allocation in implementation of linked list is
a) malloc () b) calloc () c) realloc () d) Both a) and b)

6) Which of the following data structures are indexed structures ?
a) linear arrays b) linked lists
c) both of a) and b) d) None of these

7) The term "push" and "pop" is related to the
a) array b) lists c) stacks d) all of above

P.T.O.

8) The situation when in a linked list START=NULL is
   a) underflow b) overflow
   c) houseful d) saturated

9) Which of the following data structure store the homogenous data elements ?
   a) arrays b) Records c) Pointers d) None

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

11) Recursive function can be implemented by using
   a) stack b) queue c) linked list d) none

12) Fibonacci series contains integer
   a) 1,1,3,5,7,9,11 b) 0,1,1,2,3,5,8,13
   c) 0,1,2,3,4,7,11 d) none

13) Queue in which we can insert item or delete from any position based on some property are known as
   a) deque b) circular queue c) priority queue d) none

14) Queue elements are added at
   a) rear end b) front end c) top end d) none

15) Elements of stacks are called
   a) ordered b) unordered c) sequential d) none

16) Push operation on stack push element at location
   a) top + 1 b) top – 1 c) rear + 1 d) rear – 1

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

18) We can check the empty condition of linked list by checking whether the external pointer is
   a) –1 b) + 1 c) 0 d) Null

19) Free function is used to
   a) release memory for node b) to unlink the node
   c) to unlink first and last node d) none

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

———————

SLR-VB – 382

Seat No.	

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

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

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

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

SECTION – I

2. Solve **any four** : **(5×4=20)**

a) Write a short note on 'C' operators.

b) Write in brief about structure as an ADT.

c) Write a short note on :

i) Structures and Unions

ii) File Handling in 'C'.

d) Explain types of functions in detail.

e) Write a short note on conversion of Infix to Postfix with example.

3. a) Solve **any one** : **(1×10=10)**

i) Write a program to perform insertion, deletion and display on stack.

ii) Give detail explanation about applications of stack.

b) Write a short note on : **(2×5=10)**

i) ADT (Abstract Data Types)

ii) Conversion of Infix to Postfix with example.

SECTION – II

4. Write a short note on (solve **any four**) : **(4×5=20)**

   i) Recursion

   ii) Josephus Problem

   iii) Avail list

   iv) Deque

   v) Sorting Techniques

   vi) Binary Search.

5. a) Solve **any one** : **(1×10=10)**

   i) Explain in brief about Linear Search.

   ii) Write a short note on :

   A) Inserting node into singly linked list

   B) Deleting node from singly linked list.

   b) Explain in brief implementation of Queue. **(1×10=10)**

SLR-VB – 382

Seat No.	

Set S

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

Day and Date : Monday, 15-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) ***Assume*** *suitable data 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 : **(20×1=20)**

1) Push operation on stack push element at location
a) top + 1 b) top – 1 c) rear + 1 d) rear – 1

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

3) We can check the empty condition of linked list by checking whether the external pointer is
a) –1 b) + 1 c) 0 d) Null

4) Free function is used to
a) release memory for node b) to unlink the node
c) to unlink first and last node d) none

5) 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

6) Deq. operation of queue, makes,
a) rear=rear – 1 b) front=front – 1 c) top=top – 1 d) front=front + 1

7) If character 'D', 'C', 'B', 'A' are placed in a queue and are removed one at a time which order they will be removed
a) ABCD b) ABDC c) DCAB d) DCBA

P.T.O.

8) Overflow condition of stack is
a) front=max–1 b) front=0 c) top=max – 1 d) none

9) The conversion of B*C – D infix expression to postfix is
a) BC*D – b) B – C*D c) BC* – D d) None

10) The function that is used for memory allocation in implementation of linked list is
a) malloc () b) calloc () c) realloc () d) Both a) and b)

11) Which of the following data structures are indexed structures ?
a) linear arrays b) linked lists
c) both of a) and b) d) None of these

12) The term “push” and “pop” is related to the
a) array b) lists c) stacks d) all of above

13) The situation when in a linked list START=NULL is
a) underflow b) overflow
c) houseful d) saturated

14) Which of the following data structure store the homogenous data elements ?
a) arrays b) Records c) Pointers d) None

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

16) Recursive function can be implemented by using
a) stack b) queue c) linked list d) none

17) Fibonacci series contains integer
a) 1,1,3,5,7,9,11 b) 0,1,1,2,3,5,8,13
c) 0,1,2,3,4,7,11 d) none

18) Queue in which we can insert item or delete from any position based on some property are known as
a) deque b) circular queue c) priority queue d) none

19) Queue elements are added at
a) rear end b) front end c) top end d) none

20) Elements of stacks are called
a) ordered b) unordered c) sequential d) none

SLR-VB – 382

Seat No.	

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

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

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

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

SECTION – I

2. Solve **any four** : **(5×4=20)**

a) Write a short note on 'C' operators.

b) Write in brief about structure as an ADT.

c) Write a short note on :

i) Structures and Unions

ii) File Handling in 'C'.

d) Explain types of functions in detail.

e) Write a short note on conversion of Infix to Postfix with example.

3. a) Solve **any one** : **(1×10=10)**

i) Write a program to perform insertion, deletion and display on stack.

ii) Give detail explanation about applications of stack.

b) Write a short note on : **(2×5=10)**

i) ADT (Abstract Data Types)

ii) Conversion of Infix to Postfix with example.

SECTION – II

4. Write a short note on (solve **any four**) : **(4×5=20)**

   i) Recursion

   ii) Josephus Problem

   iii) Avail list

   iv) Deque

   v) Sorting Techniques

   vi) Binary Search.

5. a) Solve **any one** : **(1×10=10)**

   i) Explain in brief about Linear Search.

   ii) Write a short note on :

   A) Inserting node into singly linked list

   B) Deleting node from singly linked list.

   b) Explain in brief implementation of Queue. **(1×10=10)**

SLR-VB – 383

Seat No.	

Set P

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

Day and Date : Tuesday, 16-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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 $\begin{bmatrix} 2 & 3 & 5 \\ 2 & 3 & 5 \\ 2 & 3 & 5 \end{bmatrix}$ 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

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

P.T.O.

6) The eigen values of the matrix A are 2, 5, 8. Then eigen values of $\bar{A}^1$ 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) 10 b) 15 c) [0, 4, 6] d) None of these

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

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

10) If u = $\begin{bmatrix} 2 \\ -3 \\ 4 \end{bmatrix}$, then a unit vector in the direction of u is

a) $\begin{bmatrix} 2/\sqrt{29} \\ -3/\sqrt{29} \\ 4/\sqrt{29} \end{bmatrix}$ b) $\begin{bmatrix} 1 \\ -3/2 \\ 2 \end{bmatrix}$ c) $\begin{bmatrix} 2/3 \\ -1 \\ 4/3 \end{bmatrix}$ d) None of these

11) The equations of lines of regression are 10y = x + 17 and x = 5y – 7. Then $\bar{x}$ and $\bar{y}$ are

a) 1 and 10 b) 1 and 5 c) 2 and 3 d) 3 and 2

12) If the two regression coefficients are a and b then coefficient of correlation r is

a) $\frac{a}{b}$ b) $\sqrt{ab}$ c) ab d) $\frac{b}{a}$

13) The function u (x, y) is said to be harmonic if it satisfy

a) $u_x = u_y$ b) $u_{xx} - u_{yy} = 0$ c) $u_x = -u_y$ d) $u_{xx} + u_{yy} = 0$

14) An analytic function with constant modulus is

a) Analytic b) Harmonic c) Constant d) None of these

SLR-VB – 383

Seat No.	

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

Day and Date : Tuesday, 16-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

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

a) Do the three planes $x_1 + 2x_2 + x_3 = 4$, $x_2 - x_3 = 1$ and $x_1 + 3x_2 = 0$ have at least one common point of intersection ? Explain. **3**

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

c) Solve the equation AX = b by using the LU factorization given for A.

$$A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}, b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix} \text{ and } A = \begin{bmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 2 & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 3 & -7 & -2 \\ 0 & -2 & -1 \\ 0 & 0 & -1 \end{bmatrix}.$$ **3**

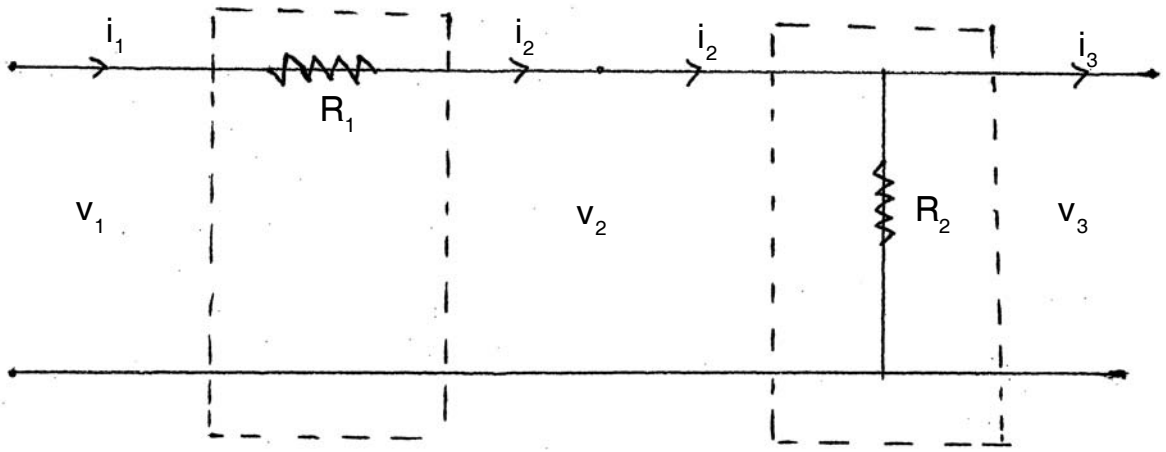
d) Let the transformation T defined by T (X) = AX, find a vector X whose image under T is b

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

3. a) Determine if the vectors are linearly independent $\begin{bmatrix} 1 \\ -3 \end{bmatrix}, \begin{bmatrix} -3 \\ 9 \end{bmatrix}$. **3**

b) Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $u = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$, $v = \begin{bmatrix} 7 \\ 8 \end{bmatrix}$ then prove that A (u+v) = Au + Av. **3**

c)



a) Compute the transfer matrix of the ladder network.

b) Design a ladder network whose transfer matrix is $\begin{bmatrix} 1 & -8 \\ -0.5 & 5 \end{bmatrix}$. **4**

4. a) Find a spanning set for the null space of the matrix, $A = \begin{bmatrix} -3 & 6 & -1 & 1 & -7 \\ 1 & -2 & 2 & 3 & -1 \\ 2 & -4 & 5 & 8 & -4 \end{bmatrix}$. **3**

b) Find the coordinator vector $[X]_B$ of X relative to the given basis $B = \{ b_1, b_2 \}$.

Where $b_1 = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$, $b_2 = \begin{bmatrix} 2 \\ -5 \end{bmatrix}$, $X = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$. **3**

c) If A is row equivalent to B. List rank A, dimNull A. Then find bases for Col A,

Row A and Null A. $A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}$. **3**

5. a) Find eigen value for the matrix $\begin{bmatrix} 4 & 3 \\ -3 & 4 \end{bmatrix}$. **3**

b) Apply power method for finding leading eigen value and eigen vector for

$A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ stop when k = 4, $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. **3**

c) Diagonalize the matrix if possible $A = \begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$. **3**

SECTION – II

6. a) Describe all least-squares solutions of the system. **3**

$x + y = 2$

$x + y = 4$

b) If $y = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$ and $u = \begin{bmatrix} 4 \\ 2 \end{bmatrix}$. Find the orthogonal projection of y onto u. **3**

c) Show that $\{v_1, v_2, v_3\}$ is an orthonormal basis of R^3, where

$$v_1 = \begin{bmatrix} 3/\sqrt{11} \\ 1/\sqrt{11} \\ 1/\sqrt{11} \end{bmatrix}, \quad v_2 = \begin{bmatrix} -1/\sqrt{6} \\ 2/\sqrt{6} \\ 1/\sqrt{6} \end{bmatrix}, \quad v_3 = \begin{bmatrix} -1/\sqrt{66} \\ -4/\sqrt{66} \\ 7/\sqrt{66} \end{bmatrix}.$$ **4**

OR

c) Find the matrix of the quadratic form, assume that X is in R^3 for

i) $8x_1^2 + 7x_2^2 - 3x_3^2 - 6x_1x_2 + 4x_1x_3 - 2x_2x_3$

ii) $x_3^2 - 4x_1x_2 + 4x_2x_3$. **4**

7. a) Let $Q(X) = x_1^2 - 8x_1x_2 - 5x_2^2$. Compute Q (X) for $X = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$. **3**

b) Compute the coefficient of correlation between x and y from the following data :

x :	2	4	5	6	8	11
y :	18	12	10	8	7	5

3

c) The line of regression of y on x is $10y = x + 17$ and the line of regression of x on y is $x = 5y - 7$. Find :

i) The means of x and y

ii) The coefficient of correlation.

iii) The most probable value of y when $x = 13$. **3**

8. a) From the following results obtain the two regression equations and estimate the yield of crop when the rainfall is 29 cms and the rainfall when the yield is 600 kgs.

	y (yield in kgs)	**x (Rainfall in cms)**
Mean	508.4	26.7
S.D.	36.8	4.6

$r = 0.52$ **3**

b) Find the equations of the lines of regression from the following data. Also find the coefficient of correlation r.

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

3

c) Find the coefficient of correlation between x and y from the following data :

$n = 25,\ \Sigma x = 120, \Sigma x^2 = 650, \Sigma y = 100, \Sigma y^2 = 450, \Sigma xy = 500$. **3**

9. a) Find the bilinear transformation which maps the points $z = 1, i, -1$ onto the points $W = i, 0, -i$. **3**

b) Prove that if $u = x^2 - y^2$, $v = -\dfrac{y}{x^2 + y^2}$ then both u and v satisfy Laplace's equation, but that $u + iv$ is not analytic function of z. **3**

c) Evaluate the integral $\oint_c \dfrac{e^z}{z-2} dz$ where C is

a) the circle $|Z| = 3$

b) the circle $|Z| = 1$. **3**

SLR-VB – 383

Seat No.	

Set Q

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

Day and Date : Tuesday, 16-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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) 10 b) 15 c) [0, 4, 6] d) None of these

2) The matrix of the quadratic form Q (X) = $5x_1^2 + 3x_1x_2$ is
a) $\begin{bmatrix} 0 & 3/2 \\ 3/2 & 5 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 3 \\ 3 & 5 \end{bmatrix}$ c) $\begin{bmatrix} 5 & 3/2 \\ 3/2 & 0 \end{bmatrix}$ d) None of these

3) If u = $\begin{bmatrix} 2 \\ -3 \\ 4 \end{bmatrix}$, then a unit vector in the direction of u is
a) $\begin{bmatrix} 2/\sqrt{29} \\ -3/\sqrt{29} \\ 4/\sqrt{29} \end{bmatrix}$ b) $\begin{bmatrix} 1 \\ -3/2 \\ 2 \end{bmatrix}$ c) $\begin{bmatrix} 2/3 \\ -1 \\ 4/3 \end{bmatrix}$ d) None of these

4) The equations of lines of regression are 10y = x + 17 and x = 5y – 7. Then $\bar{x}$ and $\bar{y}$ are
a) 1 and 10 b) 1 and 5 c) 2 and 3 d) 3 and 2

P.T.O.

5) If the two regression coefficients are a and b then coefficient of correlation r is

a) $\frac{a}{b}$ b) $\sqrt{ab}$ c) ab d) $\frac{b}{a}$

6) The function u (x, y) is said to be harmonic if it satisfy

a) $u_x = u_y$ b) $u_{xx} - u_{yy} = 0$ c) $u_x = -u_y$ d) $u_{xx} + u_{yy} = 0$

7) An analytic function with constant modulus is

a) Analytic b) Harmonic c) Constant d) None of these

8) 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

9) Rank of the matrix $\begin{bmatrix} 2 & 3 & 5 \\ 2 & 3 & 5 \\ 2 & 3 & 5 \end{bmatrix}$ is

a) 1 b) 2 c) 3 d) None of these

10) 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

11) 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

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
c) Greater than n vectors d) Exactly n vectors

13) The eigen values of the matrix A are 2, 5, 8. Then eigen values of $\bar{A}^1$ 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

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-VB – 383

Seat No.	

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

Day and Date : Tuesday, 16-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

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

a) Do the three planes $x_1 + 2x_2 + x_3 = 4$, $x_2 - x_3 = 1$ and $x_1 + 3x_2 = 0$ have at least one common point of intersection ? Explain. **3**

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

c) Solve the equation AX = b by using the LU factorization given for A.

$$A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}, b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix} \text{ and } A = \begin{bmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 2 & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 3 & -7 & -2 \\ 0 & -2 & -1 \\ 0 & 0 & -1 \end{bmatrix}.$$ **3**

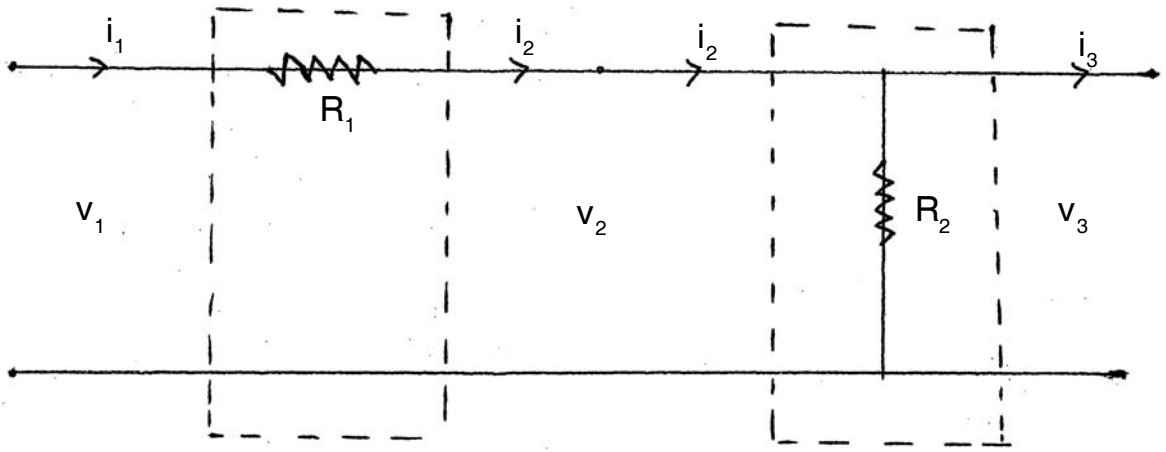
d) Let the transformation T defined by T (X) = AX, find a vector X whose image under T is b

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

3. a) Determine if the vectors are linearly independent $\begin{bmatrix} 1 \\ -3 \end{bmatrix}, \begin{bmatrix} -3 \\ 9 \end{bmatrix}$. **3**

b) Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $u = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$, $v = \begin{bmatrix} 7 \\ 8 \end{bmatrix}$ then prove that A (u+v) = Au + Av. **3**

c)



a) Compute the transfer matrix of the ladder network.

b) Design a ladder network whose transfer matrix is $\begin{bmatrix} 1 & -8 \\ -0.5 & 5 \end{bmatrix}$. **4**

4. a) Find a spanning set for the null space of the matrix, $A = \begin{bmatrix} -3 & 6 & -1 & 1 & -7 \\ 1 & -2 & 2 & 3 & -1 \\ 2 & -4 & 5 & 8 & -4 \end{bmatrix}$. **3**

b) Find the coordinator vector $[X]_B$ of X relative to the given basis $B = \{ b_1, b_2 \}$.

Where $b_1 = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$, $b_2 = \begin{bmatrix} 2 \\ -5 \end{bmatrix}$, $X = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$. **3**

c) If A is row equivalent to B. List rank A, dimNull A. Then find bases for Col A,

Row A and Null A. $A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}$. **3**

5. a) Find eigen value for the matrix $\begin{bmatrix} 4 & 3 \\ -3 & 4 \end{bmatrix}$. **3**

b) Apply power method for finding leading eigen value and eigen vector for

$A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ stop when k = 4, $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. **3**

Set Q

c) Diagonalize the matrix if possible $A = \begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$. **3**

SECTION – II

6. a) Describe all least-squares solutions of the system. **3**

$x + y = 2$

$x + y = 4$

b) If $y = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$ and $u = \begin{bmatrix} 4 \\ 2 \end{bmatrix}$. Find the orthogonal projection of y onto u. **3**

c) Show that $\{v_1, v_2, v_3\}$ is an orthonormal basis of R^3, where

$$v_1 = \begin{bmatrix} 3/\sqrt{11} \\ 1/\sqrt{11} \\ 1/\sqrt{11} \end{bmatrix}, \quad v_2 = \begin{bmatrix} -1/\sqrt{6} \\ 2/\sqrt{6} \\ 1/\sqrt{6} \end{bmatrix}, \quad v_3 = \begin{bmatrix} -1/\sqrt{66} \\ -4/\sqrt{66} \\ 7/\sqrt{66} \end{bmatrix}.$$ **4**

OR

c) Find the matrix of the quadratic form, assume that X is in R^3 for

i) $8x_1^2 + 7x_2^2 - 3x_3^2 - 6x_1x_2 + 4x_1x_3 - 2x_2x_3$

ii) $x_3^2 - 4x_1x_2 + 4x_2x_3$. **4**

7. a) Let $Q(X) = x_1^2 - 8x_1x_2 - 5x_2^2$. Compute Q (X) for $X = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$. **3**

b) Compute the coefficient of correlation between x and y from the following data :

x :	2	4	5	6	8	11
y :	18	12	10	8	7	5

3

c) The line of regression of y on x is $10y = x + 17$ and the line of regression of x on y is $x = 5y - 7$. Find :

i) The means of x and y

ii) The coefficient of correlation.

iii) The most probable value of y when $x = 13$. **3**

8. a) From the following results obtain the two regression equations and estimate the yield of crop when the rainfall is 29 cms and the rainfall when the yield is 600 kgs.

	y (yield in kgs)	**x (Rainfall in cms)**
Mean	508.4	26.7
S.D.	36.8	4.6

$r = 0.52$ **3**

b) Find the equations of the lines of regression from the following data. Also find the coefficient of correlation r.

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

3

c) Find the coefficient of correlation between x and y from the following data :

$n = 25,\ \Sigma x = 120, \Sigma x^2 = 650, \Sigma y = 100, \Sigma y^2 = 450, \Sigma xy = 500$. **3**

9. a) Find the bilinear transformation which maps the points $z = 1, i, -1$ onto the points $W = i, 0, -i$. **3**

b) Prove that if $u = x^2 - y^2$, $v = -\dfrac{y}{x^2 + y^2}$ then both u and v satisfy Laplace's equation, but that u + iv is not analytic function of z. **3**

c) Evaluate the integral $\oint_c \dfrac{e^z}{z-2} dz$ where C is

a) the circle $|Z| = 3$

b) the circle $|Z| = 1$. **3**

SLR-VB – 383

Seat No.	

Set **R**

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

Day and Date : Tuesday, 16-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

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 $\bar{A}^{1}$ 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) 10 b) 15 c) [0, 4, 6] d) None of these

5) The matrix of the quadratic form Q (X) = $5x_1^2 + 3x_1x_2$ is
   a) $\begin{bmatrix} 0 & 3/2 \\ 3/2 & 5 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 3 \\ 3 & 5 \end{bmatrix}$ c) $\begin{bmatrix} 5 & 3/2 \\ 3/2 & 0 \end{bmatrix}$ d) None of these

P.T.O.

6) If $u = \begin{bmatrix} 2 \\ -3 \\ 4 \end{bmatrix}$, then a unit vector in the direction of u is

a) $\begin{bmatrix} 2/\sqrt{29} \\ -3/\sqrt{29} \\ 4/\sqrt{29} \end{bmatrix}$ b) $\begin{bmatrix} 1 \\ -3/2 \\ 2 \end{bmatrix}$ c) $\begin{bmatrix} 2/3 \\ -1 \\ 4/3 \end{bmatrix}$ d) None of these

7) The equations of lines of regression are $10y = x + 17$ and $x = 5y - 7$. Then $\bar{x}$ and $\bar{y}$ are

a) 1 and 10 b) 1 and 5 c) 2 and 3 d) 3 and 2

8) If the two regression coefficients are a and b then coefficient of correlation r is

a) $\frac{a}{b}$ b) $\sqrt{ab}$ c) ab d) $\frac{b}{a}$

9) The function u (x, y) is said to be harmonic if it satisfy

a) $u_x = u_y$ b) $u_{xx} - u_{yy} = 0$ c) $u_x = -u_y$ d) $u_{xx} + u_{yy} = 0$

10) An analytic function with constant modulus is

a) Analytic b) Harmonic c) Constant d) None of these

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 $\begin{bmatrix} 2 & 3 & 5 \\ 2 & 3 & 5 \\ 2 & 3 & 5 \end{bmatrix}$ is

a) 1 b) 2 c) 3 d) None of these

13) 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

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
d) The number of free variables in the equation AX = 0

———————

SLR-VB – 383

Seat No.	

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

Day and Date : Tuesday, 16-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

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

a) Do the three planes $x_1 + 2x_2 + x_3 = 4$, $x_2 - x_3 = 1$ and $x_1 + 3x_2 = 0$ have at least one common point of intersection ? Explain. **3**

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

c) Solve the equation AX = b by using the LU factorization given for A.

$$A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}, b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix} \text{ and } A = \begin{bmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 2 & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 3 & -7 & -2 \\ 0 & -2 & -1 \\ 0 & 0 & -1 \end{bmatrix}.$$ **3**

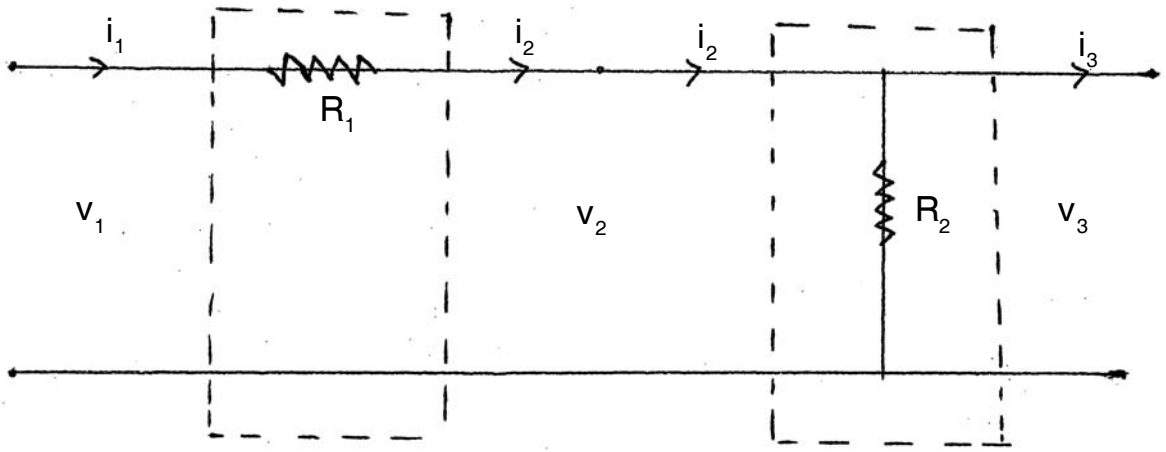
d) Let the transformation T defined by T (X) = AX, find a vector X whose image under T is b

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

3. a) Determine if the vectors are linearly independent $\begin{bmatrix} 1 \\ -3 \end{bmatrix}, \begin{bmatrix} -3 \\ 9 \end{bmatrix}$. **3**

b) Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}, \; u = \begin{bmatrix} 5 \\ 6 \end{bmatrix}, \; v = \begin{bmatrix} 7 \\ 8 \end{bmatrix}$ then prove that A (u+v) = Au + Av. **3**

c)



a) Compute the transfer matrix of the ladder network.

b) Design a ladder network whose transfer matrix is $\begin{bmatrix} 1 & -8 \\ -0.5 & 5 \end{bmatrix}$. **4**

4. a) Find a spanning set for the null space of the matrix, $A = \begin{bmatrix} -3 & 6 & -1 & 1 & -7 \\ 1 & -2 & 2 & 3 & -1 \\ 2 & -4 & 5 & 8 & -4 \end{bmatrix}$. **3**

b) Find the coordinator vector $[X]_B$ of X relative to the given basis $B = \{ b_1, b_2 \}$.

Where $b_1 = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$, $b_2 = \begin{bmatrix} 2 \\ -5 \end{bmatrix}$, $X = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$. **3**

c) If A is row equivalent to B. List rank A, dimNull A. Then find bases for Col A,

Row A and Null A. $A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}$. **3**

5. a) Find eigen value for the matrix $\begin{bmatrix} 4 & 3 \\ -3 & 4 \end{bmatrix}$. **3**

b) Apply power method for finding leading eigen value and eigen vector for

$A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ stop when k = 4, $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. **3**

Set R

c) Diagonalize the matrix if possible $A = \begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$. **3**

SECTION – II

6. a) Describe all least-squares solutions of the system. **3**

$x + y = 2$

$x + y = 4$

b) If $y = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$ and $u = \begin{bmatrix} 4 \\ 2 \end{bmatrix}$. Find the orthogonal projection of y onto u. **3**

c) Show that $\{v_1, v_2, v_3\}$ is an orthonormal basis of R^3, where

$$v_1 = \begin{bmatrix} 3/\sqrt{11} \\ 1/\sqrt{11} \\ 1/\sqrt{11} \end{bmatrix}, \quad v_2 = \begin{bmatrix} -1/\sqrt{6} \\ 2/\sqrt{6} \\ 1/\sqrt{6} \end{bmatrix}, \quad v_3 = \begin{bmatrix} -1/\sqrt{66} \\ -4/\sqrt{66} \\ 7/\sqrt{66} \end{bmatrix}.$$ **4**

OR

c) Find the matrix of the quadratic form, assume that X is in R^3 for

i) $8x_1^2 + 7x_2^2 - 3x_3^2 - 6x_1x_2 + 4x_1x_3 - 2x_2x_3$

ii) $x_3^2 - 4x_1x_2 + 4x_2x_3$. **4**

7. a) Let $Q(X) = x_1^2 - 8x_1x_2 - 5x_2^2$. Compute Q (X) for $X = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$. **3**

b) Compute the coefficient of correlation between x and y from the following data :

x :	2	4	5	6	8	11
y :	18	12	10	8	7	5

3

c) The line of regression of y on x is $10y = x + 17$ and the line of regression of x on y is $x = 5y - 7$. Find :

i) The means of x and y

ii) The coefficient of correlation.

iii) The most probable value of y when $x = 13$. **3**

8. a) From the following results obtain the two regression equations and estimate the yield of crop when the rainfall is 29 cms and the rainfall when the yield is 600 kgs.

	y (yield in kgs)	**x (Rainfall in cms)**
Mean	508.4	26.7
S.D.	36.8	4.6

$r = 0.52$ **3**

b) Find the equations of the lines of regression from the following data. Also find the coefficient of correlation r.

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

3

c) Find the coefficient of correlation between x and y from the following data :

$n = 25,\ \Sigma x = 120, \Sigma x^2 = 650, \Sigma y = 100, \Sigma y^2 = 450, \Sigma xy = 500$. **3**

9. a) Find the bilinear transformation which maps the points $z = 1, i, -1$ onto the points $W = i, 0, -i$. **3**

b) Prove that if $u = x^2 - y^2$, $v = -\dfrac{y}{x^2 + y^2}$ then both u and v satisfy Laplace's equation, but that u + iv is not analytic function of z. **3**

c) Evaluate the integral $\oint_c \dfrac{e^z}{z-2} dz$ where C is

a) the circle $|Z| = 3$

b) the circle $|Z| = 1$. **3**

SLR-VB – 383

Seat No.	

Set **S**

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

Day and Date : Tuesday, 16-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) If $u = \begin{bmatrix} 2 \\ -3 \\ 4 \end{bmatrix}$, then a unit vector in the direction of u is

a) $\begin{bmatrix} 2/\sqrt{29} \\ -3/\sqrt{29} \\ 4/\sqrt{29} \end{bmatrix}$ b) $\begin{bmatrix} 1 \\ -3/2 \\ 2 \end{bmatrix}$ c) $\begin{bmatrix} 2/3 \\ -1 \\ 4/3 \end{bmatrix}$ d) None of these

2) The equations of lines of regression are $10y = x + 17$ and $x = 5y - 7$. Then $\bar{x}$ and $\bar{y}$ are
a) 1 and 10 b) 1 and 5 c) 2 and 3 d) 3 and 2

3) If the two regression coefficients are a and b then coefficient of correlation r is
a) $\frac{a}{b}$ b) $\sqrt{ab}$ c) ab d) $\frac{b}{a}$

4) The function u (x, y) is said to be harmonic if it satisfy
a) $u_x = u_y$ b) $u_{xx} - u_{yy} = 0$ c) $u_x = -u_y$ d) $u_{xx} + u_{yy} = 0$

5) An analytic function with constant modulus is
a) Analytic b) Harmonic c) Constant d) None of these

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 $\begin{bmatrix} 2 & 3 & 5 \\ 2 & 3 & 5 \\ 2 & 3 & 5 \end{bmatrix}$ is
   a) 1 b) 2 c) 3 d) None of these

8) 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

9) 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

10) 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

11) The eigen values of the matrix A are 2, 5, 8. Then eigen values of $\overline{A}^{1}$ 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

12) 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) $4 \pm 2i$

13) If u = [3, 4, 6] and v = [0, 1, 1] then u.v = ...
   a) 10 b) 15 c) [0, 4, 6] d) None of these

14) The matrix of the quadratic form Q (X) = $5x_1^2 + 3x_1x_2$ is
   a) $\begin{bmatrix} 0 & 3/2 \\ 3/2 & 5 \end{bmatrix}$ b) $\begin{bmatrix} 0 & 3 \\ 3 & 5 \end{bmatrix}$ c) $\begin{bmatrix} 5 & 3/2 \\ 3/2 & 0 \end{bmatrix}$ d) None of these

SLR-VB – 383

Seat No.	

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

Day and Date : Tuesday, 16-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

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

a) Do the three planes $x_1 + 2x_2 + x_3 = 4$, $x_2 - x_3 = 1$ and $x_1 + 3x_2 = 0$ have at least one common point of intersection ? Explain. **3**

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

c) Solve the equation AX = b by using the LU factorization given for A.

$$A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}, b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix} \text{ and } A = \begin{bmatrix} 1 & 0 & 0 \\ -1 & 1 & 0 \\ 2 & -5 & 1 \end{bmatrix} \cdot \begin{bmatrix} 3 & -7 & -2 \\ 0 & -2 & -1 \\ 0 & 0 & -1 \end{bmatrix}.$$ **3**

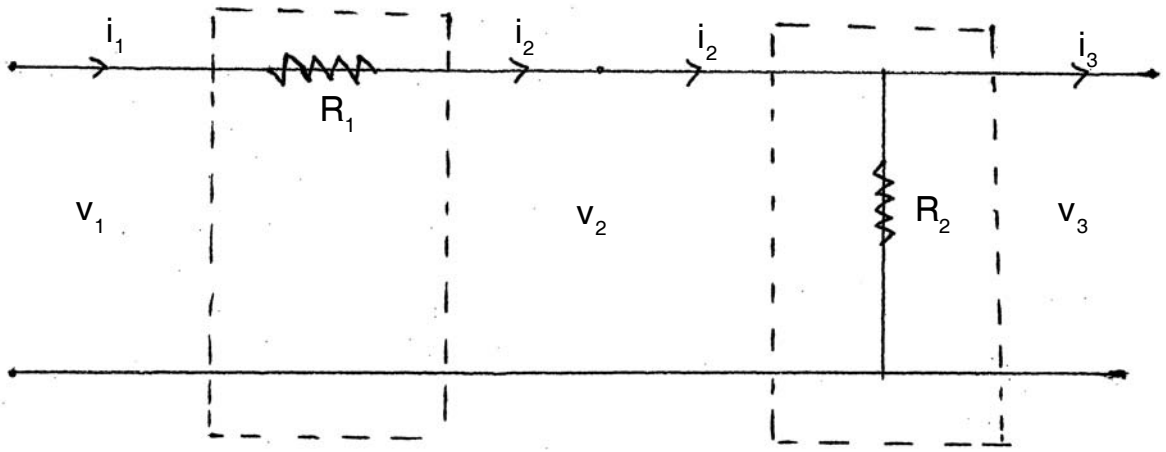
d) Let the transformation T defined by T (X) = AX, find a vector X whose image under T is b

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

3. a) Determine if the vectors are linearly independent $\begin{bmatrix} 1 \\ -3 \end{bmatrix}, \begin{bmatrix} -3 \\ 9 \end{bmatrix}$. **3**

b) Let $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $u = \begin{bmatrix} 5 \\ 6 \end{bmatrix}$, $v = \begin{bmatrix} 7 \\ 8 \end{bmatrix}$ then prove that A (u+v) = Au + Av. **3**

c)



a) Compute the transfer matrix of the ladder network.

b) Design a ladder network whose transfer matrix is $\begin{bmatrix} 1 & -8 \\ -0.5 & 5 \end{bmatrix}$. **4**

4. a) Find a spanning set for the null space of the matrix, $A = \begin{bmatrix} -3 & 6 & -1 & 1 & -7 \\ 1 & -2 & 2 & 3 & -1 \\ 2 & -4 & 5 & 8 & -4 \end{bmatrix}$. **3**

b) Find the coordinator vector $[X]_B$ of X relative to the given basis $B = \{ b_1, b_2 \}$.

Where $b_1 = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$, $b_2 = \begin{bmatrix} 2 \\ -5 \end{bmatrix}$, $X = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$. **3**

c) If A is row equivalent to B. List rank A, dimNull A. Then find bases for Col A,

Row A and Null A. $A = \begin{bmatrix} 1 & -4 & 9 & -7 \\ -1 & 2 & -4 & 1 \\ 5 & -6 & 10 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 0 & -1 & 5 \\ 0 & -2 & 5 & -6 \\ 0 & 0 & 0 & 0 \end{bmatrix}$. **3**

5. a) Find eigen value for the matrix $\begin{bmatrix} 4 & 3 \\ -3 & 4 \end{bmatrix}$. **3**

b) Apply power method for finding leading eigen value and eigen vector for

$A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ stop when k = 4, $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$. **3**

Set S

c) Diagonalize the matrix if possible $A = \begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$. **3**

SECTION – II

6. a) Describe all least-squares solutions of the system. **3**

$x + y = 2$

$x + y = 4$

b) If $y = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$ and $u = \begin{bmatrix} 4 \\ 2 \end{bmatrix}$. Find the orthogonal projection of y onto u. **3**

c) Show that $\{v_1, v_2, v_3\}$ is an orthonormal basis of R^3, where

$$v_1 = \begin{bmatrix} 3/\sqrt{11} \\ 1/\sqrt{11} \\ 1/\sqrt{11} \end{bmatrix}, \quad v_2 = \begin{bmatrix} -1/\sqrt{6} \\ 2/\sqrt{6} \\ 1/\sqrt{6} \end{bmatrix}, \quad v_3 = \begin{bmatrix} -1/\sqrt{66} \\ -4/\sqrt{66} \\ 7/\sqrt{66} \end{bmatrix}.$$ **4**

OR

c) Find the matrix of the quadratic form, assume that X is in R^3 for

i) $8x_1^2 + 7x_2^2 - 3x_3^2 - 6x_1x_2 + 4x_1x_3 - 2x_2x_3$

ii) $x_3^2 - 4x_1x_2 + 4x_2x_3$. **4**

7. a) Let $Q(X) = x_1^2 - 8x_1x_2 - 5x_2^2$. Compute Q (X) for $X = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$. **3**

b) Compute the coefficient of correlation between x and y from the following data :

x :	2	4	5	6	8	11
y :	18	12	10	8	7	5

3

c) The line of regression of y on x is $10y = x + 17$ and the line of regression of x on y is $x = 5y - 7$. Find :

i) The means of x and y

ii) The coefficient of correlation.

iii) The most probable value of y when $x = 13$. **3**

8. a) From the following results obtain the two regression equations and estimate the yield of crop when the rainfall is 29 cms and the rainfall when the yield is 600 kgs.

	y (yield in kgs)	**x (Rainfall in cms)**
Mean	508.4	26.7
S.D.	36.8	4.6

$r = 0.52$ **3**

b) Find the equations of the lines of regression from the following data. Also find the coefficient of correlation r.

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

3

c) Find the coefficient of correlation between x and y from the following data :

$n = 25,\ \Sigma x = 120, \Sigma x^2 = 650, \Sigma y = 100, \Sigma y^2 = 450, \Sigma xy = 500$. **3**

9. a) Find the bilinear transformation which maps the points $z = 1, i, -1$ onto the points $W = i, 0, -i$. **3**

b) Prove that if $u = x^2 - y^2$, $v = -\dfrac{y}{x^2 + y^2}$ then both u and v satisfy Laplace's equation, but that $u + iv$ is not analytic function of z. **3**

c) Evaluate the integral $\oint_c \dfrac{e^z}{z-2} dz$ where C is

a) the circle $|Z| = 3$

b) the circle $|Z| = 1$. **3**

SLR-VB – 384

Seat No.	

Set **P**

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

Day and Date : Thursday, 18-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The power factor of an alternator is determined by its _____
a) speed b) excitation c) load d) prime mover

2) For successful parallel operation of two 3 phase alternators must have the same _____
a) voltage rating b) speed c) excitation d) KVA rating

3) In a 3 phase star connected alternator, field current of 50A produces a full load armature current of 200A on short circuit and 1730V per phase on open circuit, then its value of synchronous impedance is _____ ohm.
a) 8.75 b) 4 c) 5 d) 34.6

4) Damper winding placed in the rotor pole faces of an alternator help in reducing the hunting effect _____
a) only at synchronous speed
b) above synchronous speed
c) below synchronous speed
d) none of the above

5) The winding of a 4 pole, 3 phase alternator having 36 slots and coil span of 7 slots is short pitched by _____ degrees.
a) 140 b) 80 c) 40 d) 20

6) If load angle of a 4 pole synchronous motor is 8 degrees electrical, its value in mechanical degrees is _____
a) 4 b) 2 c) 8 d) 6

7) The 'V' curves of a synchronous motor gives plot/relation between _____
   a) armature current and supply voltage
   b) field current and power factor
   c) field current and armature current
   d) field current and back e.m.f.

8) The slip of an induction motor is defined as the ratio of _____
   a) stator Cu loss/rotor input
   b) rotor Cu loss/rotor input
   c) rotor Cu loss/stator Cu loss
   d) rotor Cu loss/rotor output

9) A 6 pole, 50 Hz, 3 phase I. M. is running at 950 r.p.m. and has rotor Cu loss of 5 KW. Its rotor input is _____ KW.
   a) 10 b) 95 c) 90 d) 100

10) The efficiency of a 3 phase induction motor is approximately proportional to _____
   a) 1 – S b) S c) N_s d) N_r

11) The principle of operation of a 3 phase induction motor is most similar to that of a _____
   a) single phase induction motor
   b) synchronous motor
   c) transformer with shorted secondary
   d) none of these

12) If the stator voltage of a 3 phase induction motor is reduced by 10%, the torque of motor will decrease by _____
   a) 10% b) 20% c) 40% d) 5%

13) A permanent split single phase capacitor motor does not have _____
   a) squirrel cage rotor
   b) starting winding
   c) centrifugal switch
   d) high power factor

14) Capacitor start and run, single phase induction motor is basically a _____
   a) 1 phase induction motor
   b) 3 phase induction motor
   c) 2 phase induction motor
   d) none of these

_____

SLR-VB – 384

Seat No.	

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

Day and Date : Thursday, 18-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain the principle of operation of 3 phase induction motor.
   b) Derive the expression for rotor current frequency of 3 phase induction motor.
   c) Explain effect of slip on the rotor circuit of 3 phase induction motor.
   d) Derive expression for rotor current and power factor at stand still and at running for 3 phase induction motor.
   e) A 500 HP, 3 phase, 440 V, 50 Hz induction motor as a speed of 950 rpm on full load. The machine has 6 poles. Calculate the full load slip. How many cycles will the rotor voltage make per minute ?

3. Solve **any two** : **(8×2=16)**
   a) Draw and explain torque slip characteristics of 3 phase induction motor.
   b) Explain double field revolving theory for single phase induction motor.
   c) A 0.5 HP, 230 V, single phase induction motor (split phase) takes a current of 4.2 A lagging the voltage by 10° for starting winding and a current of 6.2 A lagging the voltage by 40° for its main winding.

      Find :
      i) Total current and power factor at the time of starting
      ii) Total current and power factor during running
      iii) Phase angle between the main winding current and starting winding current.
      iv) Power drawn by starting winding
      v) Power drawn by main winding
      vi) Total power drawn during starting
      vii) Total power drawn during running.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Explain with diagram, working of capacitor start motor.

   b) Explain with diagram speed control of 3 phase induction motor by changing the applied voltage.

   c) Describe the characteristics of different classes of squirrel cage motors.

   d) Explain equivalent circuit of double cage induction motor.

   e) In a double cage induction motor, if the outer cage has an equivalent impedance at stand still of (2+j2) ohm and the inner cage an equivalent impedance of (5+j5) ohm, determine the slip at which the two cages develop equal torques.

5. Solve **any two** : **(8×2=16)**

   a) Explain construction, operation, characteristics and applications of single phase induction AC series motor.

   b) Explain with diagram different methods of starting 3 phase squirrel cage motor.

   c) A 3 phase squirrel cage induction motor takes a starting current 6 times the full load current. Find the starting torque as a percentage of full load torque if the motor is started :
      i) Direct online
      ii) Through star-delta starter, the full load slip of the motor is 0.04.

SLR-VB – 384

Seat No.	

Set Q

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

Day and Date : Thursday, 18-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The slip of an induction motor is defined as the ratio of _____
   a) stator Cu loss/rotor input b) rotor Cu loss/rotor input
   c) rotor Cu loss/stator Cu loss d) rotor Cu loss/rotor output

2) A 6 pole, 50 Hz, 3 phase I. M. is running at 950 r.p.m. and has rotor Cu loss of 5 KW. Its rotor input is _____ KW.
   a) 10 b) 95 c) 90 d) 100

3) The efficiency of a 3 phase induction motor is approximately proportional to _____
   a) 1 – S b) S c) N_s d) N_r

4) The principle of operation of a 3 phase induction motor is most similar to that of a _____
   a) single phase induction motor
   b) synchronous motor
   c) transformer with shorted secondary
   d) none of these

5) If the stator voltage of a 3 phase induction motor is reduced by 10%, the torque of motor will decrease by _____
   a) 10% b) 20% c) 40% d) 5%

6) A permanent split single phase capacitor motor does not have _____
   a) squirrel cage rotor b) starting winding
   c) centrifugal switch d) high power factor

P.T.O.

7) Capacitor start and run, single phase induction motor is basically a _____
   a) 1 phase induction motor b) 3 phase induction motor
   c) 2 phase induction motor d) none of these

8) The power factor of an alternator is determined by its _____
   a) speed b) excitation c) load d) prime mover

9) For successful parallel operation of two 3 phase alternators must have the same _____
   a) voltage rating b) speed c) excitation d) KVA rating

10) In a 3 phase star connected alternator, field current of 50A produces a full load armature current of 200A on short circuit and 1730V per phase on open circuit, then its value of synchronous impedance is _____ ohm.
   a) 8.75 b) 4 c) 5 d) 34.6

11) Damper winding placed in the rotor pole faces of an alternator help in reducing the hunting effect _____
   a) only at synchronous speed
   b) above synchronous speed
   c) below synchronous speed
   d) none of the above

12) The winding of a 4 pole, 3 phase alternator having 36 slots and coil span of 7 slots is short pitched by _____ degrees.
   a) 140 b) 80 c) 40 d) 20

13) If load angle of a 4 pole synchronous motor is 8 degrees electrical, its value in mechanical degrees is _____
   a) 4 b) 2 c) 8 d) 6

14) The 'V' curves of a synchronous motor gives plot/relation between _____
   a) armature current and supply voltage
   b) field current and power factor
   c) field current and armature current
   d) field current and back e.m.f.

_____

SLR-VB – 384

Seat No.	

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

Day and Date : Thursday, 18-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain the principle of operation of 3 phase induction motor.
   b) Derive the expression for rotor current frequency of 3 phase induction motor.
   c) Explain effect of slip on the rotor circuit of 3 phase induction motor.
   d) Derive expression for rotor current and power factor at stand still and at running for 3 phase induction motor.
   e) A 500 HP, 3 phase, 440 V, 50 Hz induction motor as a speed of 950 rpm on full load. The machine has 6 poles. Calculate the full load slip. How many cycles will the rotor voltage make per minute ?

3. Solve **any two** : **(8×2=16)**
   a) Draw and explain torque slip characteristics of 3 phase induction motor.
   b) Explain double field revolving theory for single phase induction motor.
   c) A 0.5 HP, 230 V, single phase induction motor (split phase) takes a current of 4.2 A lagging the voltage by 10° for starting winding and a current of 6.2 A lagging the voltage by 40° for its main winding.

      Find :
      i) Total current and power factor at the time of starting
      ii) Total current and power factor during running
      iii) Phase angle between the main winding current and starting winding current.
      iv) Power drawn by starting winding
      v) Power drawn by main winding
      vi) Total power drawn during starting
      vii) Total power drawn during running.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Explain with diagram, working of capacitor start motor.

   b) Explain with diagram speed control of 3 phase induction motor by changing the applied voltage.

   c) Describe the characteristics of different classes of squirrel cage motors.

   d) Explain equivalent circuit of double cage induction motor.

   e) In a double cage induction motor, if the outer cage has an equivalent impedance at stand still of (2+j2) ohm and the inner cage an equivalent impedance of (5+j5) ohm, determine the slip at which the two cages develop equal torques.

5. Solve **any two** : **(8×2=16)**

   a) Explain construction, operation, characteristics and applications of single phase induction AC series motor.

   b) Explain with diagram different methods of starting 3 phase squirrel cage motor.

   c) A 3 phase squirrel cage induction motor takes a starting current 6 times the full load current. Find the starting torque as a percentage of full load torque if the motor is started :
      i) Direct online
      ii) Through star-delta starter, the full load slip of the motor is 0.04.

SLR-VB – 384

Seat No.	

Set **R**

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

Day and Date : Thursday, 18-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The winding of a 4 pole, 3 phase alternator having 36 slots and coil span of 7 slots is short pitched by _____ degrees.
a) 140 b) 80 c) 40 d) 20

2) If load angle of a 4 pole synchronous motor is 8 degrees electrical, its value in mechanical degrees is _____
a) 4 b) 2 c) 8 d) 6

3) The 'V' curves of a synchronous motor gives plot/relation between _____
a) armature current and supply voltage
b) field current and power factor
c) field current and armature current
d) field current and back e.m.f.

4) The slip of an induction motor is defined as the ratio of _____
a) stator Cu loss/rotor input b) rotor Cu loss/rotor input
c) rotor Cu loss/stator Cu loss d) rotor Cu loss/rotor output

5) A 6 pole, 50 Hz, 3 phase I. M. is running at 950 r.p.m. and has rotor Cu loss of 5 KW. Its rotor input is _____ KW.
a) 10 b) 95 c) 90 d) 100

6) The efficiency of a 3 phase induction motor is approximately proportional to _____
a) 1 – S b) S c) N_s d) N_r

7) The principle of operation of a 3 phase induction motor is most similar to that of a _____
   a) single phase induction motor
   b) synchronous motor
   c) transformer with shorted secondary
   d) none of these

8) If the stator voltage of a 3 phase induction motor is reduced by 10%, the torque of motor will decrease by _____
   a) 10% b) 20% c) 40% d) 5%

9) A permanent split single phase capacitor motor does not have _____
   a) squirrel cage rotor b) starting winding
   c) centrifugal switch d) high power factor

10) Capacitor start and run, single phase induction motor is basically a _____
   a) 1 phase induction motor b) 3 phase induction motor
   c) 2 phase induction motor d) none of these

11) The power factor of an alternator is determined by its _____
   a) speed b) excitation c) load d) prime mover

12) For successful parallel operation of two 3 phase alternators must have the same _____
   a) voltage rating b) speed c) excitation d) KVA rating

13) In a 3 phase star connected alternator, field current of 50A produces a full load armature current of 200A on short circuit and 1730V per phase on open circuit, then its value of synchronous impedance is _____ ohm.
   a) 8.75 b) 4 c) 5 d) 34.6

14) Damper winding placed in the rotor pole faces of an alternator help in reducing the hunting effect _____
   a) only at synchronous speed
   b) above synchronous speed
   c) below synchronous speed
   d) none of the above

_____

SLR-VB – 384

Seat No.	

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

Day and Date : Thursday, 18-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain the principle of operation of 3 phase induction motor.
   b) Derive the expression for rotor current frequency of 3 phase induction motor.
   c) Explain effect of slip on the rotor circuit of 3 phase induction motor.
   d) Derive expression for rotor current and power factor at stand still and at running for 3 phase induction motor.
   e) A 500 HP, 3 phase, 440 V, 50 Hz induction motor as a speed of 950 rpm on full load. The machine has 6 poles. Calculate the full load slip. How many cycles will the rotor voltage make per minute ?

3. Solve **any two** : **(8×2=16)**
   a) Draw and explain torque slip characteristics of 3 phase induction motor.
   b) Explain double field revolving theory for single phase induction motor.
   c) A 0.5 HP, 230 V, single phase induction motor (split phase) takes a current of 4.2 A lagging the voltage by 10° for starting winding and a current of 6.2 A lagging the voltage by 40° for its main winding.

      Find :
      i) Total current and power factor at the time of starting
      ii) Total current and power factor during running
      iii) Phase angle between the main winding current and starting winding current.
      iv) Power drawn by starting winding
      v) Power drawn by main winding
      vi) Total power drawn during starting
      vii) Total power drawn during running.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Explain with diagram, working of capacitor start motor.

   b) Explain with diagram speed control of 3 phase induction motor by changing the applied voltage.

   c) Describe the characteristics of different classes of squirrel cage motors.

   d) Explain equivalent circuit of double cage induction motor.

   e) In a double cage induction motor, if the outer cage has an equivalent impedance at stand still of (2+j2) ohm and the inner cage an equivalent impedance of (5+j5) ohm, determine the slip at which the two cages develop equal torques.

5. Solve **any two** : **(8×2=16)**

   a) Explain construction, operation, characteristics and applications of single phase induction AC series motor.

   b) Explain with diagram different methods of starting 3 phase squirrel cage motor.

   c) A 3 phase squirrel cage induction motor takes a starting current 6 times the full load current. Find the starting torque as a percentage of full load torque if the motor is started :
      i) Direct online
      ii) Through star-delta starter, the full load slip of the motor is 0.04.

SLR-VB – 384

Seat No.	

Set S

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

Day and Date : Thursday, 18-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The efficiency of a 3 phase induction motor is approximately proportional to _____
a) 1 – S b) S c) N_s d) N_r

2) The principle of operation of a 3 phase induction motor is most similar to that of a _____
a) single phase induction motor
b) synchronous motor
c) transformer with shorted secondary
d) none of these

3) If the stator voltage of a 3 phase induction motor is reduced by 10%, the torque of motor will decrease by _____
a) 10% b) 20% c) 40% d) 5%

4) A permanent split single phase capacitor motor does not have _____
a) squirrel cage rotor b) starting winding
c) centrifugal switch d) high power factor

5) Capacitor start and run, single phase induction motor is basically a _____
a) 1 phase induction motor b) 3 phase induction motor
c) 2 phase induction motor d) none of these

6) The power factor of an alternator is determined by its _____
a) speed b) excitation c) load d) prime mover

7) For successful parallel operation of two 3 phase alternators must have the same _____
   a) voltage rating b) speed c) excitation d) KVA rating

8) In a 3 phase star connected alternator, field current of 50A produces a full load armature current of 200A on short circuit and 1730V per phase on open circuit, then its value of synchronous impedance is _____ ohm.
   a) 8.75 b) 4 c) 5 d) 34.6

9) Damper winding placed in the rotor pole faces of an alternator help in reducing the hunting effect _____
   a) only at synchronous speed
   b) above synchronous speed
   c) below synchronous speed
   d) none of the above

10) The winding of a 4 pole, 3 phase alternator having 36 slots and coil span of 7 slots is short pitched by _____ degrees.
   a) 140 b) 80 c) 40 d) 20

11) If load angle of a 4 pole synchronous motor is 8 degrees electrical, its value in mechanical degrees is _____
   a) 4 b) 2 c) 8 d) 6

12) The 'V' curves of a synchronous motor gives plot/relation between _____
   a) armature current and supply voltage
   b) field current and power factor
   c) field current and armature current
   d) field current and back e.m.f.

13) The slip of an induction motor is defined as the ratio of _____
   a) stator Cu loss/rotor input b) rotor Cu loss/rotor input
   c) rotor Cu loss/stator Cu loss d) rotor Cu loss/rotor output

14) A 6 pole, 50 Hz, 3 phase I. M. is running at 950 r.p.m. and has rotor Cu loss of 5 KW. Its rotor input is _____ KW.
   a) 10 b) 95 c) 90 d) 100

_____

SLR-VB – 384

Seat No.	

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

Day and Date : Thursday, 18-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** the suitable data **whenever** necessary.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain the principle of operation of 3 phase induction motor.
   b) Derive the expression for rotor current frequency of 3 phase induction motor.
   c) Explain effect of slip on the rotor circuit of 3 phase induction motor.
   d) Derive expression for rotor current and power factor at stand still and at running for 3 phase induction motor.
   e) A 500 HP, 3 phase, 440 V, 50 Hz induction motor as a speed of 950 rpm on full load. The machine has 6 poles. Calculate the full load slip. How many cycles will the rotor voltage make per minute ?

3. Solve **any two** : **(8×2=16)**
   a) Draw and explain torque slip characteristics of 3 phase induction motor.
   b) Explain double field revolving theory for single phase induction motor.
   c) A 0.5 HP, 230 V, single phase induction motor (split phase) takes a current of 4.2 A lagging the voltage by 10° for starting winding and a current of 6.2 A lagging the voltage by 40° for its main winding.

      Find :
      i) Total current and power factor at the time of starting
      ii) Total current and power factor during running
      iii) Phase angle between the main winding current and starting winding current.
      iv) Power drawn by starting winding
      v) Power drawn by main winding
      vi) Total power drawn during starting
      vii) Total power drawn during running.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Explain with diagram, working of capacitor start motor.

   b) Explain with diagram speed control of 3 phase induction motor by changing the applied voltage.

   c) Describe the characteristics of different classes of squirrel cage motors.

   d) Explain equivalent circuit of double cage induction motor.

   e) In a double cage induction motor, if the outer cage has an equivalent impedance at stand still of (2+j2) ohm and the inner cage an equivalent impedance of (5+j5) ohm, determine the slip at which the two cages develop equal torques.

5. Solve **any two** : **(8×2=16)**

   a) Explain construction, operation, characteristics and applications of single phase induction AC series motor.

   b) Explain with diagram different methods of starting 3 phase squirrel cage motor.

   c) A 3 phase squirrel cage induction motor takes a starting current 6 times the full load current. Find the starting torque as a percentage of full load torque if the motor is started :
      i) Direct online
      ii) Through star-delta starter, the full load slip of the motor is 0.04.

SLR-VB – 385

Seat No.	

Set **P**

S.E. (E&E) (Part – II) (CGPA) Examination, 2017
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Saturday, 20-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The most preferred material for the control spring is
   a) German silver b) Platinum silver c) Silicon bronze d) Phosphor bronze

2) If the instrument is to have a wide range, the instrument should have
   a) Linear scale b) Square-law scale
   c) Exponential scale d) Logarithmic scale

3) One international ohm is equal to
   a) 1.00049 absolute ohm b) 0.99951 absolute ohm
   c) 0.969 absolute ohm d) 1.049 absolute ohm

4) The resistance can be measured most accurately by
   a) Voltmeter-ammeter method b) Bridge method
   c) Multimeter d) Megger

5) The shunt used in milliammeter
   a) will extend the range and reduce the meter resistance
   b) will extend the range and increase the meter resistance
   c) will decrease the range and meter resistance
   d) will not affect the meter

6) PMMC type instruments normally use
   a) Air friction damping b) Fluid friction damping
   c) Eddy current damping d) None of the above

7) The full-scale deflection current of an ammeter is 1 mA and its internal resistance is 100 Ohm. If this meter is to have full deflection at 5A, what is the value of the shunt resistance to be used ?
   a) 49.99 Ohms b) 1/49.99 Ohms c) 1 Ohm d) 2 Ohms

P.T.O.

8) The disc of an instrument using eddy current damping should be of
   a) conducting and magnetic material
   b) non-conducting and magnetic material
   c) conducting and non-magnetic material
   d) none of the above

9) The function of shunt in an ammeter is to
   a) by pass the current
   b) increase the sensitivity of the ammeter
   c) increase the resistance of ammeter
   d) none of the above

10) Two voltmeters have the same range 0 – 400 V. The internal impedance are 30,000 Ohms and 20,000 Ohms. If they are connected in series and 600 V be applied across them, the readings are
   a) 360 V and 240 V
   b) 300 V each
   c) 400 V and 200 V
   d) One of the meters out of the range and other 100 V

11) 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

12) The multiplier and the meter coil in a voltmeter are in
   a) series
   b) parallel
   c) series-parallel
   d) none of the above

13) The application of LVDT is
   a) Joint motion
   b) Finger movement
   c) Limb movement
   d) Heart wall motion

14) The resistance in the circuit of the moving coil of a dynamometer wattmeter should be
   a) almost zero
   b) low
   c) high
   d) none of the above

SLR-VB – 385

Seat No.	

S.E. (E&E) (Part – II) (CGPA) Examination, 2017
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Saturday, 20-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(Four marks each)**

a) How many base and supplementary units exists in S.I. system ? Give their definitions.

b) Explain briefly with the help of circuit diagram Kelvin's double bridge for measurement of low resistance.

c) Derive the equations for calculations of shunts and multipliers.

d) 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.

e) Two wattmeter 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 when both the readings are positive.

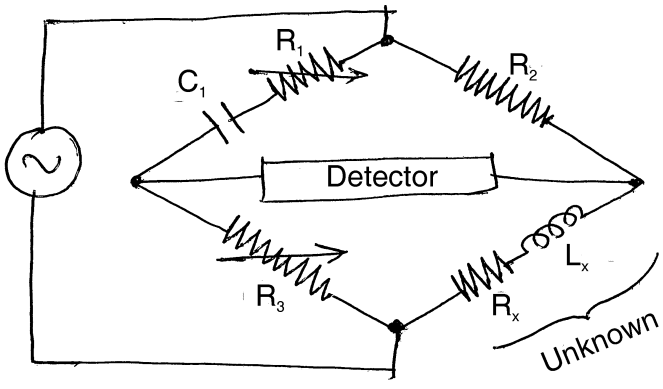
f) The meter reads 1 kWh = 15000 revolutions. In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in the circuit.

3. Solve the following : **(Six marks each)**

a) A Maxwell bridge is used to measure an inductive impedance. The bridge constants at balance are :

R_1 = 235 K Ohm, C_1 = 0.012 μF, R_2 = 2.5 K Ohm, R_3 = 50 K Ohm.

Find the series equivalent of the unknown impedance.



OR

Set P

An inductive load takes a current of 2.5 A. A non-inductive resistor connected in parallel takes 2.4 amp. When connected across 250 v supply. The total current taken from the supply is 4.5 A. Calculate :

1) Power absorbed by the load
2) Load impedance
3) Power factor of the load.

b) What are the limitations of Wheatstone bridge ? Explain Wheatstone bridge for the measurement of an unknown resistance.

SECTION – II

4. Solve **any four** : **(Four marks each)**

a) A circuit consisting of an unknown coil, a resistance and a variable capacitor connected in series is tuned to resonance using a Q meter. If the frequency is 400 KHz, the resonating capacitor is set at 220 pf., the resistance is 0.8 ohm and the Q meter indicates 110, determine the effective inductance and resistance of the unknown coil.

b) Write a short note on Lissajous patterns for measurement of frequency.

c) What are the operating principles of LCD display ?

d) Write a short note on phase sequence indicator.

e) Give in detail classification of temperature measuring instruments.

f) Explain construction and working of electro-dynamometer single-phase power factor meter.

5. Solve **any two** : **(Six marks each)**

a) With the help of neat sketch explain the front panel details of a typical dual trace oscilloscope.

b) Explain briefly photo conductive and photo-voltaic cells.

c) Explain briefly with neat diagram the working of following instruments :

1) Ramp type digital voltmeter.
2) Integrating type digital voltmeter.

———————————

SLR-VB – 385

Seat No.	

Set **Q**

S.E. (E&E) (Part – II) (CGPA) Examination, 2017
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Saturday, 20-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The disc of an instrument using eddy current damping should be of
   a) conducting and magnetic material
   b) non-conducting and magnetic material
   c) conducting and non-magnetic material
   d) none of the above

2) The function of shunt in an ammeter is to
   a) by pass the current
   b) increase the sensitivity of the ammeter
   c) increase the resistance of ammeter
   d) none of the above

3) Two voltmeters have the same range 0 – 400 V. The internal impedance are 30,000 Ohms and 20,000 Ohms. If they are connected in series and 600 V be applied across them, the readings are
   a) 360 V and 240 V
   b) 300 V each
   c) 400 V and 200 V
   d) One of the meters out of the range and other 100 V

4) 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

5) The multiplier and the meter coil in a voltmeter are in
   a) series b) parallel
   c) series-parallel d) none of the above

P.T.O.

6) The application of LVDT is
   a) Joint motion b) Finger movement
   c) Limb movement d) Heart wall motion

7) The resistance in the circuit of the moving coil of a dynamometer wattmeter should be
   a) almost zero b) low
   c) high d) none of the above

8) The most preferred material for the control spring is
   a) German silver b) Platinum silver c) Silicon bronze d) Phosphor bronze

9) If the instrument is to have a wide range, the instrument should have
   a) Linear scale b) Square-law scale
   c) Exponential scale d) Logarithmic scale

10) One international ohm is equal to
   a) 1.00049 absolute ohm b) 0.99951 absolute ohm
   c) 0.969 absolute ohm d) 1.049 absolute ohm

11) The resistance can be measured most accurately by
   a) Voltmeter-ammeter method b) Bridge method
   c) Multimeter d) Megger

12) The shunt used in milliammeter
   a) will extend the range and reduce the meter resistance
   b) will extend the range and increase the meter resistance
   c) will decrease the range and meter resistance
   d) will not affect the meter

13) PMMC type instruments normally use
   a) Air friction damping b) Fluid friction damping
   c) Eddy current damping d) None of the above

14) The full-scale deflection current of an ammeter is 1 mA and its internal resistance is 100 Ohm. If this meter is to have full deflection at 5A, what is the value of the shunt resistance to be used ?
   a) 49.99 Ohms b) 1/49.99 Ohms c) 1 Ohm d) 2 Ohms

SLR-VB – 385

Seat No.	

S.E. (E&E) (Part – II) (CGPA) Examination, 2017
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Saturday, 20-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(Four marks each)**

a) How many base and supplementary units exists in S.I. system ? Give their definitions.

b) Explain briefly with the help of circuit diagram Kelvin's double bridge for measurement of low resistance.

c) Derive the equations for calculations of shunts and multipliers.

d) 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.

e) Two wattmeter 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 when both the readings are positive.

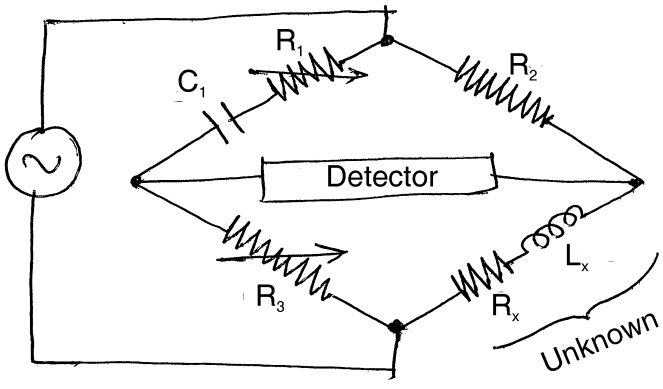
f) The meter reads 1 kWh = 15000 revolutions. In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in the circuit.

3. Solve the following : **(Six marks each)**

a) A Maxwell bridge is used to measure an inductive impedance. The bridge constants at balance are :

R_1 = 235 K Ohm, C_1 = 0.012 μF, R_2 = 2.5 K Ohm, R_3 = 50 K Ohm.

Find the series equivalent of the unknown impedance.



OR

Set Q

An inductive load takes a current of 2.5 A. A non-inductive resistor connected in parallel takes 2.4 amp. When connected across 250 v supply. The total current taken from the supply is 4.5 A. Calculate :

1) Power absorbed by the load
2) Load impedance
3) Power factor of the load.

b) What are the limitations of Wheatstone bridge ? Explain Wheatstone bridge for the measurement of an unknown resistance.

SECTION – II

4. Solve **any four** : **(Four marks each)**

a) A circuit consisting of an unknown coil, a resistance and a variable capacitor connected in series is tuned to resonance using a Q meter. If the frequency is 400 KHz, the resonating capacitor is set at 220 pf., the resistance is 0.8 ohm and the Q meter indicates 110, determine the effective inductance and resistance of the unknown coil.

b) Write a short note on Lissajous patterns for measurement of frequency.

c) What are the operating principles of LCD display ?

d) Write a short note on phase sequence indicator.

e) Give in detail classification of temperature measuring instruments.

f) Explain construction and working of electro-dynamometer single-phase power factor meter.

5. Solve **any two** : **(Six marks each)**

a) With the help of neat sketch explain the front panel details of a typical dual trace oscilloscope.

b) Explain briefly photo conductive and photo-voltaic cells.

c) Explain briefly with neat diagram the working of following instruments :

1) Ramp type digital voltmeter.
2) Integrating type digital voltmeter.

———————————

SLR-VB – 385

Seat No.	

Set **R**

S.E. (E&E) (Part – II) (CGPA) Examination, 2017
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Saturday, 20-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The shunt used in milliammeter
   a) will extend the range and reduce the meter resistance
   b) will extend the range and increase the meter resistance
   c) will decrease the range and meter resistance
   d) will not affect the meter

2) PMMC type instruments normally use
   a) Air friction damping b) Fluid friction damping
   c) Eddy current damping d) None of the above

3) The full-scale deflection current of an ammeter is 1 mA and its internal resistance is 100 Ohm. If this meter is to have full deflection at 5A, what is the value of the shunt resistance to be used ?
   a) 49.99 Ohms b) 1/49.99 Ohms c) 1 Ohm d) 2 Ohms

4) The disc of an instrument using eddy current damping should be of
   a) conducting and magnetic material
   b) non-conducting and magnetic material
   c) conducting and non-magnetic material
   d) none of the above

5) The function of shunt in an ammeter is to
   a) by pass the current
   b) increase the sensitivity of the ammeter
   c) increase the resistance of ammeter
   d) none of the above

P.T.O.

6) Two voltmeters have the same range 0 – 400 V. The internal impedance are 30,000 Ohms and 20,000 Ohms. If they are connected in series and 600 V be applied across them, the readings are
   a) 360 V and 240 V
   b) 300 V each
   c) 400 V and 200 V
   d) One of the meters out of the range and other 100 V

7) 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

8) The multiplier and the meter coil in a voltmeter are in
   a) series b) parallel
   c) series-parallel d) none of the above

9) The application of LVDT is
   a) Joint motion b) Finger movement
   c) Limb movement d) Heart wall motion

10) The resistance in the circuit of the moving coil of a dynamometer wattmeter should be
   a) almost zero b) low
   c) high d) none of the above

11) The most preferred material for the control spring is
   a) German silver b) Platinum silver c) Silicon bronze d) Phosphor bronze

12) If the instrument is to have a wide range, the instrument should have
   a) Linear scale b) Square-law scale
   c) Exponential scale d) Logarithmic scale

13) One international ohm is equal to
   a) 1.00049 absolute ohm b) 0.99951 absolute ohm
   c) 0.969 absolute ohm d) 1.049 absolute ohm

14) The resistance can be measured most accurately by
   a) Voltmeter-ammeter method b) Bridge method
   c) Multimeter d) Megger

SLR-VB – 385

Seat No.	

S.E. (E&E) (Part – II) (CGPA) Examination, 2017
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Saturday, 20-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(Four marks each)**

a) How many base and supplementary units exists in S.I. system ? Give their definitions.

b) Explain briefly with the help of circuit diagram Kelvin's double bridge for measurement of low resistance.

c) Derive the equations for calculations of shunts and multipliers.

d) 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.

e) Two wattmeter 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 when both the readings are positive.

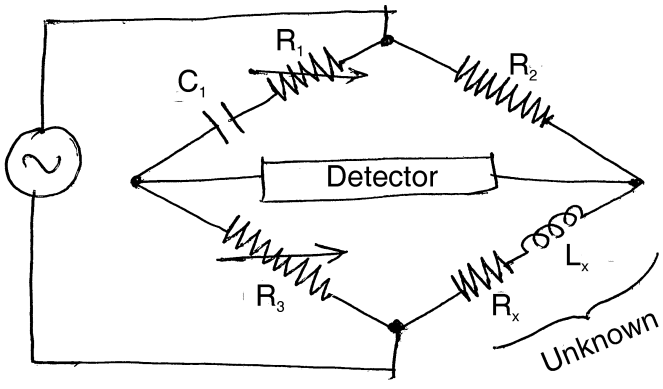
f) The meter reads 1 kWh = 15000 revolutions. In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in the circuit.

3. Solve the following : **(Six marks each)**

a) A Maxwell bridge is used to measure an inductive impedance. The bridge constants at balance are :

R_1 = 235 K Ohm, C_1 = 0.012 μF, R_2 = 2.5 K Ohm, R_3 = 50 K Ohm.

Find the series equivalent of the unknown impedance.



OR

An inductive load takes a current of 2.5 A. A non-inductive resistor connected in parallel takes 2.4 amp. When connected across 250 v supply. The total current taken from the supply is 4.5 A. Calculate :

1) Power absorbed by the load
2) Load impedance
3) Power factor of the load.

b) What are the limitations of Wheatstone bridge ? Explain Wheatstone bridge for the measurement of an unknown resistance.

SECTION – II

4. Solve **any four** : **(Four marks each)**

a) A circuit consisting of an unknown coil, a resistance and a variable capacitor connected in series is tuned to resonance using a Q meter. If the frequency is 400 KHz, the resonating capacitor is set at 220 pf., the resistance is 0.8 ohm and the Q meter indicates 110, determine the effective inductance and resistance of the unknown coil.

b) Write a short note on Lissajous patterns for measurement of frequency.

c) What are the operating principles of LCD display ?

d) Write a short note on phase sequence indicator.

e) Give in detail classification of temperature measuring instruments.

f) Explain construction and working of electro-dynamometer single-phase power factor meter.

5. Solve **any two** : **(Six marks each)**

a) With the help of neat sketch explain the front panel details of a typical dual trace oscilloscope.

b) Explain briefly photo conductive and photo-voltaic cells.

c) Explain briefly with neat diagram the working of following instruments :

1) Ramp type digital voltmeter.
2) Integrating type digital voltmeter.

———————————

SLR-VB – 385

Seat No.	

Set **S**

S.E. (E&E) (Part – II) (CGPA) Examination, 2017
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Saturday, 20-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Two voltmeters have the same range 0 – 400 V. The internal impedance are 30,000 Ohms and 20,000 Ohms. If they are connected in series and 600 V be applied across them, the readings are
   a) 360 V and 240 V
   b) 300 V each
   c) 400 V and 200 V
   d) One of the meters out of the range and other 100 V

2) 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

3) The multiplier and the meter coil in a voltmeter are in
   a) series b) parallel
   c) series-parallel d) none of the above

4) The application of LVDT is
   a) Joint motion b) Finger movement
   c) Limb movement d) Heart wall motion

5) The resistance in the circuit of the moving coil of a dynamometer wattmeter should be
   a) almost zero b) low
   c) high d) none of the above

6) The most preferred material for the control spring is
   a) German silver b) Platinum silver c) Silicon bronze d) Phosphor bronze

P.T.O.

7) If the instrument is to have a wide range, the instrument should have
   a) Linear scale
   b) Square-law scale
   c) Exponential scale
   d) Logarithmic scale

8) One international ohm is equal to
   a) 1.00049 absolute ohm
   b) 0.99951 absolute ohm
   c) 0.969 absolute ohm
   d) 1.049 absolute ohm

9) The resistance can be measured most accurately by
   a) Voltmeter-ammeter method
   b) Bridge method
   c) Multimeter
   d) Megger

10) The shunt used in milliammeter
   a) will extend the range and reduce the meter resistance
   b) will extend the range and increase the meter resistance
   c) will decrease the range and meter resistance
   d) will not affect the meter

11) PMMC type instruments normally use
   a) Air friction damping
   b) Fluid friction damping
   c) Eddy current damping
   d) None of the above

12) The full-scale deflection current of an ammeter is 1 mA and its internal resistance is 100 Ohm. If this meter is to have full deflection at 5A, what is the value of the shunt resistance to be used ?
   a) 49.99 Ohms b) 1/49.99 Ohms c) 1 Ohm d) 2 Ohms

13) The disc of an instrument using eddy current damping should be of
   a) conducting and magnetic material
   b) non-conducting and magnetic material
   c) conducting and non-magnetic material
   d) none of the above

14) The function of shunt in an ammeter is to
   a) by pass the current
   b) increase the sensitivity of the ammeter
   c) increase the resistance of ammeter
   d) none of the above

SLR-VB – 385

Seat No.	

S.E. (E&E) (Part – II) (CGPA) Examination, 2017
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Saturday, 20-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(Four marks each)**

a) How many base and supplementary units exists in S.I. system ? Give their definitions.

b) Explain briefly with the help of circuit diagram Kelvin's double bridge for measurement of low resistance.

c) Derive the equations for calculations of shunts and multipliers.

d) 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.

e) Two wattmeter 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 when both the readings are positive.

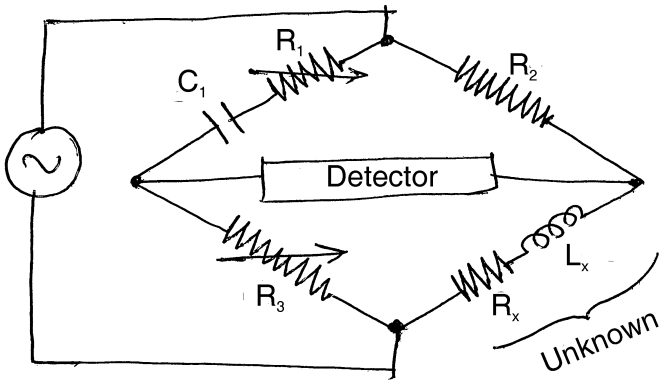
f) The meter reads 1 kWh = 15000 revolutions. In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in the circuit.

3. Solve the following : **(Six marks each)**

a) A Maxwell bridge is used to measure an inductive impedance. The bridge constants at balance are :

R_1 = 235 K Ohm, C_1 = 0.012 μF, R_2 = 2.5 K Ohm, R_3 = 50 K Ohm.

Find the series equivalent of the unknown impedance.



OR

An inductive load takes a current of 2.5 A. A non-inductive resistor connected in parallel takes 2.4 amp. When connected across 250 v supply. The total current taken from the supply is 4.5 A. Calculate :

1) Power absorbed by the load
2) Load impedance
3) Power factor of the load.

b) What are the limitations of Wheatstone bridge ? Explain Wheatstone bridge for the measurement of an unknown resistance.

SECTION – II

4. Solve **any four** : **(Four marks each)**

a) A circuit consisting of an unknown coil, a resistance and a variable capacitor connected in series is tuned to resonance using a Q meter. If the frequency is 400 KHz, the resonating capacitor is set at 220 pf., the resistance is 0.8 ohm and the Q meter indicates 110, determine the effective inductance and resistance of the unknown coil.

b) Write a short note on Lissajous patterns for measurement of frequency.

c) What are the operating principles of LCD display ?

d) Write a short note on phase sequence indicator.

e) Give in detail classification of temperature measuring instruments.

f) Explain construction and working of electro-dynamometer single-phase power factor meter.

5. Solve **any two** : **(Six marks each)**

a) With the help of neat sketch explain the front panel details of a typical dual trace oscilloscope.

b) Explain briefly photo conductive and photo-voltaic cells.

c) Explain briefly with neat diagram the working of following instruments :

1) Ramp type digital voltmeter.
2) Integrating type digital voltmeter.

———————————

SLR-VB – 386

Seat No.	

Set **P**

S.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 23-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) **All** questions are **compulsory**.*
*4) Figures to **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) Useful property of unit impulse $\delta(t)$ is that
   a) $\delta(at)$ b) $\delta(at) = \delta(t)$
   c) $\delta(at) = \frac{1}{a}\delta(t)$ d) $\delta(at) = [\delta(t)]^a$

2) Speech signal as a function of time is
   a) DT signal b) Digital signal
   c) CT signal d) Discrete signal

3) Consider a $x(t) = e^{-at}$ where a is any real number it is a
   a) Energy signal b) Power signal
   c) Neither energy nor power d) Both a) and b)

4) Adders, multipliers and delay elements are used in realization of
   a) CT LTI systems b) DT LTI systems
   c) Both d) None

5) A system characterized by the equation $y(t) = ax(t) + b$
   a) Linear for any value of b b) Linear if $b < 0$
   c) Linear if $b > 0$ d) Non linear

P.T.O.

6) If $\delta(t)$ denotes unit impulse then Laplace transform of $\frac{d^2\delta(t)}{dt^2}$ will be

a) 1 b) S^2 c) s d) S^{-2}

7) If $X_1(t) = X_2(t) = u(t)$ then $X_1(t) * X_2(t) =$

a) u(t) b) $u(t^2)$ c) tu(t) d) $t^2/t.u(t)$

8) A signal is reconstructed significantly if sampling frequency is _____ of signal frequency.

a) Greater than b) Less than
c) Greater than twice d) Less than twice

9) If x(t) on Fourier transform produces $X(j\omega)$, then x(– t) will produce

a) $X(j\omega)$ b) $X(-j\omega)$ c) $1/X(j\omega)$ d) $-X(j\omega)$

10) If $x(t) = (0.5)^2.\text{Cos}(400\pi t + 120)$ is effectively sampled at

a) 400 Hz b) 120 Hz c) 240 Hz d) 0.5 Hz

11) Z/(Z– 1) is the Z transform of

a) Unit step b) Random signal
c) Ramp signal d) Unit impulse

12) Interpolator is used in

a) Reconstruction b) Sampling c) Filtering d) Aliasing

13) Convolution of x(t) and y(t) in frequency domain is

a) $x(j\omega) + y(j\omega)$ b) $x(j\omega) - y(j\omega)$ c) $x(j\omega)\cdot y(j\omega)$ d) $x(j\omega)/y(j\omega)$

14) The unit impulse signal has Z transform

a) Z b) (Z – 1) c) 1 d) 1/(Z – 1)

_____

SLR-VB – 386

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 23-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

2. Solve **any four** of the followings : **(4×4=16)**

1) State and prove necessary and sufficient condition of stability of LSI system.

2) Check whether the following system is static or dynamic and causal or non-causal $Y(n) = x(n)x(n-1)$.

3) Explain SISO and MIMO systems.

4) Define natural response and forced response of the system.

5) Test the stability of the system for an impulse response $h(t) = te^{-6t}u(t)$.

3. Solve **any two** of the followings : **(2×6=12)**

1) Check whether following system $y(n) = odd[x(n)]$ is
   i) Static or dynamic
   ii) Linear or non-linear
   iii) Stable or unstable
   iv) Shift variant or shift invariant.

2) How to represent a differential equation in the forms of block diagram ? What are the elements associated with representation ? Explain with suitable example.

3) Distinguish between energy and power signal, identify the signal $x(t) = e^{-3t}u(t)$ as energy or power.

4. Solve **any three** : **(4×3=12)**

   a) What do you mean by R.O.C. ? Explain its significance.

   b) Explain sampling theorem and its implication.

   c) Find 4 point DFT of x(n) = {1, – 2, 3, 4}.

   d) Explain in detail, the relation between CT and DT system.

5. Attempt **any two** : **(8×2=16)**

   i) A signal $x(t) = 10 \cos(10 \pi t)$ is sampled at 8 samples per second. Plot the amplitude spectrum for $|\Omega| \leq 30\pi$. Can the original signal be recovered ? Explain.

   ii) Find IZT if $X(z) = (1 + 2Z^{-1})/(1 - 2Z^{-1} + Z^{-2})$

   iii) Show that convolution in time domain is equal to the multiplication in frequency domain.

———————

SLR-VB – 386

Seat No.	

Set Q

S.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 23-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) **All** questions are **compulsory**.*
*4) Figures to **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) A signal is reconstructed significantly if sampling frequency is _____ of signal frequency.
   a) Greater than b) Less than
   c) Greater than twice d) Less than twice

2) If x(t) on Fourier transform produces $X(j\omega)$, then x(– t) will produce
   a) $X(j\omega)$ b) $X(-j\omega)$ c) $1/X(j\omega)$ d) $-X(j\omega)$

3) If $x(t) = (0.5)^2.\text{Cos}(400\pi t + 120)$ is effectively sampled at
   a) 400 Hz b) 120 Hz c) 240 Hz d) 0.5 Hz

4) Z/(Z– 1) is the Z transform of
   a) Unit step b) Random signal
   c) Ramp signal d) Unit impulse

5) Interpolator is used in
   a) Reconstruction b) Sampling c) Filtering d) Aliasing

6) Convolution of x(t) and y(t) in frequency domain is
   a) $x(j\omega) + y(j\omega)$ b) $x(j\omega) - y(j\omega)$ c) $x(j\omega)\cdot y(j\omega)$ d) $x(j\omega)/y(j\omega)$

7) The unit impulse signal has Z transform
   a) Z b) (Z – 1) c) 1 d) 1/(Z – 1)

P.T.O.

8) Useful property of unit impulse $\delta(t)$ is that
   a) $\delta(at)$ b) $\delta(at) = \delta(t)$
   c) $\delta(at) = \frac{1}{a}\delta(t)$ d) $\delta(at) = [\delta(t)]^a$

9) Speech signal as a function of time is
   a) DT signal b) Digital signal
   c) CT signal d) Discrete signal

10) Consider a $x(t) = e^{-at}$ where a is any real number it is a
   a) Energy signal b) Power signal
   c) Neither energy nor power d) Both a) and b)

11) Adders, multipliers and delay elements are used in realization of
   a) CT LTI systems b) DT LTI systems
   c) Both d) None

12) A system characterized by the equation $y(t) = ax(t) + b$
   a) Linear for any value of b b) Linear if $b < 0$
   c) Linear if $b > 0$ d) Non linear

13) If $\delta(t)$ denotes unit impulse then Laplace transform of $\frac{d^2\delta(t)}{dt^2}$ will be
   a) 1 b) S^2 c) s d) S^{-2}

14) If $X_1(t) = X_2(t) = u(t)$ then $X_1(t) * X_2(t) =$
   a) u(t) b) $u(t^2)$ c) tu(t) d) $t^2/t.u(t)$

SLR-VB – 386

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 23-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

2. Solve **any four** of the followings : **(4×4=16)**

1) State and prove necessary and sufficient condition of stability of LSI system.

2) Check whether the following system is static or dynamic and causal or non-causal $Y(n) = x(n)x(n-1)$.

3) Explain SISO and MIMO systems.

4) Define natural response and forced response of the system.

5) Test the stability of the system for an impulse response $h(t) = te^{-6t}u(t)$.

3. Solve **any two** of the followings : **(2×6=12)**

1) Check whether following system $y(n) = odd[x(n)]$ is
   i) Static or dynamic
   ii) Linear or non-linear
   iii) Stable or unstable
   iv) Shift variant or shift invariant.

2) How to represent a differential equation in the forms of block diagram ? What are the elements associated with representation ? Explain with suitable example.

3) Distinguish between energy and power signal, identify the signal $x(t) = e^{-3t}u(t)$ as energy or power.

Set Q

4. Solve **any three** : **(4×3=12)**

   a) What do you mean by R.O.C. ? Explain its significance.

   b) Explain sampling theorem and its implication.

   c) Find 4 point DFT of x(n) = {1, – 2, 3, 4}.

   d) Explain in detail, the relation between CT and DT system.

5. Attempt **any two** : **(8×2=16)**

   i) A signal x(t) = 10 cos(10 π t) is sampled at 8 samples per second. Plot the amplitude spectrum for $|\Omega| \leq 30\pi$. Can the original signal be recovered ? Explain.

   ii) Find IZT if $X(z) = (1 + 2Z^{-1})/(1 - 2Z^{-1} + Z^{-2})$

   iii) Show that convolution in time domain is equal to the multiplication in frequency domain.

———————————

SLR-VB – 386

Seat No.	

Set R

S.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 23-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) **All** questions are **compulsory**.*
*4) Figures to **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) A system characterized by the equation $y(t) = ax(t) + b$
   a) Linear for any value of b b) Linear if $b < 0$
   c) Linear if $b > 0$ d) Non linear

2) If $\delta(t)$ denotes unit impulse then Laplace transform of $\frac{d^2\delta(t)}{dt^2}$ will be
   a) 1 b) S^2 c) s d) S^{-2}

3) If $X_1(t) = X_2(t) = u(t)$ then $X_1(t) * X_2(t) =$
   a) u(t) b) $u(t^2)$ c) tu(t) d) $t^2/t.u(t)$

4) A signal is reconstructed significantly if sampling frequency is _____ of signal frequency.
   a) Greater than b) Less than
   c) Greater than twice d) Less than twice

5) If x(t) on Fourier transform produces $X(j\omega)$, then $x(-t)$ will produce
   a) $X(j\omega)$ b) $X(-j\omega)$ c) $1/X(j\omega)$ d) $-X(j\omega)$

6) If $x(t) = (0.5)^2.\text{Cos}(400\pi t + 120)$ is effectively sampled at
   a) 400 Hz b) 120 Hz c) 240 Hz d) 0.5 Hz

P.T.O.

7) Z/(Z– 1) is the Z transform of
   a) Unit step b) Random signal
   c) Ramp signal d) Unit impulse

8) Interpolator is used in
   a) Reconstruction b) Sampling c) Filtering d) Aliasing

9) Convolution of x(t) and y(t) in frequency domain is
   a) $x(j\omega) + y(j\omega)$ b) $x(j\omega) - y(j\omega)$ c) $x(j\omega)\cdot y(j\omega)$ d) $x(j\omega)/y(j\omega)$

10) The unit impulse signal has Z transform
   a) Z b) (Z – 1) c) 1 d) 1/(Z – 1)

11) Useful property of unit impulse $\delta(t)$ is that
   a) $\delta(at)$ b) $\delta(at) = \delta(t)$
   c) $\delta(at) = \frac{1}{a}\delta(t)$ d) $\delta(at) = [\delta(t)]^a$

12) Speech signal as a function of time is
   a) DT signal b) Digital signal
   c) CT signal d) Discrete signal

13) Consider a $x(t) = e^{-at}$ where a is any real number it is a
   a) Energy signal b) Power signal
   c) Neither energy nor power d) Both a) and b)

14) Adders, multipliers and delay elements are used in realization of
   a) CT LTI systems b) DT LTI systems
   c) Both d) None

———————

SLR-VB – 386

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 23-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

2. Solve **any four** of the followings : **(4×4=16)**

1) State and prove necessary and sufficient condition of stability of LSI system.

2) Check whether the following system is static or dynamic and causal or non-causal $Y(n) = x(n)x(n-1)$.

3) Explain SISO and MIMO systems.

4) Define natural response and forced response of the system.

5) Test the stability of the system for an impulse response $h(t) = te^{-6t}u(t)$.

3. Solve **any two** of the followings : **(2×6=12)**

1) Check whether following system $y(n) = odd[x(n)]$ is
   i) Static or dynamic
   ii) Linear or non-linear
   iii) Stable or unstable
   iv) Shift variant or shift invariant.

2) How to represent a differential equation in the forms of block diagram ? What are the elements associated with representation ? Explain with suitable example.

3) Distinguish between energy and power signal, identify the signal $x(t) = e^{-3t}u(t)$ as energy or power.

4. Solve **any three** : **(4×3=12)**

   a) What do you mean by R.O.C. ? Explain its significance.

   b) Explain sampling theorem and its implication.

   c) Find 4 point DFT of x(n) = {1, – 2, 3, 4}.

   d) Explain in detail, the relation between CT and DT system.

5. Attempt **any two** : **(8×2=16)**

   i) A signal x(t) = 10 cos(10 π t) is sampled at 8 samples per second. Plot the amplitude spectrum for $|\Omega| \leq 30\pi$. Can the original signal be recovered ? Explain.

   ii) Find IZT if $X(z) = (1 + 2Z^{-1})/(1 - 2Z^{-1} + Z^{-2})$

   iii) Show that convolution in time domain is equal to the multiplication in frequency domain.

———————————

SLR-VB – 386

Seat No.	

Set S

S.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 23-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions**: 1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
*2) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
*3) **All** questions are **compulsory**.*
*4) Figures to **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) If $x(t) = (0.5)^2.\text{Cos}(400\pi t + 120)$ is effectively sampled at
a) 400 Hz b) 120 Hz c) 240 Hz d) 0.5 Hz

2) Z/(Z– 1) is the Z transform of
a) Unit step b) Random signal
c) Ramp signal d) Unit impulse

3) Interpolator is used in
a) Reconstruction b) Sampling c) Filtering d) Aliasing

4) Convolution of x(t) and y(t) in frequency domain is
a) $x(j\omega) + y(j\omega)$ b) $x(j\omega) - y(j\omega)$ c) $x(j\omega)\cdot y(j\omega)$ d) $x(j\omega)/y(j\omega)$

5) The unit impulse signal has Z transform
a) Z b) (Z – 1) c) 1 d) 1/(Z – 1)

6) Useful property of unit impulse $\delta(t)$ is that
a) $\delta(at)$ b) $\delta(at) = \delta(t)$
c) $\delta(at) = \frac{1}{a}\delta(t)$ d) $\delta(at) = [\delta(t)]^a$

P.T.O.

7) Speech signal as a function of time is
   a) DT signal b) Digital signal
   c) CT signal d) Discrete signal

8) Consider a $x(t) = e^{-at}$ where a is any real number it is a
   a) Energy signal b) Power signal
   c) Neither energy nor power d) Both a) and b)

9) Adders, multipliers and delay elements are used in realization of
   a) CT LTI systems b) DT LTI systems
   c) Both d) None

10) A system characterized by the equation $y(t) = ax(t) + b$
   a) Linear for any value of b b) Linear if $b < 0$
   c) Linear if $b > 0$ d) Non linear

11) If $\delta(t)$ denotes unit impulse then Laplace transform of $\frac{d^2\delta(t)}{dt^2}$ will be
   a) 1 b) S^2 c) s d) S^{-2}

12) If $X_1(t) = X_2(t) = u(t)$ then $X_1(t) * X_2(t) =$
   a) u(t) b) $u(t^2)$ c) tu(t) d) $t^2/t.u(t)$

13) A signal is reconstructed significantly if sampling frequency is _____ of signal frequency.
   a) Greater than b) Less than
   c) Greater than twice d) Less than twice

14) If x(t) on Fourier transform produces $X(j\omega)$, then $x(-t)$ will produce
   a) $X(j\omega)$ b) $X(-j\omega)$ c) $1/X(j\omega)$ d) $-X(j\omega)$

SLR-VB – 386

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – II) (CGPA) Examination, 2017
SIGNALS AND SYSTEMS

Day and Date : Tuesday, 23-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

2. Solve **any four** of the followings : **(4×4=16)**

1) State and prove necessary and sufficient condition of stability of LSI system.

2) Check whether the following system is static or dynamic and causal or non-causal $Y(n) = x(n)x(n-1)$.

3) Explain SISO and MIMO systems.

4) Define natural response and forced response of the system.

5) Test the stability of the system for an impulse response $h(t) = te^{-6t}u(t)$.

3. Solve **any two** of the followings : **(2×6=12)**

1) Check whether following system $y(n) = odd[x(n)]$ is
   i) Static or dynamic
   ii) Linear or non-linear
   iii) Stable or unstable
   iv) Shift variant or shift invariant.

2) How to represent a differential equation in the forms of block diagram ? What are the elements associated with representation ? Explain with suitable example.

3) Distinguish between energy and power signal, identify the signal $x(t) = e^{-3t}u(t)$ as energy or power.

4. Solve **any three** : **(4×3=12)**

   a) What do you mean by R.O.C. ? Explain its significance.

   b) Explain sampling theorem and its implication.

   c) Find 4 point DFT of x(n) = {1, – 2, 3, 4}.

   d) Explain in detail, the relation between CT and DT system.

5. Attempt **any two** : **(8×2=16)**

   i) A signal x(t) = 10 cos(10 π t) is sampled at 8 samples per second. Plot the amplitude spectrum for $|\Omega| \leq 30\pi$. Can the original signal be recovered ? Explain.

   ii) Find IZT if $X(z) = (1 + 2Z^{-1})/(1 - 2Z^{-1} + Z^{-2})$

   iii) Show that convolution in time domain is equal to the multiplication in frequency domain.

———————

SLR-VB – 387

Seat No.	

Set **P**

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

Day and Date : Thursday, 25-5-2017 Max. Marks : 70
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.*
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) The gray code equivalent of binary number $(11000001)_2$ is
   a) 1100001 b) 1100011 c) 1000011 d) 110101

2) Which table shows output for every possible combination of input variables ?
   a) Function table b) Truth table
   c) Routing table d) ASCII table

3) Multiplexer is represented by
   a) $2^n \times 1$ b) $2^n \times n$
   c) $n \times 2^n$ d) 1×2^n

4) A comparison between serial and parallel adder is that a serial adder
   a) is slower
   b) is faster
   c) has some speed as parallel adder
   d) is more complicated

5) The Fan-out for TTL family is
   a) 5 b) 10 c) 15 d) 20

P.T.O.

6) The logic expression for Y(A, B, C) = Σm(0, 2, 3, 6) is equivalent to
   a) Σm(1, 4, 5, 7)
   b) πM(0, 2, 3, 6)
   c) πM(1, 4, 5, 7)
   d) none

7) Simplify xy + xz + yz =
   a) xy + yz
   b) xz + yz
   c) x
   d) xy + xz

8) The basic memory element in digital circuit
   a) Consists of NAND gate
   b) Consist of NOR gate
   c) Is a flip flop
   d) Is a shift register

9) When flip flop is set, its output will be
   a) Q = 0, Q' = 0
   b) Q = 1, Q' = 0
   c) Q = 0, Q' = 1
   d) Q = 1, Q' = 1

10) A universal shift register
   a) Accepts serial input
   b) Accept parallel input
   c) Gives serial and parallel output
   d) Is capable of all of the above

11) The output frequency of mod-16 counter, clocked from a 20 KHz clock input signal is
   a) 20 KHz
   b) 52 KHz
   c) 625 Hz
   d) 1250 Hz

12) A sequential circuit with ten states will have
   a) 10 flip flops
   b) 5 flip flops
   c) 4 flip flops
   d) 0 flip flops

13) In general a sequential logic circuit consist of
   a) Only flip flops
   b) Only gates
   c) Flip flops and combinational logic circuit
   d) Only combinational logic circuits

14) Master slave configuration is used in the flip flops to
   a) Increase its clocking rate
   b) Reduce power dissipation
   c) Eliminate race around condition
   d) Improve its reliability

SLR-VB – 387

Seat No.	

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

Day and Date : Thursday, 25-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) Assume suitable data ***wherever*** *necessary.*

SECTION – I

2. Solve **any four** of the followings : **(4×4=16)**

1) Plot the K-map for EX-OR and EX-NOR function of 3, 4 variables.

2) Explain the concept of Multiplexer tree.

3) Draw and explain TTL gate.

4) Minimize the following expression in POS form

i) $f = \pi M(0, 1, 3, 4, 7)$

ii) $f = \pi M(0, 4, 6, 7, 8, 12, 13, 14, 15)$.

5) Design full subtracter using NAND gate.

3. Solve **any two** of the followings : **(2×6=12)**

1) Explain the CMOS-TTL interfacing in detail.

2) Design and explain BCD to Excess 3 Code converter.

3) Implement the following function $f(A, B, C, D) = \pi m(0, 1, 3, 4, 7, 10, 14)$ by 8×1 MUX.

SECTION – II

4. Solve **any four** of the followings : **(4×4=16)**

   1) Explain the working of Master-slave flip flops.

   2) Explain the applications of shift registers.

   3) Design a Asynchronous mod-6 counter using T flip flops.

   4) A binary ripple counter is required up to a count of $(16383)_{10}$ How many fillip flops are required ? If the clock frequency is 8.192 MHz, what is the frequency at output of the MSB.

   5) Explain the applications of counters.

5. Solve **any two** of the followings : **(2×6=12)**

   1) Define the following terms with relation to flip flop : Setup time, hold time, propagation delay time, preset, clear and transition table.

   2) Draw and explain bidirectional shift registers.

   3) Draw and explain Ring and Johnsons counters. Distinguish between them.

———————————

SLR-VB – 387

Seat No.	

Set Q

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

Day and Date : Thursday, 25-5-2017 Max. Marks : 70
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.*
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) The basic memory element in digital circuit
   a) Consists of NAND gate
   b) Consist of NOR gate
   c) Is a flip flop
   d) Is a shift register

2) When flip flop is set, its output will be
   a) Q = 0, Q' = 0 b) Q = 1, Q' = 0
   c) Q = 0, Q' = 1 d) Q = 1, Q' = 1

3) A universal shift register
   a) Accepts serial input
   b) Accept parallel input
   c) Gives serial and parallel output
   d) Is capable of all of the above

4) The output frequency of mod-16 counter, clocked from a 20 KHz clock input signal is
   a) 20 KHz b) 52 KHz
   c) 625 Hz d) 1250 Hz

P.T.O.

5) A sequential circuit with ten states will have
   a) 10 flip flops b) 5 flip flops
   c) 4 flip flops d) 0 flip flops

6) In general a sequential logic circuit consist of
   a) Only flip flops
   b) Only gates
   c) Flip flops and combinational logic circuit
   d) Only combinational logic circuits

7) Master slave configuration is used in the flip flops to
   a) Increase its clocking rate
   b) Reduce power dissipation
   c) Eliminate race around condition
   d) Improve its reliability

8) The gray code equivalent of binary number $(11000001)_2$ is
   a) 1100001 b) 1100011 c) 1000011 d) 110101

9) Which table shows output for every possible combination of input variables ?
   a) Function table b) Truth table
   c) Routing table d) ASCII table

10) Multiplexer is represented by
   a) $2^n \times 1$ b) $2^n \times n$
   c) $n \times 2^n$ d) 1×2^n

11) A comparison between serial and parallel adder is that a serial adder
   a) is slower
   b) is faster
   c) has some speed as parallel adder
   d) is more complicated

12) The Fan-out for TTL family is
   a) 5 b) 10 c) 15 d) 20

13) The logic expression for $Y(A, B, C) = \Sigma m(0, 2, 3, 6)$ is equivalent to
   a) $\Sigma m(1, 4, 5, 7)$ b) $\pi M(0, 2, 3, 6)$
   c) $\pi M(1, 4, 5, 7)$ d) none

14) Simplify xy + xz + yz =
   a) xy + yz b) xz + yz
   c) x d) xy + xz

SLR-VB – 387

Seat No.	

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

Day and Date : Thursday, 25-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) Assume suitable data ***wherever*** *necessary.*

SECTION – I

2. Solve **any four** of the followings : **(4×4=16)**

1) Plot the K-map for EX-OR and EX-NOR function of 3, 4 variables.

2) Explain the concept of Multiplexer tree.

3) Draw and explain TTL gate.

4) Minimize the following expression in POS form

i) $f = \pi M(0, 1, 3, 4, 7)$

ii) $f = \pi M(0, 4, 6, 7, 8, 12, 13, 14, 15)$.

5) Design full subtracter using NAND gate.

3. Solve **any two** of the followings : **(2×6=12)**

1) Explain the CMOS-TTL interfacing in detail.

2) Design and explain BCD to Excess 3 Code converter.

3) Implement the following function $f(A, B, C, D) = \pi m(0, 1, 3, 4, 7, 10, 14)$ by 8×1 MUX.

SECTION – II

4. Solve **any four** of the followings : **(4×4=16)**

   1) Explain the working of Master-slave flip flops.

   2) Explain the applications of shift registers.

   3) Design a Asynchronous mod-6 counter using T flip flops.

   4) A binary ripple counter is required up to a count of $(16383)_{10}$ How many fillip flops are required ? If the clock frequency is 8.192 MHz, what is the frequency at output of the MSB.

   5) Explain the applications of counters.

5. Solve **any two** of the followings : **(2×6=12)**

   1) Define the following terms with relation to flip flop : Setup time, hold time, propagation delay time, preset, clear and transition table.

   2) Draw and explain bidirectional shift registers.

   3) Draw and explain Ring and Johnsons counters. Distinguish between them.

SLR-VB – 387

Seat No.	

Set **R**

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

Day and Date : Thursday, 25-5-2017 Max. Marks : 70
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.*
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) The Fan-out for TTL family is
   a) 5 b) 10 c) 15 d) 20

2) The logic expression for Y(A, B, C) = Σm(0, 2, 3, 6) is equivalent to
   a) Σm(1, 4, 5, 7) b) πM(0, 2, 3, 6)
   c) πM(1, 4, 5, 7) d) none

3) Simplify xy + xz + yz =
   a) xy + yz b) xz + yz
   c) x d) xy + xz

4) The basic memory element in digital circuit
   a) Consists of NAND gate
   b) Consist of NOR gate
   c) Is a flip flop
   d) Is a shift register

5) When flip flop is set, its output will be
   a) Q = 0, Q' = 0 b) Q = 1, Q' = 0
   c) Q = 0, Q' = 1 d) Q = 1, Q' = 1

P.T.O.

6) A universal shift register
   a) Accepts serial input
   b) Accept parallel input
   c) Gives serial and parallel output
   d) Is capable of all of the above

7) The output frequency of mod-16 counter, clocked from a 20 KHz clock input signal is
   a) 20 KHz b) 52 KHz
   c) 625 Hz d) 1250 Hz

8) A sequential circuit with ten states will have
   a) 10 flip flops b) 5 flip flops
   c) 4 flip flops d) 0 flip flops

9) In general a sequential logic circuit consist of
   a) Only flip flops
   b) Only gates
   c) Flip flops and combinational logic circuit
   d) Only combinational logic circuits

10) Master slave configuration is used in the flip flops to
   a) Increase its clocking rate
   b) Reduce power dissipation
   c) Eliminate race around condition
   d) Improve its reliability

11) The gray code equivalent of binary number $(11000001)_2$ is
   a) 1100001 b) 1100011 c) 1000011 d) 110101

12) Which table shows output for every possible combination of input variables ?
   a) Function table b) Truth table
   c) Routing table d) ASCII table

13) Multiplexer is represented by
   a) $2^n \times 1$ b) $2^n \times n$
   c) $n \times 2^n$ d) 1×2^n

14) A comparison between serial and parallel adder is that a serial adder
   a) is slower
   b) is faster
   c) has some speed as parallel adder
   d) is more complicated

SLR-VB – 387

Seat No.	

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

Day and Date : Thursday, 25-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) Assume suitable data ***wherever*** *necessary.*

SECTION – I

2. Solve **any four** of the followings : **(4×4=16)**

1) Plot the K-map for EX-OR and EX-NOR function of 3, 4 variables.

2) Explain the concept of Multiplexer tree.

3) Draw and explain TTL gate.

4) Minimize the following expression in POS form

i) $f = \pi M(0, 1, 3, 4, 7)$

ii) $f = \pi M(0, 4, 6, 7, 8, 12, 13, 14, 15)$.

5) Design full subtracter using NAND gate.

3. Solve **any two** of the followings : **(2×6=12)**

1) Explain the CMOS-TTL interfacing in detail.

2) Design and explain BCD to Excess 3 Code converter.

3) Implement the following function $f(A, B, C, D) = \pi m(0, 1, 3, 4, 7, 10, 14)$ by 8×1 MUX.

SECTION – II

4. Solve **any four** of the followings : **(4×4=16)**

   1) Explain the working of Master-slave flip flops.

   2) Explain the applications of shift registers.

   3) Design a Asynchronous mod-6 counter using T flip flops.

   4) A binary ripple counter is required up to a count of $(16383)_{10}$ How many fillip flops are required ? If the clock frequency is 8.192 MHz, what is the frequency at output of the MSB.

   5) Explain the applications of counters.

5. Solve **any two** of the followings : **(2×6=12)**

   1) Define the following terms with relation to flip flop : Setup time, hold time, propagation delay time, preset, clear and transition table.

   2) Draw and explain bidirectional shift registers.

   3) Draw and explain Ring and Johnsons counters. Distinguish between them.

———————————

SLR-VB – 387

Seat No.	

Set S

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

Day and Date : Thursday, 25-5-2017 Max. Marks : 70
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.*
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) A universal shift register
   a) Accepts serial input
   b) Accept parallel input
   c) Gives serial and parallel output
   d) Is capable of all of the above

2) The output frequency of mod-16 counter, clocked from a 20 KHz clock input signal is
   a) 20 KHz b) 52 KHz
   c) 625 Hz d) 1250 Hz

3) A sequential circuit with ten states will have
   a) 10 flip flops b) 5 flip flops
   c) 4 flip flops d) 0 flip flops

4) In general a sequential logic circuit consist of
   a) Only flip flops
   b) Only gates
   c) Flip flops and combinational logic circuit
   d) Only combinational logic circuits

P.T.O.

5) Master slave configuration is used in the flip flops to
   a) Increase its clocking rate
   b) Reduce power dissipation
   c) Eliminate race around condition
   d) Improve its reliability

6) The gray code equivalent of binary number $(11000001)_2$ is
   a) 1100001 b) 1100011 c) 1000011 d) 110101

7) Which table shows output for every possible combination of input variables ?
   a) Function table b) Truth table
   c) Routing table d) ASCII table

8) Multiplexer is represented by
   a) $2^n \times 1$ b) $2^n \times n$
   c) $n \times 2^n$ d) 1×2^n

9) A comparison between serial and parallel adder is that a serial adder
   a) is slower
   b) is faster
   c) has some speed as parallel adder
   d) is more complicated

10) The Fan-out for TTL family is
   a) 5 b) 10 c) 15 d) 20

11) The logic expression for $Y(A, B, C) = \Sigma m(0, 2, 3, 6)$ is equivalent to
   a) $\Sigma m(1, 4, 5, 7)$ b) $\pi M(0, 2, 3, 6)$
   c) $\pi M(1, 4, 5, 7)$ d) none

12) Simplify xy + xz + yz =
   a) xy + yz b) xz + yz
   c) x d) xy + xz

13) The basic memory element in digital circuit
   a) Consists of NAND gate
   b) Consist of NOR gate
   c) Is a flip flop
   d) Is a shift register

14) When flip flop is set, its output will be
   a) Q = 0, Q' = 0 b) Q = 1, Q' = 0
   c) Q = 0, Q' = 1 d) Q = 1, Q' = 1

SLR-VB – 387

Seat No.	

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

Day and Date : Thursday, 25-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

2) Figures to the ***right*** *indicate* ***full*** *marks.*

3) Assume suitable data ***wherever*** *necessary.*

SECTION – I

2. Solve **any four** of the followings : **(4×4=16)**

1) Plot the K-map for EX-OR and EX-NOR function of 3, 4 variables.

2) Explain the concept of Multiplexer tree.

3) Draw and explain TTL gate.

4) Minimize the following expression in POS form

i) $f = \pi M(0, 1, 3, 4, 7)$

ii) $f = \pi M(0, 4, 6, 7, 8, 12, 13, 14, 15)$.

5) Design full subtracter using NAND gate.

3. Solve **any two** of the followings : **(2×6=12)**

1) Explain the CMOS-TTL interfacing in detail.

2) Design and explain BCD to Excess 3 Code converter.

3) Implement the following function $f(A, B, C, D) = \pi m(0, 1, 3, 4, 7, 10, 14)$ by 8×1 MUX.

SECTION – II

4. Solve **any four** of the followings : **(4×4=16)**

   1) Explain the working of Master-slave flip flops.

   2) Explain the applications of shift registers.

   3) Design a Asynchronous mod-6 counter using T flip flops.

   4) A binary ripple counter is required up to a count of $(16383)_{10}$ How many fillip flops are required ? If the clock frequency is 8.192 MHz, what is the frequency at output of the MSB.

   5) Explain the applications of counters.

5. Solve **any two** of the followings : **(2×6=12)**

   1) Define the following terms with relation to flip flop : Setup time, hold time, propagation delay time, preset, clear and transition table.

   2) Draw and explain bidirectional shift registers.

   3) Draw and explain Ring and Johnsons counters. Distinguish between them.

———————————

SLR-VB – 388

Seat No.	

Set P

T.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 4-5-2017 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. Choose the correct answer : **(14×1=14)**

1) Statement 1 : Potential is the gradient of electric field intensity.
Statement 2 : Electric field intensity is opposite to the direction in which V is increases.
Statement 1 and Statement 2 are respectively
a) True, False b) True, True
c) False, True d) False, False

2) 'r' in spherical coordinate
a) $\sqrt{x^2+y^2}$ b) $\sqrt{x^2+y^2+z^2}$
c) tan –1 (y/x) d) None

3) $dv = r^2 \sin\theta \, dr \, d\Phi \, dz$ is the differential volume in
a) Cylindrical co-ordinate system b) Spherical co-ordinate system
c) Cartesian co-ordinate system d) None of the above

4) The electric field on a plane is described by $V = 20 [(1/r) + (1/r^2)]$. The field due to
a) a monopole b) dipole
c) a dipole and a monopole d) none of these

5) Coulomb's law for the force between electric charges most closely resembles with
a) Gauss law b) Newton law of gravitation
c) Lenz law d) None of these

P.T.O.

6) A positive charge of Q Coulomb is located at point A(0, 0, 3) and a negative charge of Q Coulombs is located at point B (0, 0, –3). The electric field intensity at point C (4,0,0) is in the
   a) negative x-direction
   b) negative z-direction
   c) positive x-direction
   d) positive z-direction

7) If $\oint E.dl = 0$ then vector field is called as
   a) Conserve field
   b) Vertex field
   c) Irrotational
   d) Solenoidal

8) For volume density ρ_v the divergence of electric field intensity will be equal to
   a) $\frac{\rho v}{\in}$
   b) $\in \rho v$
   c) $\in^2 \rho v$
   d) none of these

9) The surface integral of electric field intensity is the
   a) Not flux emanating from the surface
   b) Electric charge
   c) Charge density
   d) Flux density

10) $\nabla^2 V = 0$ is
   a) Maxwell's law
   b) Poison's law
   c) Laplace law
   d) Guass law

11) Unit of electric intensity is
   a) Joules/Coulomb
   b) Newton/Coulomb
   c) Volt-Meter
   d) Both b & c

12) The electric flux density $\overline{D}$ is
   a) Normal
   b) Tangential
   c) Opposite
   d) None of these

13) The relation between E and D is
   a) $E = \varepsilon D$
   b) $E = \mu D$
   c) $D = \varepsilon E$
   d) $D = \frac{E}{\varepsilon}$

14) $A \times B \times C$ value is
   a) B(A.C) – C(A.B)
   b) A(B.C) + B(A.C)
   c) B(A.C) + C(A.B)
   d) C(A.B) – A(B.C)

———————

SLR-VB – 388

Seat No.	

T.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 4-5-2017 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)**

1) Transform the given vector A = 10 a_x – 8 a_y + 6 a_z at p (10, –8, 6) into cylindrical coordinate.

2) A charge of uniform density ρ_s=0.5 nC/m^2 covering the plane – x + 3y – 6z = 6. Find E on the side of the plane containing the origin.

3) Derive expression for find potential due to infinite line charge.

4) Explain continuity equation of current and its point form in volume.

5) Explain Poisson's and Laplace Equation.

3. Solve **any two** : **(8×2=16)**

1) Calculate electric field intensity D at (6, 8, –10) due to

A Point charge Q = 30 mC located at origin.

A Line charge density $\rho_1 = 40\,\mu$C/m at on z axis.

A plane x = 9 carry a surface charge density of ρ_s= 57.2 μC/m^2.

2) State and prove Divergence Theorem.

D = xyz a_x – y^2 a_y + yz a_z. Evaluate Divergence Theorem of both side of unit cube $0 \le x, y, z \le 1$.

3) Explain boundary condition for Electrostatic Field. Conductor free space Boundary.

Set P

SECTION – II

4. Solve **any three** : **(3×4=12)**

   1) State and explain Stroke's theorem.

   2) State the equations of Maxwell's, good conductor in time varying field in integral and point form.

   3) Explain the Ampere's circuital law in detail.

   4) Explain scalar magnetic potential.

5. Solve **any two** : **(8×2=16)**

   1) Calculate the intrinsic impedance efficiency the propagation constant y and the wave velocity v for a conduction medium in which σ =58 Ms/m, μr = 1 at a frequency f = 100 Mhz.

   2) Explain in detail the boundary condition for perfect dielectric-dielectric media in magnetic fields.

   3) Write down all Maxwell's equations. Explain the law of continuity.

———————

SLR-VB – 388

Seat No.	

Set Q

T.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 4-5-2017 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. Choose the correct answer : **(14×1=14)**

1) For volume density ρ_v the divergence of electric field intensity will be equal to

a) $\frac{\rho v}{\in}$ b) $\in \rho v$

c) $\in^2 \rho v$ d) none of these

2) The surface integral of electric field intensity is the

a) Not flux emanating from the surface b) Electric charge

c) Charge density d) Flux density

3) $\nabla^2 V = 0$ is

a) Maxwell's law b) Poison's law

c) Laplace law d) Guass law

4) Unit of electric intensity is

a) Joules/Coulomb b) Newton/Coulomb

c) Volt-Meter d) Both b & c

5) The electric flux density $\overline{D}$ is

a) Normal b) Tangential

c) Opposite d) None of these

P.T.O.

6) The relation between E and D is

a) $E = \varepsilon D$ b) $E = \mu D$ c) $D = \varepsilon E$ d) $D = \frac{E}{\varepsilon}$

7) $A \times B \times C$ value is

a) B(A.C) – C(A.B) b) A(B.C) + B(A.C)

c) B(A.C) + C(A.B) d) C(A.B) – A(B.C)

8) Statement 1 : Potential is the gradient of electric field intensity.

Statement 2 : Electric field intensity is opposite to the direction in which V is increases.

Statement 1 and Statement 2 are respectively

a) True, False b) True, True

c) False, True d) False, False

9) 'r' in spherical coordinate

a) $\sqrt{x^2 + y^2}$ b) $\sqrt{x^2 + y^2 + z^2}$

c) tan –1 (y/x) d) None

10) $dv = r^2 \sin\theta \, dr \, d\Phi \, dz$ is the differential volume in

a) Cylindrical co-ordinate system b) Spherical co-ordinate system

c) Cartesian co-ordinate system d) None of the above

11) The electric field on a plane is described by $V = 20 [(1/r) + (1/r^2)]$. The field due to

a) a monopole b) dipole

c) a dipole and a monopole d) none of these

12) Coulomb's law for the force between electric charges most closely resembles with

a) Gauss law b) Newton law of gravitation

c) Lenz law d) None of these

13) A positive charge of Q Coulomb is located at point A(0, 0, 3) and a negative charge of Q Coulombs is located at point B (0, 0, –3). The electric field intensity at point C (4,0,0) is in the

a) negative x-direction b) negative z-direction

c) positive x-direction d) positive z-direction

14) If $\oint E.dl = 0$ then vector field is called as

a) Conserve field b) Vertex field

c) Irrotational d) Solenoidal

———————

SLR-VB – 388

Seat No.	

T.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 4-5-2017 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)**

1) Transform the given vector A = 10 a_x – 8 a_y + 6 a_z at p (10, –8, 6) into cylindrical coordinate.

2) A charge of uniform density ρ_s=0.5 nC/m^2 covering the plane – x + 3y – 6z = 6. Find E on the side of the plane containing the origin.

3) Derive expression for find potential due to infinite line charge.

4) Explain continuity equation of current and its point form in volume.

5) Explain Poisson's and Laplace Equation.

3. Solve **any two** : **(8×2=16)**

1) Calculate electric field intensity D at (6, 8, –10) due to

A Point charge Q = 30 mC located at origin.

A Line charge density $\rho_1 = 40\,\mu$C/m at on z axis.

A plane x = 9 carry a surface charge density of ρ_s= 57.2 μC/m^2.

2) State and prove Divergence Theorem.

D = xyz a_x – y^2 a_y + yz a_z. Evaluate Divergence Theorem of both side of unit cube $0 \le x, y, z \le 1$.

3) Explain boundary condition for Electrostatic Field. Conductor free space Boundary.

Set Q

SECTION – II

4. Solve **any three** : **(3×4=12)**

   1) State and explain Stroke's theorem.

   2) State the equations of Maxwell's, good conductor in time varying field in integral and point form.

   3) Explain the Ampere's circuital law in detail.

   4) Explain scalar magnetic potential.

5. Solve **any two** : **(8×2=16)**

   1) Calculate the intrinsic impedance efficiency the propagation constant y and the wave velocity v for a conduction medium in which σ =58 Ms/m, μr = 1 at a frequency f = 100 Mhz.

   2) Explain in detail the boundary condition for perfect dielectric-dielectric media in magnetic fields.

   3) Write down all Maxwell's equations. Explain the law of continuity.

———————

SLR-VB – 388

Seat No.	

Set R

T.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 4-5-2017 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. Choose the correct answer : **(14×1=14)**

1) Coulomb's law for the force between electric charges most closely resembles with
   a) Gauss law b) Newton law of gravitation
   c) Lenz law d) None of these

2) A positive charge of Q Coulomb is located at point A(0, 0, 3) and a negative charge of Q Coulombs is located at point B (0, 0, –3). The electric field intensity at point C (4,0,0) is in the
   a) negative x-direction b) negative z-direction
   c) positive x-direction d) positive z-direction

3) If $\oint E.dl = 0$ then vector field is called as
   a) Conserve field b) Vertex field
   c) Irrotational d) Solenoidal

4) For volume density ρ_v the divergence of electric field intensity will be equal to
   a) $\frac{\rho v}{\in}$ b) $\in \rho v$
   c) $\in^2 \rho v$ d) none of these

5) The surface integral of electric field intensity is the
   a) Not flux emanating from the surface b) Electric charge
   c) Charge density d) Flux density

P.T.O.

6) $\nabla^2 V = 0$ is

a) Maxwell's law b) Poison's law

c) Laplace law d) Guass law

7) Unit of electric intensity is

a) Joules/Coulomb b) Newton/Coulomb

c) Volt-Meter d) Both b & c

8) The electric flux density $\overline{D}$ is

a) Normal b) Tangential

c) Opposite d) None of these

9) The relation between E and D is

a) $E = \varepsilon D$ b) $E = \mu D$ c) $D = \varepsilon E$ d) $D = \frac{E}{\varepsilon}$

10) $A \times B \times C$ value is

a) B(A.C) – C(A.B) b) A(B.C) + B(A.C)

c) B(A.C) + C(A.B) d) C(A.B) – A(B.C)

11) Statement 1 : Potential is the gradient of electric field intensity.

Statement 2 : Electric field intensity is opposite to the direction in which V is increases.

Statement 1 and Statement 2 are respectively

a) True, False b) True, True

c) False, True d) False, False

12) 'r' in spherical coordinate

a) $\sqrt{x^2 + y^2}$ b) $\sqrt{x^2 + y^2 + z^2}$

c) tan –1 (y/x) d) None

13) $dv = r^2 \sin\theta \, dr \, d\Phi \, dz$ is the differential volume in

a) Cylindrical co-ordinate system b) Spherical co-ordinate system

c) Cartesian co-ordinate system d) None of the above

14) The electric field on a plane is described by $V = 20 [(1/r) + (1/r^2)]$. The field due to

a) a monopole b) dipole

c) a dipole and a monopole d) none of these

SLR-VB – 388

Seat No.	

T.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 4-5-2017 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)**

1) Transform the given vector A = 10 a_x – 8 a_y + 6 a_z at p (10, –8, 6) into cylindrical coordinate.

2) A charge of uniform density ρ_s=0.5 nC/m^2 covering the plane – x + 3y – 6z = 6. Find E on the side of the plane containing the origin.

3) Derive expression for find potential due to infinite line charge.

4) Explain continuity equation of current and its point form in volume.

5) Explain Poisson's and Laplace Equation.

3. Solve **any two** : **(8×2=16)**

1) Calculate electric field intensity D at (6, 8, –10) due to

A Point charge Q = 30 mC located at origin.

A Line charge density $\rho_1 = 40\,\mu$C/m at on z axis.

A plane x = 9 carry a surface charge density of ρ_s= 57.2 μC/m^2.

2) State and prove Divergence Theorem.

D = xyz a_x – y^2 a_y + yz a_z. Evaluate Divergence Theorem of both side of unit cube $0 \le x, y, z \le 1$.

3) Explain boundary condition for Electrostatic Field. Conductor free space Boundary.

Set R

SECTION – II

4. Solve **any three** : **(3×4=12)**

   1) State and explain Stroke's theorem.

   2) State the equations of Maxwell's, good conductor in time varying field in integral and point form.

   3) Explain the Ampere's circuital law in detail.

   4) Explain scalar magnetic potential.

5. Solve **any two** : **(8×2=16)**

   1) Calculate the intrinsic impedance efficiency the propagation constant y and the wave velocity v for a conduction medium in which σ =58 Ms/m, μr = 1 at a frequency f = 100 Mhz.

   2) Explain in detail the boundary condition for perfect dielectric-dielectric media in magnetic fields.

   3) Write down all Maxwell's equations. Explain the law of continuity.

———————

SLR-VB – 388

Seat No.	

Set S

T.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 4-5-2017 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. Choose the correct answer : **(14×1=14)**

1) $\nabla^2 V = 0$ is
   a) Maxwell's law b) Poison's law
   c) Laplace law d) Guass law

2) Unit of electric intensity is
   a) Joules/Coulomb b) Newton/Coulomb
   c) Volt-Meter d) Both b & c

3) The electric flux density $\overline{D}$ is
   a) Normal b) Tangential
   c) Opposite d) None of these

4) The relation between E and D is
   a) $E = \varepsilon D$ b) $E = \mu D$ c) $D = \varepsilon E$ d) $D = \frac{E}{\varepsilon}$

5) $A \times B \times C$ value is
   a) $B(A.C) - C(A.B)$ b) $A(B.C) + B(A.C)$
   c) $B(A.C) + C(A.B)$ d) $C(A.B) - A(B.C)$

6) Statement 1 : Potential is the gradient of electric field intensity.
   Statement 2 : Electric field intensity is opposite to the direction in which V is increases.
   Statement 1 and Statement 2 are respectively
   a) True, False b) True, True
   c) False, True d) False, False

P.T.O.

7) 'r' in spherical coordinate

a) $\sqrt{x^2 + y^2}$ b) $\sqrt{x^2 + y^2 + z^2}$

c) tan –1 (y/x) d) None

8) $dv = r^2 \sin \theta \, dr \, d\Phi \, dz$ is the differential volume in

a) Cylindrical co-ordinate system b) Spherical co-ordinate system

c) Cartesian co-ordinate system d) None of the above

9) The electric field on a plane is described by $V = 20 [(1/r) + (1/r^2)]$. The field due to

a) a monopole b) dipole

c) a dipole and a monopole d) none of these

10) Coulomb's law for the force between electric charges most closely resembles with

a) Gauss law b) Newton law of gravitation

c) Lenz law d) None of these

11) A positive charge of Q Coulomb is located at point A(0, 0, 3) and a negative charge of Q Coulombs is located at point B (0, 0, –3). The electric field intensity at point C (4,0,0) is in the

a) negative x-direction b) negative z-direction

c) positive x-direction d) positive z-direction

12) If $\oint E.dl = 0$ then vector field is called as

a) Conserve field b) Vertex field

c) Irrotational d) Solenoidal

13) For volume density ρ_v the divergence of electric field intensity will be equal to

a) $\frac{\rho v}{\in}$ b) $\in \rho v$

c) $\in^2 \rho v$ d) none of these

14) The surface integral of electric field intensity is the

a) Not flux emanating from the surface b) Electric charge

c) Charge density d) Flux density

———————

SLR-VB – 388

Seat No.	

T.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2017
ELECTROMAGNETIC ENGINEERING

Day and Date : Thursday, 4-5-2017 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)**

1) Transform the given vector A = 10 a_x – 8 a_y + 6 a_z at p (10, –8, 6) into cylindrical coordinate.

2) A charge of uniform density ρ_s=0.5 nC/m^2 covering the plane – x + 3y – 6z = 6. Find E on the side of the plane containing the origin.

3) Derive expression for find potential due to infinite line charge.

4) Explain continuity equation of current and its point form in volume.

5) Explain Poisson's and Laplace Equation.

3. Solve **any two** : **(8×2=16)**

1) Calculate electric field intensity D at (6, 8, –10) due to

A Point charge Q = 30 mC located at origin.

A Line charge density $\rho_1 = 40\,\mu$C/m at on z axis.

A plane x = 9 carry a surface charge density of ρ_s= 57.2 μC/m^2.

2) State and prove Divergence Theorem.

D = xyz a_x – y^2 a_y + yz a_z. Evaluate Divergence Theorem of both side of unit cube $0 \le x, y, z \le 1$.

3) Explain boundary condition for Electrostatic Field. Conductor free space Boundary.

Set S

SECTION – II

4. Solve **any three** : **(3×4=12)**

   1) State and explain Stroke's theorem.

   2) State the equations of Maxwell's, good conductor in time varying field in integral and point form.

   3) Explain the Ampere's circuital law in detail.

   4) Explain scalar magnetic potential.

5. Solve **any two** : **(8×2=16)**

   1) Calculate the intrinsic impedance efficiency the propagation constant y and the wave velocity v for a conduction medium in which σ =58 Ms/m, μr = 1 at a frequency f = 100 Mhz.

   2) Explain in detail the boundary condition for perfect dielectric-dielectric media in magnetic fields.

   3) Write down all Maxwell's equations. Explain the law of continuity.

———————

SLR-VB – 389

Seat No.	

Set P

T.E. (Part – I) (Electrical and Electronics) (CGPA) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 5-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A transducer converts
   a) Mechanical energy into electrical energy
   b) Mechanical displacement into electrical signal
   c) One form of energy into another form of energy
   d) Electrical energy into mechanical form

2) One of the following is an active transducer
   a) Strain gauge b) Selsyn
   c) Photo voltaic cell d) Photo emissive cell

3) A strip chart recorder is
   a) An active transducer b) An inverse transducer
   c) An output transducer d) b and c

4) While selecting a transducer for particular application
   a) Only the input characteristics should be considered
   b) Only the output characteristics should be considered
   c) Only the transfer characteristics should be considered
   d) Input, output and transducer characteristics should be considered

5) A Reynolds's number of 1000 indicates
   a) Turbulence flow
   b) Laminar flow
   c) A flow which can either be turbulent or laminar
   d) None of these

6) Thermocouples are
   a) Passive transducers
   b) Active transducers
   c) Both active and passive transducers
   d) Output transducers

7) In an LVDT the two secondary windings are connected in differential to obtain
   a) Higher output voltage
   b) An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core tool place from right to left or from left to right
   c) In order to establish the null or the reference point for the displacement of the core
   d) Both b and c

8) The dynamic characteristics of capacitive transducers are similar to those of
   a) Low pass filter b) High pass filter
   c) Notch filter d) Band stop filters

9) Quartz and Rochelle salt belongs 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

10) Piezo-electric transducers are
   a) Passive transducers b) Active transducers
   c) Inverse transducers d) b and c

11) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

12) 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

13) Modem is an acronym of
   a) Modulation b) Demodulation
   c) Modulation and demodulation d) None of these

14) 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

———————

SLR-VB – 389

Seat No.	

T.E. (Part – I) (Electrical and Electronics) (CGPA) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 5-5-2017 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 four** : **(4×4=16)**

a) Define :
   1) Accuracy
   2) Precision
   3) Resolution
   4) Repeatability
   5) Hysteresis.

b) Draw and explain Chopper Stabilized amplifier.

c) Draw and explain sine wave generation circuit.

d) Explain sample and hold circuit.

e) Explain frequency to voltage converter.

f) Explain R-2R ADC circuit.

3. Solve **any two** : **(6×2=12)**

a) Draw and explain block diagram of instrumentation system and function of each block. Give one industrial example.

b) What is meant by Active filters and Derive the frequency response of 1^{st} and 2^{nd} order filter ?

c) Explain the concept of DAS. State all the types and multichannel DAS.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) Explain voltage and current telemetry system.

   b) List the Strip chart recorder. Explain any one.

   c) List the digital I/O devices. Explain any two.

   d) Write a short note on :

      i) LCD Display

      ii) LED display.

   e) What is the role of PLC in automation and list the programming devices of PLC ?

   f) Explain concept of modulation. Explain one of the type.

5. Solve **any two** : **(6×2=12)**

   a) Draw and explain block diagram of general telemetering system and state types.

   b) Draw and explain Architecture of PLC. State the types of PLC.

   c) Explain function generator and pulse generator.

———————

SLR-VB – 389

Seat No.	

Set Q

T.E. (Part – I) (Electrical and Electronics) (CGPA) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 5-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) 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

2) Quartz and Rochelle salt belongs 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

3) Piezo-electric transducers are
   a) Passive transducers b) Active transducers
   c) Inverse transducers d) b and c

4) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

5) 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

6) Modem is an acronym of
   a) Modulation b) Demodulation
   c) Modulation and demodulation d) None of these

7) 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

8) A transducer converts
   a) Mechanical energy into electrical energy
   b) Mechanical displacement into electrical signal
   c) One form of energy into another form of energy
   d) Electrical energy into mechanical form

9) One of the following is an active transducer
   a) Strain gauge
   b) Selsyn
   c) Photo voltaic cell
   d) Photo emissive cell

10) A strip chart recorder is
   a) An active transducer
   b) An inverse transducer
   c) An output transducer
   d) b and c

11) While selecting a transducer for particular application
   a) Only the input characteristics should be considered
   b) Only the output characteristics should be considered
   c) Only the transfer characteristics should be considered
   d) Input, output and transducer characteristics should be considered

12) A Reynolds's number of 1000 indicates
   a) Turbulence flow
   b) Laminar flow
   c) A flow which can either be turbulent or laminar
   d) None of these

13) Thermocouples are
   a) Passive transducers
   b) Active transducers
   c) Both active and passive transducers
   d) Output transducers

14) 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

———————

SLR-VB – 389

Seat No.	

T.E. (Part – I) (Electrical and Electronics) (CGPA) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 5-5-2017 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 four** : **(4×4=16)**

   a) Define :
      1) Accuracy
      2) Precision
      3) Resolution
      4) Repeatability
      5) Hysteresis.

   b) Draw and explain Chopper Stabilized amplifier.

   c) Draw and explain sine wave generation circuit.

   d) Explain sample and hold circuit.

   e) Explain frequency to voltage converter.

   f) Explain R-2R ADC circuit.

3. Solve **any two** : **(6×2=12)**

   a) Draw and explain block diagram of instrumentation system and function of each block. Give one industrial example.

   b) What is meant by Active filters and Derive the frequency response of 1^{st} and 2^{nd} order filter ?

   c) Explain the concept of DAS. State all the types and multichannel DAS.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) Explain voltage and current telemetry system.

   b) List the Strip chart recorder. Explain any one.

   c) List the digital I/O devices. Explain any two.

   d) Write a short note on :

      i) LCD Display

      ii) LED display.

   e) What is the role of PLC in automation and list the programming devices of PLC ?

   f) Explain concept of modulation. Explain one of the type.

5. Solve **any two** : **(6×2=12)**

   a) Draw and explain block diagram of general telemetering system and state types.

   b) Draw and explain Architecture of PLC. State the types of PLC.

   c) Explain function generator and pulse generator.

———————

SLR-VB – 389

Seat No.	

Set R

T.E. (Part – I) (Electrical and Electronics) (CGPA) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 5-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A Reynolds's number of 1000 indicates
   a) Turbulence flow
   b) Laminar flow
   c) A flow which can either be turbulent or laminar
   d) None of these

2) Thermocouples are
   a) Passive transducers
   b) Active transducers
   c) Both active and passive transducers
   d) Output transducers

3) 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

4) 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

5) Quartz and Rochelle salt belongs 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

P.T.O.

6) Piezo-electric transducers are
   a) Passive transducers b) Active transducers
   c) Inverse transducers d) b and c

7) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

8) 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

9) Modem is an acronym of
   a) Modulation b) Demodulation
   c) Modulation and demodulation d) None of these

10) 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

11) A transducer converts
   a) Mechanical energy into electrical energy
   b) Mechanical displacement into electrical signal
   c) One form of energy into another form of energy
   d) Electrical energy into mechanical form

12) One of the following is an active transducer
   a) Strain gauge b) Selsyn
   c) Photo voltaic cell d) Photo emissive cell

13) A strip chart recorder is
   a) An active transducer b) An inverse transducer
   c) An output transducer d) b and c

14) While selecting a transducer for particular application
   a) Only the input characteristics should be considered
   b) Only the output characteristics should be considered
   c) Only the transfer characteristics should be considered
   d) Input, output and transducer characteristics should be considered

———————

SLR-VB – 389

Seat No.	

T.E. (Part – I) (Electrical and Electronics) (CGPA) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 5-5-2017 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 four** : **(4×4=16)**

a) Define :
   1) Accuracy
   2) Precision
   3) Resolution
   4) Repeatability
   5) Hysteresis.

b) Draw and explain Chopper Stabilized amplifier.

c) Draw and explain sine wave generation circuit.

d) Explain sample and hold circuit.

e) Explain frequency to voltage converter.

f) Explain R-2R ADC circuit.

3. Solve **any two** : **(6×2=12)**

a) Draw and explain block diagram of instrumentation system and function of each block. Give one industrial example.

b) What is meant by Active filters and Derive the frequency response of 1^{st} and 2^{nd} order filter ?

c) Explain the concept of DAS. State all the types and multichannel DAS.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) Explain voltage and current telemetry system.

   b) List the Strip chart recorder. Explain any one.

   c) List the digital I/O devices. Explain any two.

   d) Write a short note on :

      i) LCD Display

      ii) LED display.

   e) What is the role of PLC in automation and list the programming devices of PLC ?

   f) Explain concept of modulation. Explain one of the type.

5. Solve **any two** : **(6×2=12)**

   a) Draw and explain block diagram of general telemetering system and state types.

   b) Draw and explain Architecture of PLC. State the types of PLC.

   c) Explain function generator and pulse generator.

———————

SLR-VB – 389

Seat No.	

Set S

T.E. (Part – I) (Electrical and Electronics) (CGPA) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 5-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Piezo-electric transducers are
   a) Passive transducers b) Active transducers
   c) Inverse transducers d) b and c

2) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

3) 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

4) Modem is an acronym of
   a) Modulation b) Demodulation
   c) Modulation and demodulation d) None of these

5) 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

6) A transducer converts
   a) Mechanical energy into electrical energy
   b) Mechanical displacement into electrical signal
   c) One form of energy into another form of energy
   d) Electrical energy into mechanical form

7) One of the following is an active transducer
   a) Strain gauge
   b) Selsyn
   c) Photo voltaic cell
   d) Photo emissive cell

8) A strip chart recorder is
   a) An active transducer
   b) An inverse transducer
   c) An output transducer
   d) b and c

9) While selecting a transducer for particular application
   a) Only the input characteristics should be considered
   b) Only the output characteristics should be considered
   c) Only the transfer characteristics should be considered
   d) Input, output and transducer characteristics should be considered

10) A Reynolds's number of 1000 indicates
   a) Turbulence flow
   b) Laminar flow
   c) A flow which can either be turbulent or laminar
   d) None of these

11) Thermocouples are
   a) Passive transducers
   b) Active transducers
   c) Both active and passive transducers
   d) Output transducers

12) 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

13) 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

14) Quartz and Rochelle salt belongs 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

———————

SLR-VB – 389

Seat No.	

T.E. (Part – I) (Electrical and Electronics) (CGPA) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Friday, 5-5-2017 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 four** : **(4×4=16)**

a) Define :
   1) Accuracy
   2) Precision
   3) Resolution
   4) Repeatability
   5) Hysteresis.

b) Draw and explain Chopper Stabilized amplifier.

c) Draw and explain sine wave generation circuit.

d) Explain sample and hold circuit.

e) Explain frequency to voltage converter.

f) Explain R-2R ADC circuit.

3. Solve **any two** : **(6×2=12)**

a) Draw and explain block diagram of instrumentation system and function of each block. Give one industrial example.

b) What is meant by Active filters and Derive the frequency response of 1^{st} and 2^{nd} order filter ?

c) Explain the concept of DAS. State all the types and multichannel DAS.

SECTION – II

4. Solve **any four** : **(4×4=16)**

   a) Explain voltage and current telemetry system.

   b) List the Strip chart recorder. Explain any one.

   c) List the digital I/O devices. Explain any two.

   d) Write a short note on :

      i) LCD Display

      ii) LED display.

   e) What is the role of PLC in automation and list the programming devices of PLC ?

   f) Explain concept of modulation. Explain one of the type.

5. Solve **any two** : **(6×2=12)**

   a) Draw and explain block diagram of general telemetering system and state types.

   b) Draw and explain Architecture of PLC. State the types of PLC.

   c) Explain function generator and pulse generator.

———————

SLR-VB – 390

Seat No.	

Set P

T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
MICROPROCESSOR AND ITS APPLICATIONS (CGPA)

Day and Date : Saturday, 6-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct option : **(14×1=14)**

1) Vector location of RST 6.5 is
a) 0024 H b) 003C H c) 0034 H d) 002C H

2) How many address lines are there on 2K byte memory chip ?
a) 16 b) 13 c) 8 d) 11

3) IC74LS138 is a
a) Latch b) Encoder c) Buffer d) Decoder

4) The number of machine cycle required for STA instruction in 8085 microprocessor is
a) 4 b) 2 c) 3 d) 5

5) PSW stands for
a) Accumulator content b) Flag byte
c) Accumulator and flag byte d) None

6) Which of the following memory requires refreshing ?
a) ROM b) SRAM c) DRAM d) EPROM

7) Which microprocessor pins are used to request and acknowledge a DMA transfer ?
a) Reset and ready b) Ready and wait
c) HOLD and HLDA d) None of these

P.T.O.

8) In 8254 control word register, if SC1=0 and SC0=1, then the counter selected is
   a) Counter 0 b) Counter 1 c) Counter 2 d) None

9) Which of the following is not a mode of data transmission ?
   a) simplex b) duplex c) semi duplex d) half duplex

10) The number of counters that are present in the programmable timer device 8254 is
   a) 1 b) 2 c) 3 d) 4

11) 8251 is a
   a) UART
   b) USART
   c) Programmable Interrupt controller
   d) Programmable interval timer/counter

12) If the programmable counter timer 8254 is set in mode 1 and is to be used to count six events, the output will remain at logic 0 for _____ number of counts.
   a) 5 b) 6 c) 0 d) All of the above

13) Which pins are general purpose I/O pins during mode-2 operation of the 82C55 ?
   a) PA0-PA7 b) PB0-PB7 c) PC3-PC7 d) PC0-PC2

14) Dual slope ADC techniques uses
   a) Voltage-current conversion b) Current-voltage conversion
   c) Time to voltage conversion d) Voltage to time conversion

_____

SLR-VB – 390

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
MICROPROCESSOR AND ITS APPLICATIONS (CGPA)

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data if ***necessary****.*
4) Draw ***neat*** *diagram where* ***required****.*

SECTION – I

2. Attempt **any three** : **(4×3=12)**
   1) Write a subroutine for 8085 to generate a delay of 10msec. Assume 33 μsec as clock delay.
   2) Explain different hardware interrupts of 8085.
   3) Analyze the following program running on 8085 and find out the content of Program Counter and Stack Pointer.

Memory address in HEX	Instructions
2000	LXI SP, 1000
2003	PUSH H
2004	PUSH D
2005	CALL 2050
2008	POP H
2009	HLT

   4) Describe the features of 8085.

3. Attempt **any two** : **(2×8=16)**
   1) Draw SIM instruction format and discuss.
   2) Explain interrupt structure of 8085 in detail.
   3) Draw and explain timing diagram of an instruction LHLD 2000 H.

SECTION – II

4. Attempt **any three** : **(4×3=12)**
   1) List out the specifications of 8255.
   2) Draw suitable diagram for weighted resistor type DAC and discuss.
   3) Draw the schematic diagram of speed measurement and display using microprocessor.
   4) Describe control word format of USART 8251 in asynchronous and synchronous mode.

5. Attempt **any two** : **(2×8=16)**
   1) Interface stepper motor to 8085 using 8255. Interface 8255 in I/O mapped I/O.
   2) Draw and explain functional block diagram of 8251. Discuss each block in detail.
   3) Explain with suitable timing diagram mode 2 and mode 3 of 8253 in detail.

———————————

SLR-VB – 390

Seat No.	

Set Q

T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
MICROPROCESSOR AND ITS APPLICATIONS (CGPA)

Day and Date : Saturday, 6-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct option : **(14×1=14)**

1) In 8254 control word register, if SC1=0 and SC0=1, then the counter selected is
a) Counter 0 b) Counter 1 c) Counter 2 d) None

2) Which of the following is not a mode of data transmission ?
a) simplex b) duplex c) semi duplex d) half duplex

3) The number of counters that are present in the programmable timer device 8254 is
a) 1 b) 2 c) 3 d) 4

4) 8251 is a
a) UART
b) USART
c) Programmable Interrupt controller
d) Programmable interval timer/counter

5) If the programmable counter timer 8254 is set in mode 1 and is to be used to count six events, the output will remain at logic 0 for _____ number of counts.
a) 5 b) 6 c) 0 d) All of the above

6) Which pins are general purpose I/O pins during mode-2 operation of the 82C55 ?
   a) PA0-PA7 b) PB0-PB7 c) PC3-PC7 d) PC0-PC2

7) Dual slope ADC techniques uses
   a) Voltage-current conversion b) Current-voltage conversion
   c) Time to voltage conversion d) Voltage to time conversion

8) Vector location of RST 6.5 is
   a) 0024 H b) 003C H c) 0034 H d) 002C H

9) How many address lines are there on 2K byte memory chip ?
   a) 16 b) 13 c) 8 d) 11

10) IC74LS138 is a
   a) Latch b) Encoder c) Buffer d) Decoder

11) The number of machine cycle required for STA instruction in 8085 microprocessor is
   a) 4 b) 2 c) 3 d) 5

12) PSW stands for
   a) Accumulator content b) Flag byte
   c) Accumulator and flag byte d) None

13) Which of the following memory requires refreshing ?
   a) ROM b) SRAM c) DRAM d) EPROM

14) Which microprocessor pins are used to request and acknowledge a DMA transfer ?
   a) Reset and ready b) Ready and wait
   c) HOLD and HLDA d) None of these

———————

SLR-VB – 390

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
MICROPROCESSOR AND ITS APPLICATIONS (CGPA)

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data if ***necessary****.*
4) Draw ***neat*** *diagram where* ***required****.*

SECTION – I

2. Attempt **any three** : **(4×3=12)**
   1) Write a subroutine for 8085 to generate a delay of 10msec. Assume 33 μsec as clock delay.
   2) Explain different hardware interrupts of 8085.
   3) Analyze the following program running on 8085 and find out the content of Program Counter and Stack Pointer.

Memory address in HEX	Instructions
2000	LXI SP, 1000
2003	PUSH H
2004	PUSH D
2005	CALL 2050
2008	POP H
2009	HLT

   4) Describe the features of 8085.

3. Attempt **any two** : **(2×8=16)**
   1) Draw SIM instruction format and discuss.
   2) Explain interrupt structure of 8085 in detail.
   3) Draw and explain timing diagram of an instruction LHLD 2000 H.

SECTION – II

4. Attempt **any three** : **(4×3=12)**
   1) List out the specifications of 8255.
   2) Draw suitable diagram for weighted resistor type DAC and discuss.
   3) Draw the schematic diagram of speed measurement and display using microprocessor.
   4) Describe control word format of USART 8251 in asynchronous and synchronous mode.

5. Attempt **any two** : **(2×8=16)**
   1) Interface stepper motor to 8085 using 8255. Interface 8255 in I/O mapped I/O.
   2) Draw and explain functional block diagram of 8251. Discuss each block in detail.
   3) Explain with suitable timing diagram mode 2 and mode 3 of 8253 in detail.

———————————

SLR-VB – 390

Seat No.	

Set **R**

T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
MICROPROCESSOR AND ITS APPLICATIONS (CGPA)

Day and Date : Saturday, 6-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct option : **(14×1=14)**

1) PSW stands for
   a) Accumulator content b) Flag byte
   c) Accumulator and flag byte d) None

2) Which of the following memory requires refreshing ?
   a) ROM b) SRAM c) DRAM d) EPROM

3) Which microprocessor pins are used to request and acknowledge a DMA transfer ?
   a) Reset and ready b) Ready and wait
   c) HOLD and HLDA d) None of these

4) In 8254 control word register, if SC1=0 and SC0=1, then the counter selected is
   a) Counter 0 b) Counter 1 c) Counter 2 d) None

5) Which of the following is not a mode of data transmission ?
   a) simplex b) duplex c) semi duplex d) half duplex

6) The number of counters that are present in the programmable timer device 8254 is
   a) 1 b) 2 c) 3 d) 4

7) 8251 is a
   a) UART
   b) USART
   c) Programmable Interrupt controller
   d) Programmable interval timer/counter

8) If the programmable counter timer 8254 is set in mode 1 and is to be used to count six events, the output will remain at logic 0 for _____ number of counts.
   a) 5 b) 6 c) 0 d) All of the above

9) Which pins are general purpose I/O pins during mode-2 operation of the 82C55 ?
   a) PA0-PA7 b) PB0-PB7 c) PC3-PC7 d) PC0-PC2

10) Dual slope ADC techniques uses
   a) Voltage-current conversion b) Current-voltage conversion
   c) Time to voltage conversion d) Voltage to time conversion

11) Vector location of RST 6.5 is
   a) 0024 H b) 003C H c) 0034 H d) 002C H

12) How many address lines are there on 2K byte memory chip ?
   a) 16 b) 13 c) 8 d) 11

13) IC74LS138 is a
   a) Latch b) Encoder c) Buffer d) Decoder

14) The number of machine cycle required for STA instruction in 8085 microprocessor is
   a) 4 b) 2 c) 3 d) 5

_____

SLR-VB – 390

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
MICROPROCESSOR AND ITS APPLICATIONS (CGPA)

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data if ***necessary****.*
4) Draw ***neat*** *diagram where* ***required****.*

SECTION – I

2. Attempt **any three** : **(4×3=12)**
   1) Write a subroutine for 8085 to generate a delay of 10msec. Assume 33 μsec as clock delay.
   2) Explain different hardware interrupts of 8085.
   3) Analyze the following program running on 8085 and find out the content of Program Counter and Stack Pointer.

Memory address in HEX	Instructions
2000	LXI SP, 1000
2003	PUSH H
2004	PUSH D
2005	CALL 2050
2008	POP H
2009	HLT

   4) Describe the features of 8085.

3. Attempt **any two** : **(2×8=16)**
   1) Draw SIM instruction format and discuss.
   2) Explain interrupt structure of 8085 in detail.
   3) Draw and explain timing diagram of an instruction LHLD 2000 H.

Set R

SECTION – II

4. Attempt **any three** : **(4×3=12)**
   1) List out the specifications of 8255.
   2) Draw suitable diagram for weighted resistor type DAC and discuss.
   3) Draw the schematic diagram of speed measurement and display using microprocessor.
   4) Describe control word format of USART 8251 in asynchronous and synchronous mode.

5. Attempt **any two** : **(2×8=16)**
   1) Interface stepper motor to 8085 using 8255. Interface 8255 in I/O mapped I/O.
   2) Draw and explain functional block diagram of 8251. Discuss each block in detail.
   3) Explain with suitable timing diagram mode 2 and mode 3 of 8253 in detail.

———————————

SLR-VB – 390

Seat No.	

Set **S**

T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
MICROPROCESSOR AND ITS APPLICATIONS (CGPA)

Day and Date : Saturday, 6-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose correct option : **(14×1=14)**

1) The number of counters that are present in the programmable timer device 8254 is
a) 1 b) 2 c) 3 d) 4

2) 8251 is a
a) UART
b) USART
c) Programmable Interrupt controller
d) Programmable interval timer/counter

3) If the programmable counter timer 8254 is set in mode 1 and is to be used to count six events, the output will remain at logic 0 for _____ number of counts.
a) 5 b) 6 c) 0 d) All of the above

4) Which pins are general purpose I/O pins during mode-2 operation of the 82C55 ?
a) PA0-PA7 b) PB0-PB7 c) PC3-PC7 d) PC0-PC2

5) Dual slope ADC techniques uses
a) Voltage-current conversion b) Current-voltage conversion
c) Time to voltage conversion d) Voltage to time conversion

P.T.O.

6) Vector location of RST 6.5 is
   a) 0024 H b) 003C H c) 0034 H d) 002C H

7) How many address lines are there on 2K byte memory chip ?
   a) 16 b) 13 c) 8 d) 11

8) IC74LS138 is a
   a) Latch b) Encoder c) Buffer d) Decoder

9) The number of machine cycle required for STA instruction in 8085 microprocessor is
   a) 4 b) 2 c) 3 d) 5

10) PSW stands for
   a) Accumulator content b) Flag byte
   c) Accumulator and flag byte d) None

11) Which of the following memory requires refreshing ?
   a) ROM b) SRAM c) DRAM d) EPROM

12) Which microprocessor pins are used to request and acknowledge a DMA transfer ?
   a) Reset and ready b) Ready and wait
   c) HOLD and HLDA d) None of these

13) In 8254 control word register, if SC1=0 and SC0=1, then the counter selected is
   a) Counter 0 b) Counter 1 c) Counter 2 d) None

14) Which of the following is not a mode of data transmission ?
   a) simplex b) duplex c) semi duplex d) half duplex

———————

SLR-VB – 390

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
MICROPROCESSOR AND ITS APPLICATIONS (CGPA)

Day and Date : Saturday, 6-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to ***right*** *indicate* ***full*** *marks.*
3) Assume suitable data if ***necessary****.*
4) Draw ***neat*** *diagram where* ***required****.*

SECTION – I

2. Attempt **any three** : **(4×3=12)**
   1) Write a subroutine for 8085 to generate a delay of 10msec. Assume 33 μsec as clock delay.
   2) Explain different hardware interrupts of 8085.
   3) Analyze the following program running on 8085 and find out the content of Program Counter and Stack Pointer.

Memory address in HEX	Instructions
2000	LXI SP, 1000
2003	PUSH H
2004	PUSH D
2005	CALL 2050
2008	POP H
2009	HLT

   4) Describe the features of 8085.

3. Attempt **any two** : **(2×8=16)**
   1) Draw SIM instruction format and discuss.
   2) Explain interrupt structure of 8085 in detail.
   3) Draw and explain timing diagram of an instruction LHLD 2000 H.

SECTION – II

4. Attempt **any three** : **(4×3=12)**
   1) List out the specifications of 8255.
   2) Draw suitable diagram for weighted resistor type DAC and discuss.
   3) Draw the schematic diagram of speed measurement and display using microprocessor.
   4) Describe control word format of USART 8251 in asynchronous and synchronous mode.

5. Attempt **any two** : **(2×8=16)**
   1) Interface stepper motor to 8085 using 8255. Interface 8255 in I/O mapped I/O.
   2) Draw and explain functional block diagram of 8251. Discuss each block in detail.
   3) Explain with suitable timing diagram mode 2 and mode 3 of 8253 in detail.

———————————

SLR-VB – 391

Seat No.	

Set P

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 8-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***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 options : **14**

1) Maximum power transfer capability of transmission line can be increased by
   a) Parallel transmission lines b) Using series capacitance
   c) Using bundled conductors d) All of the above

2) For flat voltage profile system, voltage regulation is
   a) 0% b) 100%
   c) 50% d) Any of the above

3) Proximity effect is more in case of
   a) Power cables b) Over head lines
   c) Same in both cases d) None of the above

4) Overhead system can be designed for operation upto
   a) 11 kV b) 33 kV
   c) 66 kV d) 400 kV

5) The minimum clearance between the ground and a 220 kV line is about
   a) 4.3 m b) 5.5 m
   c) 7.0 m d) 10.5 m

P.T.O.

6) The effective resistance of a conductor will be the same as ohmic resistance when
   a) Current is in true sine waveform
   b) Voltage is low
   c) Power factor is unity
   d) Current is uniformly distributed in the conductor cross-section

7) The power transmitted will be maximum when
   a) Corona losses are minimum
   b) Reactance is high
   c) Sending end voltage is more
   d) Receiving end voltage is more

8) The usual spans with R.C.C. poles are
   a) 40-50 meters
   b) 60-100 meters
   c) 80-100 meters
   d) 300-500 meters

9) Which of the following is not a constituent for making porcelain insulators ?
   a) Quartz b) Kaolin c) Felspar d) Silica

10) The voltage drop, for constant voltage transmission is compensated by installing
   a) Inductors
   b) Capacitors
   c) Synchronous motors
   d) All of the above

11) The material generally used for armour of high voltage cables is
   a) Aluminium b) Steel c) Brass d) Copper

12) Which of the following method is used for changing power factor from leading to lagging ?
   a) Shunt capacitor
   b) Series capacitor
   c) Shunt reactor
   d) Any of the above

13) Multicore cables generally use
   a) Square conductors
   b) Circular conductors
   c) Rectangular conductors
   d) Sector-shaped conductors

14) The material commonly used for sheaths of underground cables is
   a) Lead b) Rubber c) Copper d) Iron

———————

SLR-VB – 391

Seat No.	

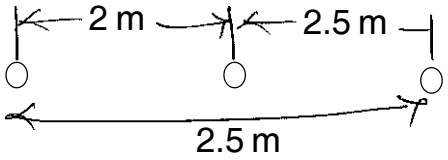
T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

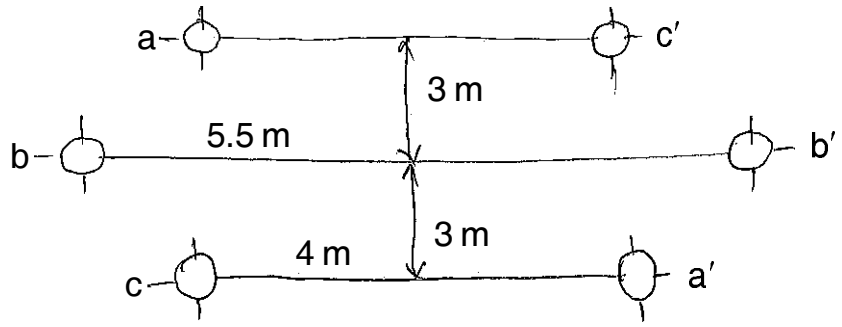
Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***maximum*** *marks.*
3) Assume the suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Write short note on proximity effect.
   2) Criteria for choosing conductor material. Describe ACSR conductors.
   3) Explain the concept of mutual GMD.
   4) Explain stock bridge damper with neat diagram.
   5) Define corona, its voltages and power loss with equations.
   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) Find the inductance per phase per km of double circuit 3-phase line as shown in figure. Distances are between center to center of conductors. The conductor are transposed and of radius 0.75 cm each. Phase sequence is ABC.



   3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.

Set P

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Derive an expression for voltage regulation and efficiency of medium transmission line consider nominal-T 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) Describe properties of insulating material used in underground cable.

   5) Derive the generalized circuit constants for medium line using nominal Π -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 3-phase, 50 Hz overhead transmission line 100 km long delivers 20 MW at 0.9 p.f. lagging and at 110 kV. The resistance and reactance of line per phase per km are 0.2Ω and 0.4Ω respectively, while capacitance admittance is 2.5×10^{-6} Siemen/km/phase.

      Calculate :

      i) The current and voltage at the sending end

      ii) Efficiency of transmission.

      Use nominal T method.

   3) Derive an expression for sending end and receiving end voltage and current for long transmission line (Rigorous method).

———————————

SLR-VB – 391

Seat No.	

Set Q

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 8-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **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 options : **14**

1) The usual spans with R.C.C. poles are
   a) 40-50 meters b) 60-100 meters
   c) 80-100 meters d) 300-500 meters

2) Which of the following is not a constituent for making porcelain insulators ?
   a) Quartz b) Kaolin c) Felspar d) Silica

3) The voltage drop, for constant voltage transmission is compensated by installing
   a) Inductors b) Capacitors
   c) Synchronous motors d) All of the above

4) The material generally used for armour of high voltage cables is
   a) Aluminium b) Steel c) Brass d) Copper

5) Which of the following method is used for changing power factor from leading to lagging ?
   a) Shunt capacitor b) Series capacitor
   c) Shunt reactor d) Any of the above

6) Multicore cables generally use
   a) Square conductors
   b) Circular conductors
   c) Rectangular conductors
   d) Sector-shaped conductors

7) The material commonly used for sheaths of underground cables is
   a) Lead b) Rubber c) Copper d) Iron

8) Maximum power transfer capability of transmission line can be increased by
   a) Parallel transmission lines
   b) Using series capacitance
   c) Using bundled conductors
   d) All of the above

9) For flat voltage profile system, voltage regulation is
   a) 0%
   b) 100%
   c) 50%
   d) Any of the above

10) Proximity effect is more in case of
   a) Power cables
   b) Over head lines
   c) Same in both cases
   d) None of the above

11) Overhead system can be designed for operation upto
   a) 11 kV
   b) 33 kV
   c) 66 kV
   d) 400 kV

12) The minimum clearance between the ground and a 220 kV line is about
   a) 4.3 m
   b) 5.5 m
   c) 7.0 m
   d) 10.5 m

13) The effective resistance of a conductor will be the same as ohmic resistance when
   a) Current is in true sine waveform
   b) Voltage is low
   c) Power factor is unity
   d) Current is uniformly distributed in the conductor cross-section

14) The power transmitted will be maximum when
   a) Corona losses are minimum
   b) Reactance is high
   c) Sending end voltage is more
   d) Receiving end voltage is more

———————

SLR-VB – 391

Seat No.	

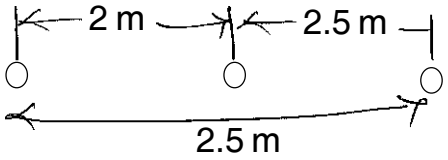
T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

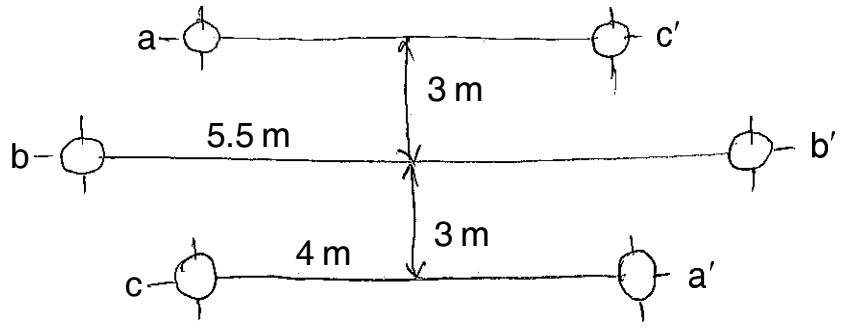
Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***maximum*** *marks.*
3) Assume the suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Write short note on proximity effect.
   2) Criteria for choosing conductor material. Describe ACSR conductors.
   3) Explain the concept of mutual GMD.
   4) Explain stock bridge damper with neat diagram.
   5) Define corona, its voltages and power loss with equations.
   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) Find the inductance per phase per km of double circuit 3-phase line as shown in figure. Distances are between center to center of conductors. The conductor are transposed and of radius 0.75 cm each. Phase sequence is ABC.



   3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.

Set Q

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Derive an expression for voltage regulation and efficiency of medium transmission line consider nominal-T 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) Describe properties of insulating material used in underground cable.

   5) Derive the generalized circuit constants for medium line using nominal Π -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 3-phase, 50 Hz overhead transmission line 100 km long delivers 20 MW at 0.9 p.f. lagging and at 110 kV. The resistance and reactance of line per phase per km are 0.2Ω and 0.4Ω respectively, while capacitance admittance is 2.5×10^{-6} Siemen/km/phase.

      Calculate :

      i) The current and voltage at the sending end

      ii) Efficiency of transmission.

      Use nominal T method.

   3) Derive an expression for sending end and receiving end voltage and current for long transmission line (Rigorous method).

———————————

SLR-VB – 391

Seat No.	

Set R

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 8-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicate* ***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 options : **14**

1) The minimum clearance between the ground and a 220 kV line is about
   a) 4.3 m b) 5.5 m
   c) 7.0 m d) 10.5 m

2) The effective resistance of a conductor will be the same as ohmic resistance when
   a) Current is in true sine waveform
   b) Voltage is low
   c) Power factor is unity
   d) Current is uniformly distributed in the conductor cross-section

3) The power transmitted will be maximum when
   a) Corona losses are minimum b) Reactance is high
   c) Sending end voltage is more d) Receiving end voltage is more

4) The usual spans with R.C.C. poles are
   a) 40-50 meters b) 60-100 meters
   c) 80-100 meters d) 300-500 meters

P.T.O.

5) Which of the following is not a constituent for making porcelain insulators ?
a) Quartz b) Kaolin c) Felspar d) Silica

6) The voltage drop, for constant voltage transmission is compensated by installing
a) Inductors b) Capacitors
c) Synchronous motors d) All of the above

7) The material generally used for armour of high voltage cables is
a) Aluminium b) Steel c) Brass d) Copper

8) Which of the following method is used for changing power factor from leading to lagging ?
a) Shunt capacitor b) Series capacitor
c) Shunt reactor d) Any of the above

9) Multicore cables generally use
a) Square conductors b) Circular conductors
c) Rectangular conductors d) Sector-shaped conductors

10) The material commonly used for sheaths of underground cables is
a) Lead b) Rubber c) Copper d) Iron

11) Maximum power transfer capability of transmission line can be increased by
a) Parallel transmission lines b) Using series capacitance
c) Using bundled conductors d) All of the above

12) For flat voltage profile system, voltage regulation is
a) 0% b) 100%
c) 50% d) Any of the above

13) Proximity effect is more in case of
a) Power cables b) Over head lines
c) Same in both cases d) None of the above

14) Overhead system can be designed for operation upto
a) 11 kV b) 33 kV
c) 66 kV d) 400 kV

———————

SLR-VB – 391

Seat No.	

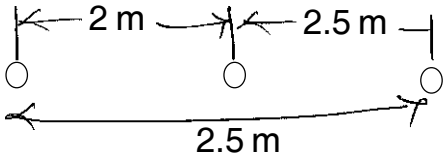
T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

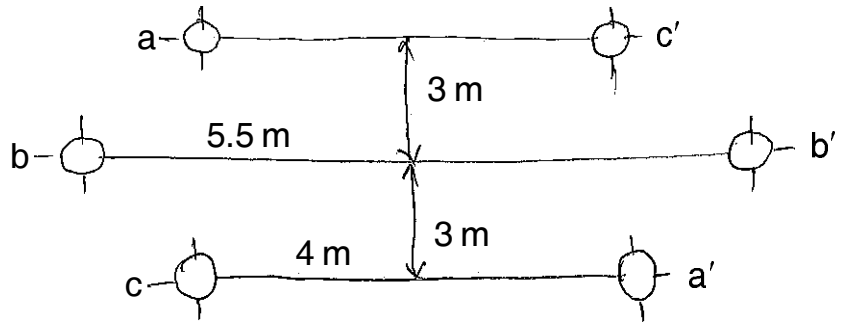
Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***maximum*** *marks.*
3) Assume the suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Write short note on proximity effect.
   2) Criteria for choosing conductor material. Describe ACSR conductors.
   3) Explain the concept of mutual GMD.
   4) Explain stock bridge damper with neat diagram.
   5) Define corona, its voltages and power loss with equations.
   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) Find the inductance per phase per km of double circuit 3-phase line as shown in figure. Distances are between center to center of conductors. The conductor are transposed and of radius 0.75 cm each. Phase sequence is ABC.



   3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.

Set R

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Derive an expression for voltage regulation and efficiency of medium transmission line consider nominal-T 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) Describe properties of insulating material used in underground cable.

   5) Derive the generalized circuit constants for medium line using nominal Π-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 3-phase, 50 Hz overhead transmission line 100 km long delivers 20 MW at 0.9 p.f. lagging and at 110 kV. The resistance and reactance of line per phase per km are 0.2Ω and 0.4Ω respectively, while capacitance admittance is 2.5×10^{-6} Siemen/km/phase.

      Calculate :

      i) The current and voltage at the sending end

      ii) Efficiency of transmission.

      Use nominal T method.

   3) Derive an expression for sending end and receiving end voltage and current for long transmission line (Rigorous method).

———————

SLR-VB – 391

Seat No.	

Set S

T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 8-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figures to the **right** indicate **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 options : **14**

1) The voltage drop, for constant voltage transmission is compensated by installing
   a) Inductors b) Capacitors
   c) Synchronous motors d) All of the above

2) The material generally used for armour of high voltage cables is
   a) Aluminium b) Steel c) Brass d) Copper

3) Which of the following method is used for changing power factor from leading to lagging ?
   a) Shunt capacitor b) Series capacitor
   c) Shunt reactor d) Any of the above

4) Multicore cables generally use
   a) Square conductors b) Circular conductors
   c) Rectangular conductors d) Sector-shaped conductors

5) The material commonly used for sheaths of underground cables is
   a) Lead b) Rubber c) Copper d) Iron

P.T.O.

6) Maximum power transfer capability of transmission line can be increased by
   a) Parallel transmission lines
   b) Using series capacitance
   c) Using bundled conductors
   d) All of the above

7) For flat voltage profile system, voltage regulation is
   a) 0%
   b) 100%
   c) 50%
   d) Any of the above

8) Proximity effect is more in case of
   a) Power cables
   b) Over head lines
   c) Same in both cases
   d) None of the above

9) Overhead system can be designed for operation upto
   a) 11 kV
   b) 33 kV
   c) 66 kV
   d) 400 kV

10) The minimum clearance between the ground and a 220 kV line is about
   a) 4.3 m
   b) 5.5 m
   c) 7.0 m
   d) 10.5 m

11) The effective resistance of a conductor will be the same as ohmic resistance when
   a) Current is in true sine waveform
   b) Voltage is low
   c) Power factor is unity
   d) Current is uniformly distributed in the conductor cross-section

12) The power transmitted will be maximum when
   a) Corona losses are minimum
   b) Reactance is high
   c) Sending end voltage is more
   d) Receiving end voltage is more

13) The usual spans with R.C.C. poles are
   a) 40-50 meters
   b) 60-100 meters
   c) 80-100 meters
   d) 300-500 meters

14) Which of the following is not a constituent for making porcelain insulators ?
   a) Quartz b) Kaolin c) Felspar d) Silica

———————

SLR-VB – 391

Seat No.	

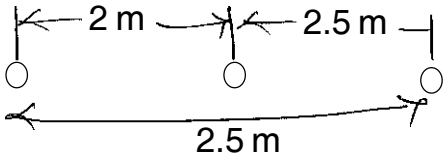
T.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2017
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 8-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

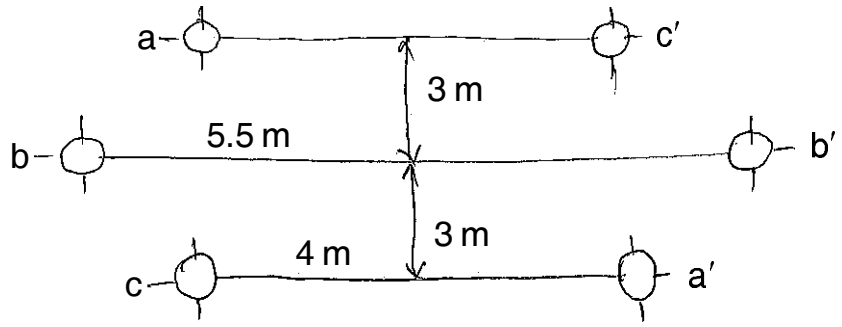
Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figures to the ***right*** *indicates* ***maximum*** *marks.*
3) Assume the suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   1) Write short note on proximity effect.
   2) Criteria for choosing conductor material. Describe ACSR conductors.
   3) Explain the concept of mutual GMD.
   4) Explain stock bridge damper with neat diagram.
   5) Define corona, its voltages and power loss with equations.
   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) Find the inductance per phase per km of double circuit 3-phase line as shown in figure. Distances are between center to center of conductors. The conductor are transposed and of radius 0.75 cm each. Phase sequence is ABC.



   3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.

Set S

SECTION – II

4. Solve **any four** : **(4×4=16)**

   1) Derive an expression for voltage regulation and efficiency of medium transmission line consider nominal-T 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) Describe properties of insulating material used in underground cable.

   5) Derive the generalized circuit constants for medium line using nominal Π -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 3-phase, 50 Hz overhead transmission line 100 km long delivers 20 MW at 0.9 p.f. lagging and at 110 kV. The resistance and reactance of line per phase per km are 0.2Ω and 0.4Ω respectively, while capacitance admittance is 2.5×10^{-6} Siemen/km/phase.

      Calculate :

      i) The current and voltage at the sending end

      ii) Efficiency of transmission.

      Use nominal T method.

   3) Derive an expression for sending end and receiving end voltage and current for long transmission line (Rigorous method).

———————

SLR-VB – 392

Seat No.	

Set **P**

T.E. (E&E) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEMS – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In force-voltage analogy, velocity is analogous to
a) Current b) Charge c) Inductance d) Capacitance

2) The transfer function of a system is defined as
a) The Laplace transform of the impulse response
b) Laplace transform of the step response
c) Laplace transform of the ramp response
d) Laplace transform of the sinusoidal input

3) The initial response when the output is not equal to input is called
a) Transient response b) Error response
c) Dynamic response d) Either of the above

4) The type I system has _____ at the origin.
a) No pole b) Net pole c) Simple pole d) Two poles

5) The equation $2s^4 + s^3 + 3s^2 + 5s + 10$ has roots in the left half of s-plane.
a) one b) two c) three d) four

6) For n^{th} order system the state equations will be of order of
a) n b) 1 c) n/2 d) (n + 1)/2

P.T.O.

7) There is a _____ between two nodes of signal flow graph.
   a) Link b) Branch
   c) Tree d) None of above

8) 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

9) The term reset control refers to
   a) Proportional b) Integral
   c) Derivative d) None of the above

10) Which of the following is the best method for determining the stability and transient response ?
   a) Root locus b) Bode plot
   c) Nyquist plot d) None of the above

11) A constant K in Bode plot
   a) Adds – 20dB/decades slope
   b) Adds + 20dB/decades slope
   c) Shifts the plot downward
   d) Shifts the plot upward

12) The state model of a linear time invariant system is given by

   $X(t) = AX(t) + BU(t)$ and $Y(t) = CX(t) + DU(t)$.

   The expression for transfer function of the system is
   a) $C(sI – A)–1\ BU(s) + D$ b) $(sI – A)–1\ BU(s) + D$
   c) $(sI – A)–1\ BU(s)$ d) $C(sI – A)–1\ B$

13) Which of the following will increase the steady state accuracy ?
   a) Phase Lead-compensator
   b) Phase Lag-compensator
   c) Differentiator
   d) Integrator

14) Addition of zeros in transfer function causes which of the following ?
   a) Lead-compensation b) Lag-compensation
   c) Lead-lag compensation d) None of the above

_____

SLR-VB – 392

Seat No.	

T.E. (E&E) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEMS – I

Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Differentiate between open loop and closed loop control systems.

b) Explain the transient response specifications.

c) Explain the terms BIBO stability, relative stability, asymptotic stability.

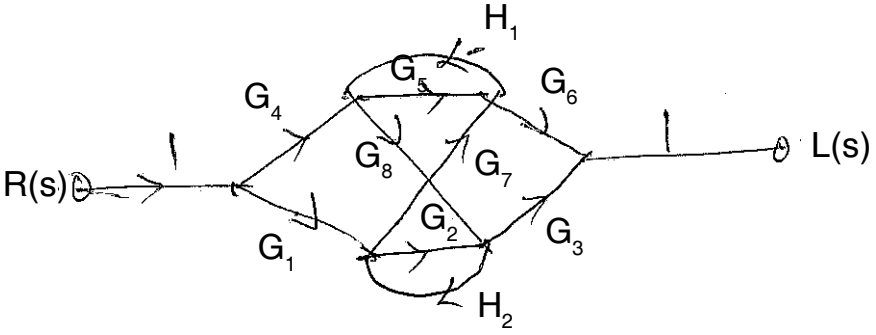
d) Explain any five block diagram reduction rules in detail.

e) What is Routh-Hurwitz stability criterion ? Explain.

f) A second order system is given by $C(s)/R(s) = 8/s^2 + 4s + 8$. Find its peak time, peak overshoot, settling time.

3. Solve **any two** : **(6×2=12)**

a) Using Mason's gain formula find gain of the following system in figure below



b) Derive effect of ξ on second order system performance of time response.

c) Sketch the root locus for the system having $G(s) * H(s) = k/s(s + 2)(s + 4)$.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Write the correlation between time domain and frequency domain.
   b) What is state space ? State advantages and limitations of state space.
   c) Explain PID controller with example.
   d) Explain the term phase margin and gain margin.
   e) Derive transfer function from state model for continuous time system.
   f) What is PLC ? Explain the block diagram of PLC.

5. Solve **any two** : **(6×2=12)**
   a) A unity feedback control system has $G(s) = 80/s(s + 2)(s + 20)$ draw the bode plot. Determine G.M., P.M.
   b) Obtain the state variable model of RLC circuit using physical variables.
   c) Explain and derive the Lag-Lead compensator.

———————

SLR-VB – 392

Seat No.	

Set **Q**

T.E. (E&E) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEMS – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Phase margin of a system is used to specify which of the following ?
   a) Frequency response b) Absolute stability
   c) Relative stability d) Time response

2) The term reset control refers to
   a) Proportional b) Integral
   c) Derivative d) None of the above

3) Which of the following is the best method for determining the stability and transient response ?
   a) Root locus b) Bode plot
   c) Nyquist plot d) None of the above

4) A constant K in Bode plot
   a) Adds – 20dB/decades slope b) Adds + 20dB/decades slope
   c) Shifts the plot downward d) Shifts the plot upward

5) The state model of a linear time invariant system is given by
   $X(t) = AX(t) + BU(t)$ and $Y(t) = CX(t) + DU(t)$.
   The expression for transfer function of the system is
   a) $C(sI – A)–1 BU(s) + D$ b) $(sI – A)–1 BU(s) + D$
   c) $(sI – A)–1 BU(s)$ d) $C(sI – A)–1 B$

P.T.O.

6) Which of the following will increase the steady state accuracy ?
   a) Phase Lead-compensator
   b) Phase Lag-compensator
   c) Differentiator
   d) Integrator

7) Addition of zeros in transfer function causes which of the following ?
   a) Lead-compensation b) Lag-compensation
   c) Lead-lag compensation d) None of the above

8) In force-voltage analogy, velocity is analogous to
   a) Current b) Charge c) Inductance d) Capacitance

9) The transfer function of a system is defined as
   a) The Laplace transform of the impulse response
   b) Laplace transform of the step response
   c) Laplace transform of the ramp response
   d) Laplace transform of the sinusoidal input

10) The initial response when the output is not equal to input is called
   a) Transient response b) Error response
   c) Dynamic response d) Either of the above

11) The type I system has _____ at the origin.
   a) No pole b) Net pole c) Simple pole d) Two poles

12) The equation $2s^4 + s^3 + 3s^2 + 5s + 10$ has roots in the left half of s-plane.
   a) one b) two c) three d) four

13) For n^{th} order system the state equations will be of order of
   a) n b) 1 c) n/2 d) (n + 1)/2

14) There is a _____ between two nodes of signal flow graph.
   a) Link b) Branch
   c) Tree d) None of above

_____

SLR-VB – 392

Seat No.	

T.E. (E&E) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEMS – I

Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Differentiate between open loop and closed loop control systems.

b) Explain the transient response specifications.

c) Explain the terms BIBO stability, relative stability, asymptotic stability.

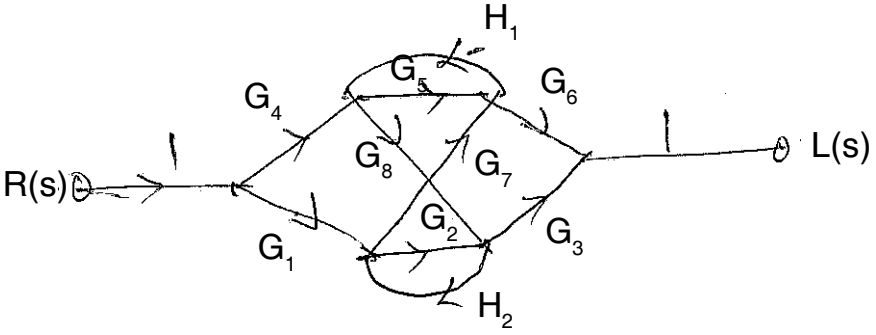
d) Explain any five block diagram reduction rules in detail.

e) What is Routh-Hurwitz stability criterion ? Explain.

f) A second order system is given by $C(s)/R(s) = 8/s^2 + 4s + 8$. Find its peak time, peak overshoot, settling time.

3. Solve **any two** : **(6×2=12)**

a) Using Mason's gain formula find gain of the following system in figure below



b) Derive effect of ξ on second order system performance of time response.

c) Sketch the root locus for the system having $G(s) * H(s) = k/s(s + 2)(s + 4)$.

Set Q

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Write the correlation between time domain and frequency domain.
   b) What is state space ? State advantages and limitations of state space.
   c) Explain PID controller with example.
   d) Explain the term phase margin and gain margin.
   e) Derive transfer function from state model for continuous time system.
   f) What is PLC ? Explain the block diagram of PLC.

5. Solve **any two** : **(6×2=12)**
   a) A unity feedback control system has $G(s) = 80/s(s + 2)(s + 20)$ draw the bode plot. Determine G.M., P.M.
   b) Obtain the state variable model of RLC circuit using physical variables.
   c) Explain and derive the Lag-Lead compensator.

———————

SLR-VB – 392

Seat No.	

Set **R**

T.E. (E&E) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEMS – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The equation $2s^4 + s^3 + 3s^2 + 5s + 10$ has roots in the left half of s-plane.
a) one b) two c) three d) four

2) For n^{th} order system the state equations will be of order of
a) n b) 1 c) n/2 d) (n + 1)/2

3) There is a _____ between two nodes of signal flow graph.
a) Link b) Branch
c) Tree d) None of above

4) 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

5) The term reset control refers to
a) Proportional b) Integral
c) Derivative d) None of the above

6) Which of the following is the best method for determining the stability and transient response ?
a) Root locus b) Bode plot
c) Nyquist plot d) None of the above

P.T.O.

7) A constant K in Bode plot
   a) Adds – 20dB/decades slope
   b) Adds + 20dB/decades slope
   c) Shifts the plot downward
   d) Shifts the plot upward

8) The state model of a linear time invariant system is given by

   $X(t) = AX(t) + BU(t)$ and $Y(t) = CX(t) + DU(t)$.

   The expression for transfer function of the system is

   a) $C(sI – A)–1\ BU(s) + D$ b) $(sI – A)–1\ BU(s) + D$
   c) $(sI – A)–1\ BU(s)$ d) $C(sI – A)–1\ B$

9) Which of the following will increase the steady state accuracy ?
   a) Phase Lead-compensator
   b) Phase Lag-compensator
   c) Differentiator
   d) Integrator

10) Addition of zeros in transfer function causes which of the following ?
   a) Lead-compensation b) Lag-compensation
   c) Lead-lag compensation d) None of the above

11) In force-voltage analogy, velocity is analogous to
   a) Current b) Charge c) Inductance d) Capacitance

12) The transfer function of a system is defined as
   a) The Laplace transform of the impulse response
   b) Laplace transform of the step response
   c) Laplace transform of the ramp response
   d) Laplace transform of the sinusoidal input

13) The initial response when the output is not equal to input is called
   a) Transient response b) Error response
   c) Dynamic response d) Either of the above

14) The type I system has _____ at the origin.
   a) No pole b) Net pole c) Simple pole d) Two poles

_____

SLR-VB – 392

Seat No.	

T.E. (E&E) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEMS – I

Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Differentiate between open loop and closed loop control systems.

b) Explain the transient response specifications.

c) Explain the terms BIBO stability, relative stability, asymptotic stability.

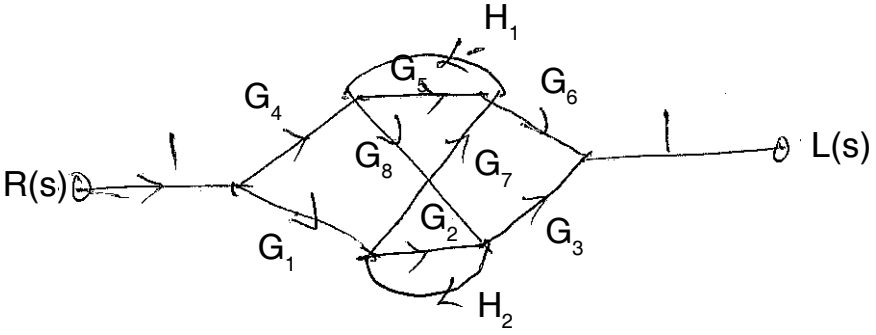
d) Explain any five block diagram reduction rules in detail.

e) What is Routh-Hurwitz stability criterion ? Explain.

f) A second order system is given by $C(s)/R(s) = 8/s^2 + 4s + 8$. Find its peak time, peak overshoot, settling time.

3. Solve **any two** : **(6×2=12)**

a) Using Mason's gain formula find gain of the following system in figure below



b) Derive effect of ξ on second order system performance of time response.

c) Sketch the root locus for the system having $G(s) * H(s) = k/s(s + 2)(s + 4)$.

Set R

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Write the correlation between time domain and frequency domain.
   b) What is state space ? State advantages and limitations of state space.
   c) Explain PID controller with example.
   d) Explain the term phase margin and gain margin.
   e) Derive transfer function from state model for continuous time system.
   f) What is PLC ? Explain the block diagram of PLC.

5. Solve **any two** : **(6×2=12)**
   a) A unity feedback control system has $G(s) = 80/s(s + 2)(s + 20)$ draw the bode plot. Determine G.M., P.M.
   b) Obtain the state variable model of RLC circuit using physical variables.
   c) Explain and derive the Lag-Lead compensator.

———————

SLR-VB – 392

Seat No.	

Set **S**

T.E. (E&E) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEMS – I

Day and Date : Tuesday, 9-5-2017 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Which of the following is the best method for determining the stability and transient response ?

a) Root locus b) Bode plot
c) Nyquist plot d) None of the above

2) A constant K in Bode plot

a) Adds – 20dB/decades slope
b) Adds + 20dB/decades slope
c) Shifts the plot downward
d) Shifts the plot upward

3) The state model of a linear time invariant system is given by

$X(t) = AX(t) + BU(t)$ and $Y(t) = CX(t) + DU(t)$.

The expression for transfer function of the system is

a) $C(sI – A)^{–1} BU(s) + D$ b) $(sI – A)^{–1} BU(s) + D$
c) $(sI – A)^{–1} BU(s)$ d) $C(sI – A)^{–1} B$

4) Which of the following will increase the steady state accuracy ?

a) Phase Lead-compensator b) Phase Lag-compensator
c) Differentiator d) Integrator

P.T.O.

5) Addition of zeros in transfer function causes which of the following ?
   a) Lead-compensation b) Lag-compensation
   c) Lead-lag compensation d) None of the above

6) In force-voltage analogy, velocity is analogous to
   a) Current b) Charge c) Inductance d) Capacitance

7) The transfer function of a system is defined as
   a) The Laplace transform of the impulse response
   b) Laplace transform of the step response
   c) Laplace transform of the ramp response
   d) Laplace transform of the sinusoidal input

8) The initial response when the output is not equal to input is called
   a) Transient response b) Error response
   c) Dynamic response d) Either of the above

9) The type I system has _____ at the origin.
   a) No pole b) Net pole c) Simple pole d) Two poles

10) The equation $2s^4 + s^3 + 3s^2 + 5s + 10$ has roots in the left half of s-plane.
   a) one b) two c) three d) four

11) For n^{th} order system the state equations will be of order of
   a) n b) 1 c) n/2 d) (n + 1)/2

12) There is a _____ between two nodes of signal flow graph.
   a) Link b) Branch
   c) Tree d) None of above

13) 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

14) The term reset control refers to
   a) Proportional b) Integral
   c) Derivative d) None of the above

_____

SLR-VB – 392

Seat No.	

T.E. (E&E) (Part – I) (CGPA) Examination, 2017
CONTROL SYSTEMS – I

Day and Date : Tuesday, 9-5-2017 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×4=16)**

a) Differentiate between open loop and closed loop control systems.

b) Explain the transient response specifications.

c) Explain the terms BIBO stability, relative stability, asymptotic stability.

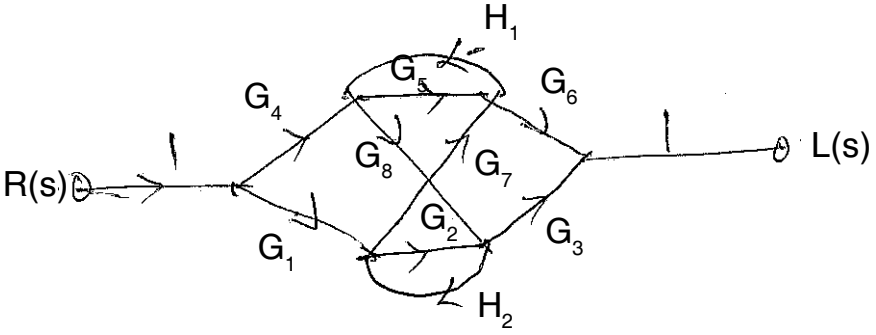
d) Explain any five block diagram reduction rules in detail.

e) What is Routh-Hurwitz stability criterion ? Explain.

f) A second order system is given by $C(s)/R(s) = 8/s^2 + 4s + 8$. Find its peak time, peak overshoot, settling time.

3. Solve **any two** : **(6×2=12)**

a) Using Mason's gain formula find gain of the following system in figure below



b) Derive effect of ξ on second order system performance of time response.

c) Sketch the root locus for the system having $G(s) * H(s) = k/s(s + 2)(s + 4)$.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Write the correlation between time domain and frequency domain.
   b) What is state space ? State advantages and limitations of state space.
   c) Explain PID controller with example.
   d) Explain the term phase margin and gain margin.
   e) Derive transfer function from state model for continuous time system.
   f) What is PLC ? Explain the block diagram of PLC.

5. Solve **any two** : **(6×2=12)**
   a) A unity feedback control system has $G(s) = 80/s(s + 2)(s + 20)$ draw the bode plot. Determine G.M., P.M.
   b) Obtain the state variable model of RLC circuit using physical variables.
   c) Explain and derive the Lag-Lead compensator.

———————

SLR-VB – 394

Seat No.	

Set P

T.E. (Electrical and Electronics Engineering) (Part – II) (New – CGPA) Examination, 2017
POWER ELECTRONICS

Day and Date : Monday, 15-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) When a line commutated converter operates in the inverter mode ?
   a) It draws both real and reactive power from the AC supply
   b) It delivers both real and reactive power to the AC supply
   c) It delivers real power to the AC supply
   d) It draws reactive power from the AC supply

2) A chopper operating at a fixed frequency is feeding an RL load. As the duty ratio of the chopper is increased from 25% to 75% the ripple in the load current is
   a) Remains constant
   b) Decreases, reaches a minimum at 50% duty ratio and then increases
   c) Increases, reaches a maximum at 50% duty ratio and then decreases
   d) Keeps on increasing as the duty ratio is increased

3) To turn off a SCR, the reverse bias should be applied for a period _____ the turn-off time of the SCR.
   a) Equal to b) Longer than c) Less than d) Irrespective of

4) In class A and class B commutation the resonating circuit has to be
   a) Over damped b) Critically damped
   c) Under damped d) Negatively damped

5) In phase controlled rectification Power Factor (PF)
   a) Remains unaffected
   b) Improves with increase of firing angle α
   c) Deteriorates with increase of α
   d) Is unrelated to α

P.T.O.

6) Comparing with the full wave rectifier using two diodes, the four diode bridge rectifier has the dominant advantage of
   a) Higher current carrying
   b) Lower peak inverse voltage requirement
   c) Lower ripple factor
   d) Higher efficiency

7) Advantages of Cuk converter is/are
   a) Large number of reactive component
   b) Low stress on switch
   c) Low stress on capacitor
   d) None of these

8) In a push-pull converter, the filter capacitor can be obtained as
   a) $C_{min} = V/(V_r L f^2)$
   b) $C_{min} = (1 – D) V/(V_r L f^2)$
   c) $C_{min} = (1 – 2D) V/32 (V_r L f^2)$
   d) $C_{min} = (1 – 2D) V/42 (V_r L f^2)$

9) The typical value of SCR for modern alternator is
   a) 1.5 b) 0.5 c) 1.0 d) 1.2

10) A cycloconverter is a
   a) Frequency changer from higher to lower frequency with one-state conversion
   b) Frequency changer from higher to lower frequency with two-stage conversion
   c) Frequency changer from lower to higher frequency with one-stage conversion
   d) Either a or c

11) 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

12) In synchronized UJT triggering of an SCR, voltage VC across capacitor reaches UJT threshold thrice in each half cycle so that there are three firing pulses during each half cycle. The firing angle of the SCR can be controlled
   a) Once in each half cycle
   b) Thrice in each half cycle
   c) Twice in each half cycle
   d) Four times in each half cycle

13) In a GTO, anode current begins to fall when gate current
   a) Is negative peak at time t = 0
   b) Is negative peak at t = storage period tS
   c) Just begins to become negative at t = 0
   d) Is negative peak at t = (tS + fall time)

14) The SCR can be turned on by
   A) Applying anode voltage at a sufficiently fast rate
   B) Applying sufficiently large anode voltage
   C) Increasing the temperature of SCR to a sufficiently large value
   D) Applying sufficiently large gate current

   Options :
   a) A, B b) C, D c) B, C d) A, B, C, D

_____

SLR-VB – 394

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (New – CGPA) Examination, 2017
POWER ELECTRONICS

Day and Date : Monday, 15-5-2017 Marks : 56

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

Instructions *: 1) Assume* ***suitable*** *data* ***wherever*** *necessary.*

2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any three :** **(3×4=12)**

a) Explain Gate characteristics of SCR.

b) Draw the block diagram of UPS and explain each block.

c) Explain over voltage protection in detail.

d) A single phase half controlled converter with R load is connected to 230V, 50 HZ supply. The resistance is 10 Ohm. Find the Average output voltage and output power if the firing angle is 30°.

e) With the help of neat diagram and waveform explain single phase half wave controlled rectifier with R load in detail.

3. Solve **any two** : **(8×2=16)**

a) Draw circuit for fully controlled bride rectifier with RL load. Draw waveforms for load voltage and derive the expression for average load voltage and average load current.

b) Explain the effect of source inductance on single phase full bridge rectifier with circuit diagram and waveforms.

c) Draw the block diagram of Power Electronics system and explain each block.

SECTION – II

4. Solve **any three :** **(3×4=12)**

   a) Explain different types of control strategies in case of Chopper.

   b) Explain working principle of step down Chopper with necessary Diagrams.

   c) State applications of cycloconverter.

   d) Write short note on performance parameters of inverter.

   e) Explain single phase Current Source Inverter in detail with circuit diagram and waveforms.

5. Solve **any two** : **(8×2=16)**

   a) Explain circuit diagram and waveforms for Jones Chopper Circuit.

   b) Explain three phase to three phase, 3 pulse cycloconverter.

   c) Explain voltage source inverter in detail.

SLR-VB – 394

Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engineering) (Part – II) (New – CGPA) Examination, 2017
POWER ELECTRONICS

Day and Date : Monday, 15-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In a push-pull converter, the filter capacitor can be obtained as
   a) $C_{min} = V/(V_r L f^2)$ b) $C_{min} = (1 – D) V/(V_r L f^2)$
   c) $C_{min} = (1 – 2D) V/32 (V_r L f^2)$ d) $C_{min} = (1 – 2D) V/42 (V_r L f^2)$

2) The typical value of SCR for modern alternator is
   a) 1.5 b) 0.5 c) 1.0 d) 1.2

3) A cycloconverter is a
   a) Frequency changer from higher to lower frequency with one-state conversion
   b) Frequency changer from higher to lower frequency with two-stage conversion
   c) Frequency changer from lower to higher frequency with one-stage conversion
   d) Either a or c

4) 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

5) In synchronized UJT triggering of an SCR, voltage VC across capacitor reaches UJT threshold thrice in each half cycle so that there are three firing pulses during each half cycle. The firing angle of the SCR can be controlled
   a) Once in each half cycle b) Thrice in each half cycle
   c) Twice in each half cycle d) Four times in each half cycle

6) In a GTO, anode current begins to fall when gate current
   a) Is negative peak at time t = 0
   b) Is negative peak at t = storage period tS
   c) Just begins to become negative at t = 0
   d) Is negative peak at t = (tS + fall time)

P.T.O.

7) The SCR can be turned on by
   A) Applying anode voltage at a sufficiently fast rate
   B) Applying sufficiently large anode voltage
   C) Increasing the temperature of SCR to a sufficiently large value
   D) Applying sufficiently large gate current

   Options :
   a) A, B b) C, D c) B, C d) A, B, C, D

8) When a line commutated converter operates in the inverter mode ?
   a) It draws both real and reactive power from the AC supply
   b) It delivers both real and reactive power to the AC supply
   c) It delivers real power to the AC supply
   d) It draws reactive power from the AC supply

9) A chopper operating at a fixed frequency is feeding an RL load. As the duty ratio of the chopper is increased from 25% to 75% the ripple in the load current is
   a) Remains constant
   b) Decreases, reaches a minimum at 50% duty ratio and then increases
   c) Increases, reaches a maximum at 50% duty ratio and then decreases
   d) Keeps on increasing as the duty ratio is increased

10) To turn off a SCR, the reverse bias should be applied for a period _____ the turn-off time of the SCR.
   a) Equal to b) Longer than c) Less than d) Irrespective of

11) In class A and class B commutation the resonating circuit has to be
   a) Over damped b) Critically damped
   c) Under damped d) Negatively damped

12) In phase controlled rectification Power Factor (PF)
   a) Remains unaffected
   b) Improves with increase of firing angle α
   c) Deteriorates with increase of α
   d) Is unrelated to α

13) Comparing with the full wave rectifier using two diodes, the four diode bridge rectifier has the dominant advantage of
   a) Higher current carrying b) Lower peak inverse voltage requirement
   c) Lower ripple factor d) Higher efficiency

14) Advantages of Cuk converter is/are
   a) Large number of reactive component b) Low stress on switch
   c) Low stress on capacitor d) None of these

_____

SLR-VB – 394

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (New – CGPA) Examination, 2017
POWER ELECTRONICS

Day and Date : Monday, 15-5-2017 Marks : 56

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

Instructions *: 1) Assume* ***suitable*** *data* ***wherever*** *necessary.*

2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any three :** **(3×4=12)**

a) Explain Gate characteristics of SCR.

b) Draw the block diagram of UPS and explain each block.

c) Explain over voltage protection in detail.

d) A single phase half controlled converter with R load is connected to 230V, 50 HZ supply. The resistance is 10 Ohm. Find the Average output voltage and output power if the firing angle is 30°.

e) With the help of neat diagram and waveform explain single phase half wave controlled rectifier with R load in detail.

3. Solve **any two** : **(8×2=16)**

a) Draw circuit for fully controlled bride rectifier with RL load. Draw waveforms for load voltage and derive the expression for average load voltage and average load current.

b) Explain the effect of source inductance on single phase full bridge rectifier with circuit diagram and waveforms.

c) Draw the block diagram of Power Electronics system and explain each block.

SECTION – II

4. Solve **any three :** **(3×4=12)**

   a) Explain different types of control strategies in case of Chopper.

   b) Explain working principle of step down Chopper with necessary Diagrams.

   c) State applications of cycloconverter.

   d) Write short note on performance parameters of inverter.

   e) Explain single phase Current Source Inverter in detail with circuit diagram and waveforms.

5. Solve **any two** : **(8×2=16)**

   a) Explain circuit diagram and waveforms for Jones Chopper Circuit.

   b) Explain three phase to three phase, 3 pulse cycloconverter.

   c) Explain voltage source inverter in detail.

SLR-VB – 394

Seat No.	

Set R

T.E. (Electrical and Electronics Engineering) (Part – II) (New – CGPA) Examination, 2017
POWER ELECTRONICS

Day and Date : Monday, 15-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In phase controlled rectification Power Factor (PF)
   a) Remains unaffected
   b) Improves with increase of firing angle α
   c) Deteriorates with increase of α
   d) Is unrelated to α

2) Comparing with the full wave rectifier using two diodes, the four diode bridge rectifier has the dominant advantage of
   a) Higher current carrying
   b) Lower peak inverse voltage requirement
   c) Lower ripple factor
   d) Higher efficiency

3) Advantages of Cuk converter is/are
   a) Large number of reactive component
   b) Low stress on switch
   c) Low stress on capacitor
   d) None of these

4) In a push-pull converter, the filter capacitor can be obtained as
   a) $C_{min} = V/(V_r L f^2)$
   b) $C_{min} = (1 – D) V/(V_r L f^2)$
   c) $C_{min} = (1 – 2D) V/32 (V_r L f^2)$
   d) $C_{min} = (1 – 2D) V/42 (V_r L f^2)$

5) The typical value of SCR for modern alternator is
   a) 1.5 b) 0.5 c) 1.0 d) 1.2

6) A cycloconverter is a
   a) Frequency changer from higher to lower frequency with one-state conversion
   b) Frequency changer from higher to lower frequency with two-stage conversion
   c) Frequency changer from lower to higher frequency with one-stage conversion
   d) Either a or c

P.T.O.

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) In synchronized UJT triggering of an SCR, voltage VC across capacitor reaches UJT threshold thrice in each half cycle so that there are three firing pulses during each half cycle. The firing angle of the SCR can be controlled
   a) Once in each half cycle
   b) Thrice in each half cycle
   c) Twice in each half cycle
   d) Four times in each half cycle

9) In a GTO, anode current begins to fall when gate current
   a) Is negative peak at time t = 0
   b) Is negative peak at t = storage period tS
   c) Just begins to become negative at t = 0
   d) Is negative peak at t = (tS + fall time)

10) The SCR can be turned on by
   A) Applying anode voltage at a sufficiently fast rate
   B) Applying sufficiently large anode voltage
   C) Increasing the temperature of SCR to a sufficiently large value
   D) Applying sufficiently large gate current

   Options :
   a) A, B b) C, D c) B, C d) A, B, C, D

11) When a line commutated converter operates in the inverter mode ?
   a) It draws both real and reactive power from the AC supply
   b) It delivers both real and reactive power to the AC supply
   c) It delivers real power to the AC supply
   d) It draws reactive power from the AC supply

12) A chopper operating at a fixed frequency is feeding an RL load. As the duty ratio of the chopper is increased from 25% to 75% the ripple in the load current is
   a) Remains constant
   b) Decreases, reaches a minimum at 50% duty ratio and then increases
   c) Increases, reaches a maximum at 50% duty ratio and then decreases
   d) Keeps on increasing as the duty ratio is increased

13) To turn off a SCR, the reverse bias should be applied for a period _____ the turn-off time of the SCR.
   a) Equal to b) Longer than c) Less than d) Irrespective of

14) In class A and class B commutation the resonating circuit has to be
   a) Over damped
   b) Critically damped
   c) Under damped
   d) Negatively damped

_____

SLR-VB – 394

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (New – CGPA) Examination, 2017
POWER ELECTRONICS

Day and Date : Monday, 15-5-2017 Marks : 56

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

Instructions *: 1) Assume* ***suitable*** *data* ***wherever*** *necessary.*

2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any three :** **(3×4=12)**

a) Explain Gate characteristics of SCR.

b) Draw the block diagram of UPS and explain each block.

c) Explain over voltage protection in detail.

d) A single phase half controlled converter with R load is connected to 230V, 50 HZ supply. The resistance is 10 Ohm. Find the Average output voltage and output power if the firing angle is 30°.

e) With the help of neat diagram and waveform explain single phase half wave controlled rectifier with R load in detail.

3. Solve **any two** : **(8×2=16)**

a) Draw circuit for fully controlled bride rectifier with RL load. Draw waveforms for load voltage and derive the expression for average load voltage and average load current.

b) Explain the effect of source inductance on single phase full bridge rectifier with circuit diagram and waveforms.

c) Draw the block diagram of Power Electronics system and explain each block.

SECTION – II

4. Solve **any three :** **(3×4=12)**

   a) Explain different types of control strategies in case of Chopper.

   b) Explain working principle of step down Chopper with necessary Diagrams.

   c) State applications of cycloconverter.

   d) Write short note on performance parameters of inverter.

   e) Explain single phase Current Source Inverter in detail with circuit diagram and waveforms.

5. Solve **any two** : **(8×2=16)**

   a) Explain circuit diagram and waveforms for Jones Chopper Circuit.

   b) Explain three phase to three phase, 3 pulse cycloconverter.

   c) Explain voltage source inverter in detail.

SLR-VB – 394

Seat No.	

Set **S**

T.E. (Electrical and Electronics Engineering) (Part – II) (New – CGPA) Examination, 2017
POWER ELECTRONICS

Day and Date : Monday, 15-5-2017 Max. Marks : 70

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

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

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

3) Assume ***suitable*** *data* ***wherever*** *necessary.*

4) Non-programmable calculators are ***permitted****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A cycloconverter is a
   a) Frequency changer from higher to lower frequency with one-state conversion
   b) Frequency changer from higher to lower frequency with two-stage conversion
   c) Frequency changer from lower to higher frequency with one-stage conversion
   d) Either a or c

2) 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

3) In synchronized UJT triggering of an SCR, voltage VC across capacitor reaches UJT threshold thrice in each half cycle so that there are three firing pulses during each half cycle. The firing angle of the SCR can be controlled
   a) Once in each half cycle
   b) Thrice in each half cycle
   c) Twice in each half cycle
   d) Four times in each half cycle

4) In a GTO, anode current begins to fall when gate current
   a) Is negative peak at time t = 0
   b) Is negative peak at t = storage period tS
   c) Just begins to become negative at t = 0
   d) Is negative peak at t = (tS + fall time)

P.T.O.

5) The SCR can be turned on by
   A) Applying anode voltage at a sufficiently fast rate
   B) Applying sufficiently large anode voltage
   C) Increasing the temperature of SCR to a sufficiently large value
   D) Applying sufficiently large gate current

   Options :
   a) A, B b) C, D c) B, C d) A, B, C, D

6) When a line commutated converter operates in the inverter mode ?
   a) It draws both real and reactive power from the AC supply
   b) It delivers both real and reactive power to the AC supply
   c) It delivers real power to the AC supply
   d) It draws reactive power from the AC supply

7) A chopper operating at a fixed frequency is feeding an RL load. As the duty ratio of the chopper is increased from 25% to 75% the ripple in the load current is
   a) Remains constant
   b) Decreases, reaches a minimum at 50% duty ratio and then increases
   c) Increases, reaches a maximum at 50% duty ratio and then decreases
   d) Keeps on increasing as the duty ratio is increased

8) To turn off a SCR, the reverse bias should be applied for a period _____ the turn-off time of the SCR.
   a) Equal to b) Longer than c) Less than d) Irrespective of

9) In class A and class B commutation the resonating circuit has to be
   a) Over damped b) Critically damped
   c) Under damped d) Negatively damped

10) In phase controlled rectification Power Factor (PF)
   a) Remains unaffected
   b) Improves with increase of firing angle α
   c) Deteriorates with increase of α
   d) Is unrelated to α

11) Comparing with the full wave rectifier using two diodes, the four diode bridge rectifier has the dominant advantage of
   a) Higher current carrying b) Lower peak inverse voltage requirement
   c) Lower ripple factor d) Higher efficiency

12) Advantages of Cuk converter is/are
   a) Large number of reactive component b) Low stress on switch
   c) Low stress on capacitor d) None of these

13) In a push-pull converter, the filter capacitor can be obtained as
   a) $C_{min} = V/(V_r L f^2)$ b) $C_{min} = (1 – D) V/(V_r L f^2)$
   c) $C_{min} = (1 – 2D) V/32 (V_r L f^2)$ d) $C_{min} = (1 – 2D) V/42 (V_r L f^2)$

14) The typical value of SCR for modern alternator is
   a) 1.5 b) 0.5 c) 1.0 d) 1.2

_____

SLR-VB – 394

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (New – CGPA) Examination, 2017
POWER ELECTRONICS

Day and Date : Monday, 15-5-2017 Marks : 56

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

Instructions *: 1) Assume* ***suitable*** *data* ***wherever*** *necessary.*

2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Solve **any three :** **(3×4=12)**

a) Explain Gate characteristics of SCR.

b) Draw the block diagram of UPS and explain each block.

c) Explain over voltage protection in detail.

d) A single phase half controlled converter with R load is connected to 230V, 50 HZ supply. The resistance is 10 Ohm. Find the Average output voltage and output power if the firing angle is 30°.

e) With the help of neat diagram and waveform explain single phase half wave controlled rectifier with R load in detail.

3. Solve **any two** : **(8×2=16)**

a) Draw circuit for fully controlled bride rectifier with RL load. Draw waveforms for load voltage and derive the expression for average load voltage and average load current.

b) Explain the effect of source inductance on single phase full bridge rectifier with circuit diagram and waveforms.

c) Draw the block diagram of Power Electronics system and explain each block.

SECTION – II

4. Solve **any three :** **(3×4=12)**

   a) Explain different types of control strategies in case of Chopper.

   b) Explain working principle of step down Chopper with necessary Diagrams.

   c) State applications of cycloconverter.

   d) Write short note on performance parameters of inverter.

   e) Explain single phase Current Source Inverter in detail with circuit diagram and waveforms.

5. Solve **any two** : **(8×2=16)**

   a) Explain circuit diagram and waveforms for Jones Chopper Circuit.

   b) Explain three phase to three phase, 3 pulse cycloconverter.

   c) Explain voltage source inverter in detail.

SLR-VB – 395

Seat No.	

Set P

T.E. (Electrical and Electronics Engg.) (Part – II) (New CGPA) Examination, 2017
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 17-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Base band signal is
   a) Information signal b) Carrier signal
   c) High frequency signal d) Band pass signal

2) An FM signal can be detected by using
   a) an LPF b) a PLL
   c) a discriminator d) an average detector

3) 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

4) A positive RF peak of an AM voltage rise to maximum value of 12V and drop to a minimum value 4V. The modulation index assuming single tone modulation is
   a) 3 b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{1}{2}$

5) A product modulator yields
   a) a full AM signal b) a DSB-SC signal
   c) a VSB signal d) an SSB signal

P.T.O.

6) Following is not advantage of FM over AM
   a) Noise immunity b) Fidelity
   c) Capture effect d) Sputtering effect

7) State true or false : “Periodic signal is always a energy signal”.
   a) True b) False

8) The stationary process has
   a) ensemble average equal to time average
   b) all statistical properties are dependent on time
   c) all statistical properties are independent on time
   d) zero variance

9) The coding efficiency is given by
   a) 1 – Redundancy b) 1 + Redundancy
   c) 1/Redundancy d) None

10) Companding is used in PCM to
   a) Reduce bandwidth b) Reduce power
   c) Increase S/N ratio d) Get almost uniform S/N ratio

11) Aliasing occurs when the Nyquist rate is
   a) 2 Fm b) 3 Fm
   c) 2.5 Fm d) 1.2 Fm

12) Which of the following modulation is analog in nature ?
   a) PCM b) DPCM
   c) DM d) None of the above

13) Timing jitter in regenerative repeaters in effect of
   a) Variation of pulse position b) Variation of sampling instant
   c) Both a) and b) d) None of the above

14) In a _____ handoff a mobile station can communicate with two base station at same time.
   a) Hard b) Soft
   c) Medium d) None

_____

SLR-VB – 395

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – II) (New CGPA) Examination, 2017
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 17-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any three** of the following : **(4×3=12)**
   1) What is modulation ? Explain necessity of modulation.
   2) Draw and explain super heterodyne receiver.
   3) Explain the relationship between FM and PM.
   4) Draw and explain VSB transmission for television system.

3. Solve **any two** of the following : **(8×2=16)**
   1) Explain graphical representation and mathematical equation of AM wave. Derive the equation of modulation index.
   2) A single tone modulating signal $\cos(15\pi\ 10^3 t)$ frequency modulates a carrier of 10 MHz and produces a frequency deviation of 75 KHz.

      Find :
      a) Modulation index
      b) Phase deviation produced in FM wave
      c) If another modulating signal produces a modulation index of 100 while maintaining same deviation. Find frequency and amplitude of modulating signal assuming Kf = 15 KHz per volt.
   3) Explain classification of signal with different associated operation.

SECTION – II

4. Solve **any three** of the following : **(4×3=12)**
   1) 24 telephone channels, each band limited to 3.4 KHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and an 8 KHz sampling frequency.
   2) What is linear block coding ? How it is different from systematic linear block code ?
   3) Draw and explain basic block diagram of mobile communication.
   4) What are different moments of random variables ? Explain in brief.

5. Solve **any two** of the following : **(8×2=16)**
   1) What are limitations of delta modulation ? Draw and explain block diagram of adaptive delta modulation.
   2) Explain hamming code generation process step by step with an example.
   3) Explain handoff techniques and different multiple access technologies.

———————

SLR-VB – 395

Seat No.	

Set Q

T.E. (Electrical and Electronics Engg.) (Part – II) (New CGPA) Examination, 2017
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 17-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) The stationary process has
   a) ensemble average equal to time average
   b) all statistical properties are dependent on time
   c) all statistical properties are independent on time
   d) zero variance

2) The coding efficiency is given by
   a) 1 – Redundancy b) 1 + Redundancy
   c) 1/Redundancy d) None

3) Companding is used in PCM to
   a) Reduce bandwidth b) Reduce power
   c) Increase S/N ratio d) Get almost uniform S/N ratio

4) Aliasing occurs when the Nyquist rate is
   a) 2 Fm b) 3 Fm
   c) 2.5 Fm d) 1.2 Fm

P.T.O.

5) Which of the following modulation is analog in nature ?
   a) PCM b) DPCM
   c) DM d) None of the above

6) Timing jitter in regenerative repeaters in effect of
   a) Variation of pulse position b) Variation of sampling instant
   c) Both a) and b) d) None of the above

7) In a _____ handoff a mobile station can communicate with two base station at same time.
   a) Hard b) Soft
   c) Medium d) None

8) Base band signal is
   a) Information signal b) Carrier signal
   c) High frequency signal d) Band pass signal

9) An FM signal can be detected by using
   a) an LPF b) a PLL
   c) a discriminator d) an average detector

10) 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

11) A positive RF peak of an AM voltage rise to maximum value of 12V and drop to a minimum value 4V. The modulation index assuming single tone modulation is
   a) 3 b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{1}{2}$

12) A product modulator yields
   a) a full AM signal b) a DSB-SC signal
   c) a VSB signal d) an SSB signal

13) Following is not advantage of FM over AM
   a) Noise immunity b) Fidelity
   c) Capture effect d) Sputtering effect

14) State true or false : “Periodic signal is always a energy signal”.
   a) True b) False

_____

SLR-VB – 395

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – II) (New CGPA) Examination, 2017
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 17-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any three** of the following : **(4×3=12)**
   1) What is modulation ? Explain necessity of modulation.
   2) Draw and explain super heterodyne receiver.
   3) Explain the relationship between FM and PM.
   4) Draw and explain VSB transmission for television system.

3. Solve **any two** of the following : **(8×2=16)**
   1) Explain graphical representation and mathematical equation of AM wave. Derive the equation of modulation index.
   2) A single tone modulating signal $\cos(15\pi\ 10^3 t)$ frequency modulates a carrier of 10 MHz and produces a frequency deviation of 75 KHz.

      Find :
      a) Modulation index
      b) Phase deviation produced in FM wave
      c) If another modulating signal produces a modulation index of 100 while maintaining same deviation. Find frequency and amplitude of modulating signal assuming Kf = 15 KHz per volt.
   3) Explain classification of signal with different associated operation.

SECTION – II

4. Solve **any three** of the following : **(4×3=12)**
   1) 24 telephone channels, each band limited to 3.4 KHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and an 8 KHz sampling frequency.
   2) What is linear block coding ? How it is different from systematic linear block code ?
   3) Draw and explain basic block diagram of mobile communication.
   4) What are different moments of random variables ? Explain in brief.

5. Solve **any two** of the following : **(8×2=16)**
   1) What are limitations of delta modulation ? Draw and explain block diagram of adaptive delta modulation.
   2) Explain hamming code generation process step by step with an example.
   3) Explain handoff techniques and different multiple access technologies.

———————

SLR-VB – 395

Seat No.	

Set R

T.E. (Electrical and Electronics Engg.) (Part – II) (New CGPA) Examination, 2017
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 17-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) A product modulator yields
   a) a full AM signal b) a DSB-SC signal
   c) a VSB signal d) an SSB signal

2) Following is not advantage of FM over AM
   a) Noise immunity b) Fidelity
   c) Capture effect d) Sputtering effect

3) State true or false : "Periodic signal is always a energy signal".
   a) True b) False

4) The stationary process has
   a) ensemble average equal to time average
   b) all statistical properties are dependent on time
   c) all statistical properties are independent on time
   d) zero variance

5) The coding efficiency is given by
   a) 1 – Redundancy b) 1 + Redundancy
   c) 1/Redundancy d) None

6) Companding is used in PCM to
   a) Reduce bandwidth
   b) Reduce power
   c) Increase S/N ratio
   d) Get almost uniform S/N ratio

7) Aliasing occurs when the Nyquist rate is
   a) 2 Fm
   b) 3 Fm
   c) 2.5 Fm
   d) 1.2 Fm

8) Which of the following modulation is analog in nature ?
   a) PCM
   b) DPCM
   c) DM
   d) None of the above

9) Timing jitter in regenerative repeaters in effect of
   a) Variation of pulse position
   b) Variation of sampling instant
   c) Both a) and b)
   d) None of the above

10) In a _____ handoff a mobile station can communicate with two base station at same time.
   a) Hard
   b) Soft
   c) Medium
   d) None

11) Base band signal is
   a) Information signal
   b) Carrier signal
   c) High frequency signal
   d) Band pass signal

12) An FM signal can be detected by using
   a) an LPF
   b) a PLL
   c) a discriminator
   d) an average detector

13) 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

14) A positive RF peak of an AM voltage rise to maximum value of 12V and drop to a minimum value 4V. The modulation index assuming single tone modulation is
   a) 3
   b) $\frac{1}{3}$
   c) $\frac{1}{4}$
   d) $\frac{1}{2}$

SLR-VB – 395

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – II) (New CGPA) Examination, 2017
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 17-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any three** of the following : **(4×3=12)**
   1) What is modulation ? Explain necessity of modulation.
   2) Draw and explain super heterodyne receiver.
   3) Explain the relationship between FM and PM.
   4) Draw and explain VSB transmission for television system.

3. Solve **any two** of the following : **(8×2=16)**
   1) Explain graphical representation and mathematical equation of AM wave. Derive the equation of modulation index.
   2) A single tone modulating signal $\cos(15\pi\ 10^3 t)$ frequency modulates a carrier of 10 MHz and produces a frequency deviation of 75 KHz.

      Find :
      a) Modulation index
      b) Phase deviation produced in FM wave
      c) If another modulating signal produces a modulation index of 100 while maintaining same deviation. Find frequency and amplitude of modulating signal assuming Kf = 15 KHz per volt.
   3) Explain classification of signal with different associated operation.

SECTION – II

4. Solve **any three** of the following : **(4×3=12)**
   1) 24 telephone channels, each band limited to 3.4 KHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and an 8 KHz sampling frequency.
   2) What is linear block coding ? How it is different from systematic linear block code ?
   3) Draw and explain basic block diagram of mobile communication.
   4) What are different moments of random variables ? Explain in brief.

5. Solve **any two** of the following : **(8×2=16)**
   1) What are limitations of delta modulation ? Draw and explain block diagram of adaptive delta modulation.
   2) Explain hamming code generation process step by step with an example.
   3) Explain handoff techniques and different multiple access technologies.

———————

SLR-VB – 395

Seat No.	

Set S

T.E. (Electrical and Electronics Engg.) (Part – II) (New CGPA) Examination, 2017
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 17-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) 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) Aliasing occurs when the Nyquist rate is
   a) 2 Fm b) 3 Fm
   c) 2.5 Fm d) 1.2 Fm

3) Which of the following modulation is analog in nature ?
   a) PCM b) DPCM
   c) DM d) None of the above

4) Timing jitter in regenerative repeaters in effect of
   a) Variation of pulse position b) Variation of sampling instant
   c) Both a) and b) d) None of the above

5) In a _____ handoff a mobile station can communicate with two base station at same time.
   a) Hard b) Soft c) Medium d) None

P.T.O.

6) Base band signal is
   a) Information signal
   b) Carrier signal
   c) High frequency signal
   d) Band pass signal

7) An FM signal can be detected by using
   a) an LPF
   b) a PLL
   c) a discriminator
   d) an average detector

8) 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

9) A positive RF peak of an AM voltage rise to maximum value of 12V and drop to a minimum value 4V. The modulation index assuming single tone modulation is
   a) 3
   b) $\frac{1}{3}$
   c) $\frac{1}{4}$
   d) $\frac{1}{2}$

10) A product modulator yields
   a) a full AM signal
   b) a DSB-SC signal
   c) a VSB signal
   d) an SSB signal

11) Following is not advantage of FM over AM
   a) Noise immunity
   b) Fidelity
   c) Capture effect
   d) Sputtering effect

12) State true or false : “Periodic signal is always a energy signal”.
   a) True
   b) False

13) The stationary process has
   a) ensemble average equal to time average
   b) all statistical properties are dependent on time
   c) all statistical properties are independent on time
   d) zero variance

14) The coding efficiency is given by
   a) 1 – Redundancy
   b) 1 + Redundancy
   c) 1/Redundancy
   d) None

———————

SLR-VB – 395

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – II) (New CGPA) Examination, 2017
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Wednesday, 17-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any three** of the following : **(4×3=12)**
   1) What is modulation ? Explain necessity of modulation.
   2) Draw and explain super heterodyne receiver.
   3) Explain the relationship between FM and PM.
   4) Draw and explain VSB transmission for television system.

3. Solve **any two** of the following : **(8×2=16)**
   1) Explain graphical representation and mathematical equation of AM wave. Derive the equation of modulation index.
   2) A single tone modulating signal $\cos(15\pi\ 10^3 t)$ frequency modulates a carrier of 10 MHz and produces a frequency deviation of 75 KHz.

      Find :
      a) Modulation index
      b) Phase deviation produced in FM wave
      c) If another modulating signal produces a modulation index of 100 while maintaining same deviation. Find frequency and amplitude of modulating signal assuming Kf = 15 KHz per volt.
   3) Explain classification of signal with different associated operation.

SECTION – II

4. Solve **any three** of the following : **(4×3=12)**
   1) 24 telephone channels, each band limited to 3.4 KHz are to be time division multiplexed by using PCM. Calculate the bandwidth of PCM system for 128 quantization levels and an 8 KHz sampling frequency.
   2) What is linear block coding ? How it is different from systematic linear block code ?
   3) Draw and explain basic block diagram of mobile communication.
   4) What are different moments of random variables ? Explain in brief.

5. Solve **any two** of the following : **(8×2=16)**
   1) What are limitations of delta modulation ? Draw and explain block diagram of adaptive delta modulation.
   2) Explain hamming code generation process step by step with an example.
   3) Explain handoff techniques and different multiple access technologies.

———————

SLR-VB – 396

Seat No.	

Set **P**

T.E. (E & E) (Part – II) (New) Examination, 2017
POWER SYSTEM ANALYSIS (CGPA)

Day and Date : Friday, 19-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1 mark each)**

1) In _____ method of load flow, convergence is dependent on the choice of slack bus.
a) G-S b) N-R c) FD d) All

2) Zero sequence currents flows in the transmission line when there is
a) double line to ground fault
b) an over voltage in the line caused by charged loads
c) a line to line fault
d) a fault across all the three lines

3) Total generation is equal to total load plus
a) reactive power b) losses c) generation d) demand

4) The magnitude of the fault current depends upon
a) total impedance upto fault
b) voltage at the fault point
c) load current being supplied before occurrence of the fault
d) both a) and b)

5) I $d^2\delta/dt^2$ =
a) rotor momentum b) accelerating power
c) inertia constant d) excitation of generator

6) For limiting short circuits we use
a) reactors b) resistors c) capacitors d) none of above

7) Transient disturbances are caused by
a) sudden load changes b) switching operations
c) faults in the power systems d) all of the above

P.T.O.

8) EMF source is present in _____ sequence N/W.

a) positive b) zero c) negative d) all of the above

9) An acceleration factor is used in load flow studies using G – S method to

a) to increase the number of iterations

b) to increase the speed of calculations

c) both a) and b)

d) none of above

10) The usual value of δ is about

a) 30 b) 45 c) 60 d) 90

11) Primitive Y matrix is

a) singular b) diagonal c) sparse d) null

12) If a new line is added between the buses 2 and 3 in a system, the elements of YBus affected by addition of this line are

a) Y_{22}, Y_{33} b) Y_{22}, Y_{23}, Y_{32}, Y_{33}

c) Y_{23}, Y_{32} d) None of the above

13) At PQ bus we assume _____ and _____

a) P and Q b) $|V|$ and del c) P and del d) Q and del

14) The positive sequence current of the transmission line is

a) always zero

b) 1/3 of negative sequence current

c) equal to the negative sequence current

d) three time negative sequence current

_____

SLR-VB – 396

Seat No.	

T.E. (E & E) (Part – II) (New) Examination, 2017
POWER SYSTEM ANALYSIS (CGPA)

Day and Date : Friday, 19-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

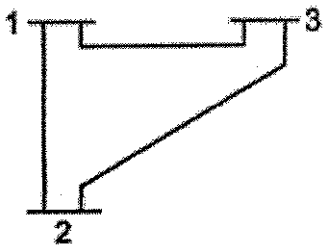
a) Explain various types of buses and their significance in detail.

b) Explain formation of Y bus by singular transformation.

c) Three generators are rated as G_1 : 100 MVA, 33 KV, X_{g1} = 0.1 pu., G_2 : 150 MVA, 32 KV, X_{g2} = 0.08 pu and G_3 : 110 MVA, 30 KV, X_{g3} = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.

d) Find out the Y bus matrix for the system shown in fig. data for the system are given in table.

Bus code *i-k*	*Impedance* Z_{ik}	*Line charging* $y'_{ik/2}$
1-2	0.02 + j0.06	j0.03
1-3	0.08 + j0.24	j0.025
2-3	0.06 + j 0.18	j0.020



e) Describe various methods of improving stability.

f) Derive load flow equation and comment on its significance.

3. Solve the following : **(6 marks each)**

a) Explain the G-S method for solution of non – linear algebraic equations.

OR

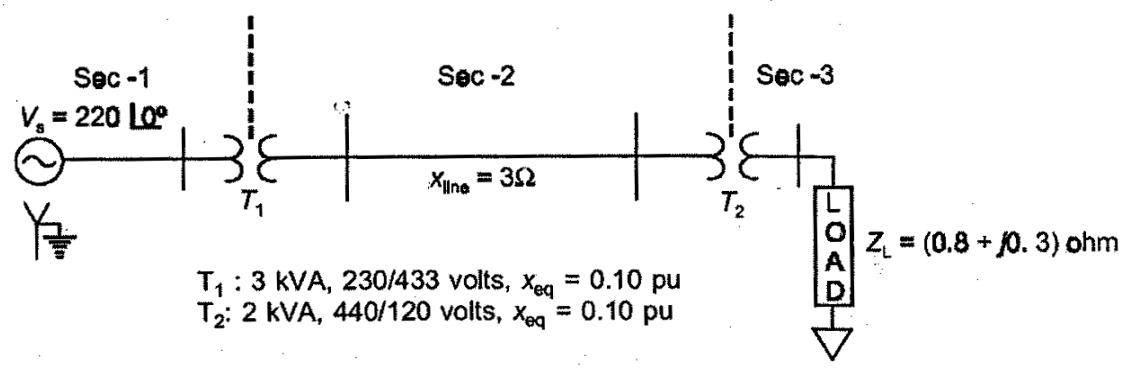
a) Data for the sample three bus system are given in following tables. Using Gauss Siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

		Generation		Load	
Bus code *i*	*Assumed bus voltage*	*MW*	*MVAr*	*MW*	*MVAr*
1 (slack bus)	1.05 + j0.0	–	–	0	0
2	1 + j0.0	50	30	305.6	140.2
3	1 + j0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus code *i – k*	*Impedance* Z_{ik}
1 – 2	0.02 + j0.04
1 – 3	0.01 + j0.03
2 – 3	0.0125 + j0.025

b) Using the base values of 3 KVA and 230 V in sec-1 draw per unit reactance diagram of a following power system and determine per unit impedances and per unit source voltage. Also calculate load current both in per unit and in amperes.

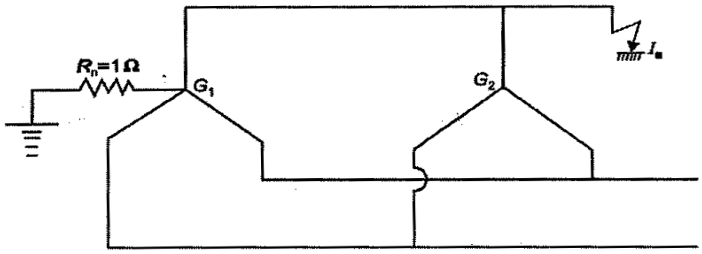


SECTION – II

4. Attempt **any 4** questions : **(4 marks each)**

a) 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 voltage E_Y and E_B.

b) Two 11 KV, 12 MVA, star connected generators operate in parallel. The positive, negative, zero sequence reactances of each being j0.09, j0.05 and j0.04 pu respectively. If single line to ground fault occurs at terminal of one of the generators determine fault current.



c) Derive an expression for fault current for a single line to ground fault.

d) For the power system shown below draw zero sequence network.

G : x_{g0} = 0.05 pu

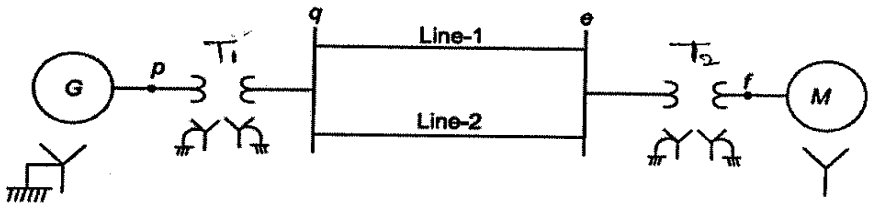
M : x_{m0} = 0.03 pu

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



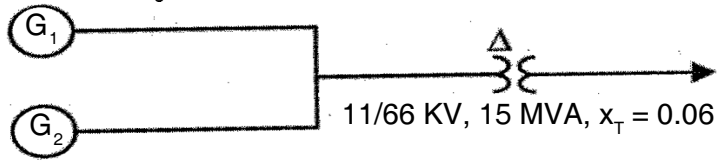
e) Derive the sequence impedances of 3 phase transmission line having self impedances 'Z_s' per phase and mutual impedances 'Z_m' between the phases.

f) Explain how we decide the rating of circuit breaker on the basis of symmetrical short circuit currents.

5. Attempt **any 2** questions : **(6 marks each)**

a) For the sample system shown in fig. calculate sub transient current in each generator if three phase fault occurs at high voltage side of the transformer. Choose 100 MVA, 11 KV base in a G1 circuit.

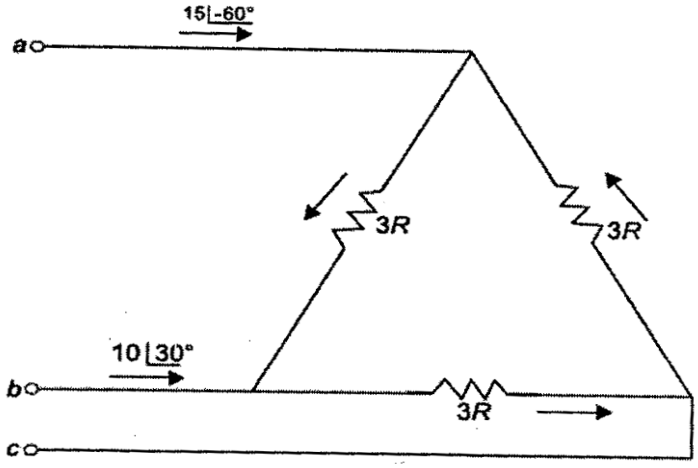
15 MVA, 11 KV, x''_{g1} = 0.10



10 MVA, 11 KV, x''_{g2} = 0.10

Set P

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) Explain the short circuit of synchronous machine on 1) no load 2) load.

SLR-VB – 396

Seat No.	

Set **Q**

T.E. (E & E) (Part – II) (New) Examination, 2017
POWER SYSTEM ANALYSIS (CGPA)

Day and Date : Friday, 19-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1 mark each)**

1) EMF source is present in _____ sequence N/W.
a) positive b) zero c) negative d) all of the above

2) An acceleration factor is used in load flow studies using G – S method to
a) to increase the number of iterations
b) to increase the speed of calculations
c) both a) and b)
d) none of above

3) The usual value of δ is about
a) 30 b) 45 c) 60 d) 90

4) Primitive Y matrix is
a) singular b) diagonal c) sparse d) null

5) If a new line is added between the buses 2 and 3 in a system, the elements of YBus affected by addition of this line are
a) Y_{22}, Y_{33} b) Y_{22}, Y_{23}, Y_{32}, Y_{33}
c) Y_{23}, Y_{32} d) None of the above

6) At PQ bus we assume _____ and _____
a) P and Q b) $|V|$ and del c) P and del d) Q and del

7) The positive sequence current of the transmission line is
a) always zero
b) 1/3 of negative sequence current
c) equal to the negative sequence current
d) three time negative sequence current

P.T.O.

8) In _____ method of load flow, convergence is dependent on the choice of slack bus.
   a) G-S b) N-R c) FD d) All

9) Zero sequence currents flows in the transmission line when there is
   a) double line to ground fault
   b) an over voltage in the line caused by charged loads
   c) a line to line fault
   d) a fault across all the three lines

10) Total generation is equal to total load plus
   a) reactive power b) losses c) generation d) demand

11) The magnitude of the fault current depends upon
   a) total impedance upto fault
   b) voltage at the fault point
   c) load current being supplied before occurrence of the fault
   d) both a) and b)

12) I $d^2\delta/dt^2$ =
   a) rotor momentum b) accelerating power
   c) inertia constant d) excitation of generator

13) For limiting short circuits we use
   a) reactors b) resistors c) capacitors d) none of above

14) Transient disturbances are caused by
   a) sudden load changes b) switching operations
   c) faults in the power systems d) all of the above

_____

SLR-VB – 396

Seat No.	

T.E. (E & E) (Part – II) (New) Examination, 2017
POWER SYSTEM ANALYSIS (CGPA)

Day and Date : Friday, 19-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

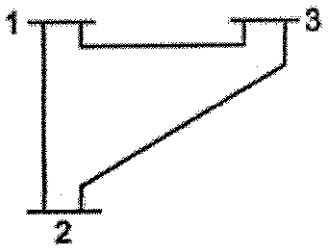
a) Explain various types of buses and their significance in detail.

b) Explain formation of Y bus by singular transformation.

c) Three generators are rated as G_1 : 100 MVA, 33 KV, X_{g1} = 0.1 pu., G_2 : 150 MVA, 32 KV, X_{g2} = 0.08 pu and G_3 : 110 MVA, 30 KV, X_{g3} = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.

d) Find out the Y bus matrix for the system shown in fig. data for the system are given in table.

Bus code *i-k*	*Impedance* Z_{ik}	*Line charging* $y'_{ik/2}$
1-2	0.02 + j0.06	j0.03
1-3	0.08 + j0.24	j0.025
2-3	0.06 + j 0.18	j0.020



e) Describe various methods of improving stability.

f) Derive load flow equation and comment on its significance.

3. Solve the following : **(6 marks each)**

a) Explain the G-S method for solution of non – linear algebraic equations.

OR

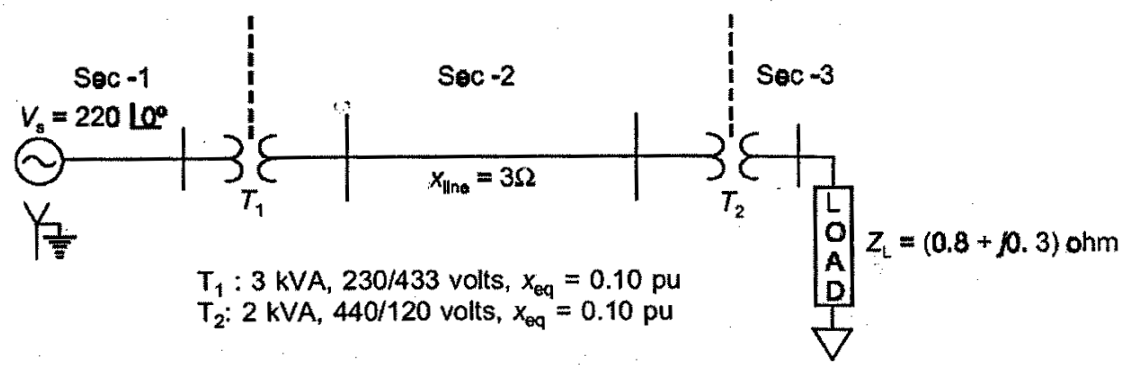
a) Data for the sample three bus system are given in following tables. Using Gauss Siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

		Generation		Load	
Bus code *i*	*Assumed bus voltage*	*MW*	*MVAr*	*MW*	*MVAr*
1 (slack bus)	1.05 + j0.0	–	–	0	0
2	1 + j0.0	50	30	305.6	140.2
3	1 + j0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus code *i – k*	*Impedance* Z_{ik}
1 – 2	0.02 + j0.04
1 – 3	0.01 + j0.03
2 – 3	0.0125 + j0.025

b) Using the base values of 3 KVA and 230 V in sec-1 draw per unit reactance diagram of a following power system and determine per unit impedances and per unit source voltage. Also calculate load current both in per unit and in amperes.

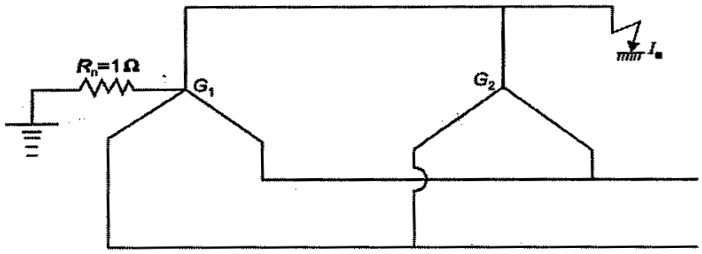


SECTION – II

4. Attempt **any 4** questions : **(4 marks each)**

a) 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 voltage E_Y and E_B.

b) Two 11 KV, 12 MVA, star connected generators operate in parallel. The positive, negative, zero sequence reactances of each being j0.09, j0.05 and j0.04 pu respectively. If single line to ground fault occurs at terminal of one of the generators determine fault current.



c) Derive an expression for fault current for a single line to ground fault.

d) For the power system shown below draw zero sequence network.

G : x_{g0} = 0.05 pu

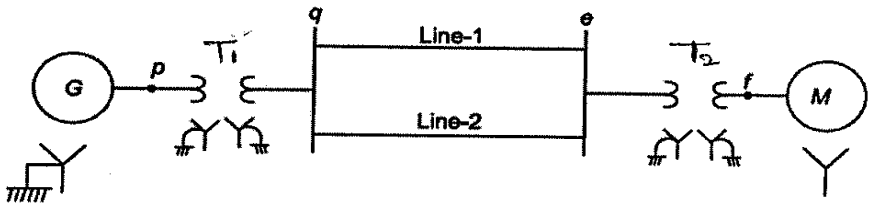
M : x_{m0} = 0.03 pu

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



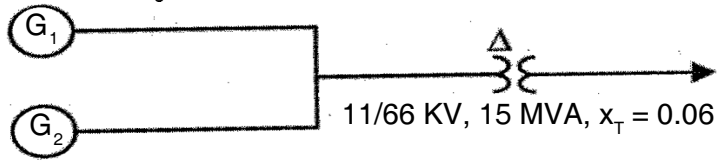
e) Derive the sequence impedances of 3 phase transmission line having self impedances 'Z_s' per phase and mutual impedances 'Z_m' between the phases.

f) Explain how we decide the rating of circuit breaker on the basis of symmetrical short circuit currents.

5. Attempt **any 2** questions : **(6 marks each)**

a) For the sample system shown in fig. calculate sub transient current in each generator if three phase fault occurs at high voltage side of the transformer. Choose 100 MVA, 11 KV base in a G1 circuit.

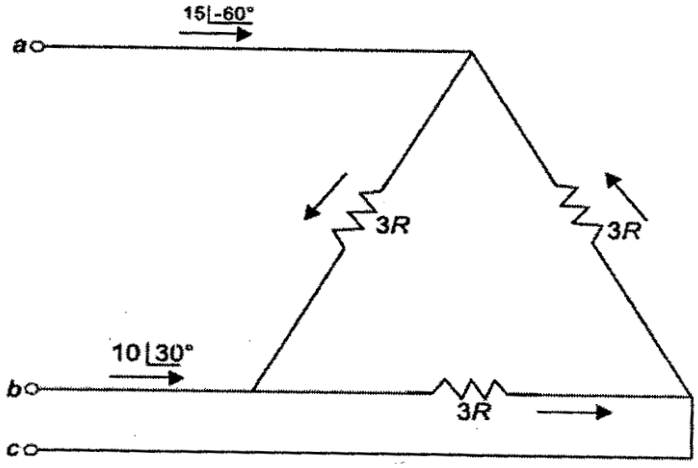
15 MVA, 11 KV, x''_{g1} = 0.10



10 MVA, 11 KV, x''_{g2} = 0.10

Set Q

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) Explain the short circuit of synchronous machine on 1) no load 2) load.

SLR-VB – 396

Seat No.	

Set **R**

T.E. (E & E) (Part – II) (New) Examination, 2017
POWER SYSTEM ANALYSIS (CGPA)

Day and Date : Friday, 19-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1 mark each)**

1) $I\, d^2\delta/dt^2$ =
   a) rotor momentum b) accelerating power
   c) inertia constant d) excitation of generator

2) For limiting short circuits we use
   a) reactors b) resistors c) capacitors d) none of above

3) Transient disturbances are caused by
   a) sudden load changes b) switching operations
   c) faults in the power systems d) all of the above

4) EMF source is present in _____ sequence N/W.
   a) positive b) zero c) negative d) all of the above

5) An acceleration factor is used in load flow studies using G – S method to
   a) to increase the number of iterations
   b) to increase the speed of calculations
   c) both a) and b)
   d) none of above

6) The usual value of δ is about
   a) 30 b) 45 c) 60 d) 90

7) Primitive Y matrix is
   a) singular b) diagonal c) sparse d) null

P.T.O.

8) If a new line is added between the buses 2 and 3 in a system, the elements of YBus affected by addition of this line are

a) Y_{22}, Y_{33} b) Y_{22}, Y_{23}, Y_{32}, Y_{33}

c) Y_{23}, Y_{32} d) None of the above

9) At PQ bus we assume _____ and _____

a) P and Q b) $|V|$ and del c) P and del d) Q and del

10) The positive sequence current of the transmission line is

a) always zero

b) 1/3 of negative sequence current

c) equal to the negative sequence current

d) three time negative sequence current

11) In _____ method of load flow, convergence is dependent on the choice of slack bus.

a) G-S b) N-R c) FD d) All

12) Zero sequence currents flows in the transmission line when there is

a) double line to ground fault

b) an over voltage in the line caused by charged loads

c) a line to line fault

d) a fault across all the three lines

13) Total generation is equal to total load plus

a) reactive power b) losses c) generation d) demand

14) The magnitude of the fault current depends upon

a) total impedance upto fault

b) voltage at the fault point

c) load current being supplied before occurrence of the fault

d) both a) and b)

_____

SLR-VB – 396

Seat No.	

T.E. (E & E) (Part – II) (New) Examination, 2017
POWER SYSTEM ANALYSIS (CGPA)

Day and Date : Friday, 19-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

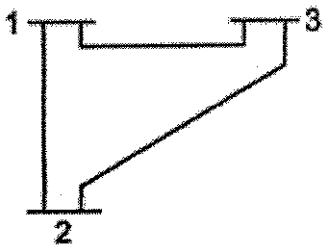
a) Explain various types of buses and their significance in detail.

b) Explain formation of Y bus by singular transformation.

c) Three generators are rated as G_1 : 100 MVA, 33 KV, X_{g1} = 0.1 pu., G_2 : 150 MVA, 32 KV, X_{g2} = 0.08 pu and G_3 : 110 MVA, 30 KV, X_{g3} = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.

d) Find out the Y bus matrix for the system shown in fig. data for the system are given in table.

Bus code *i-k*	*Impedance* Z_{ik}	*Line charging* $y'_{ik/2}$
1-2	0.02 + j0.06	j0.03
1-3	0.08 + j0.24	j0.025
2-3	0.06 + j 0.18	j0.020



e) Describe various methods of improving stability.

f) Derive load flow equation and comment on its significance.

3. Solve the following : **(6 marks each)**

a) Explain the G-S method for solution of non – linear algebraic equations.

OR

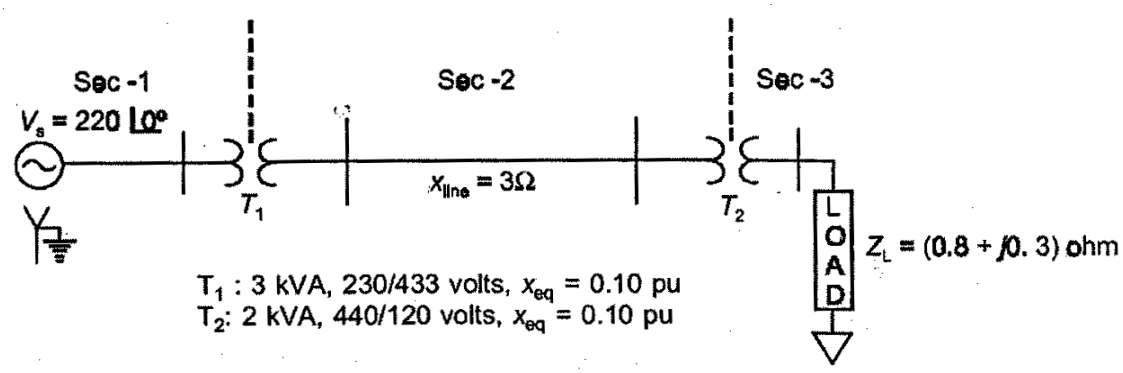
a) Data for the sample three bus system are given in following tables. Using Gauss Siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

		Generation		Load	
Bus code *i*	*Assumed bus voltage*	*MW*	*MVAr*	*MW*	*MVAr*
1 (slack bus)	1.05 + j0.0	–	–	0	0
2	1 + j0.0	50	30	305.6	140.2
3	1 + j0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus code *i – k*	*Impedance* Z_{ik}
1 – 2	0.02 + j0.04
1 – 3	0.01 + j0.03
2 – 3	0.0125 + j0.025

b) Using the base values of 3 KVA and 230 V in sec-1 draw per unit reactance diagram of a following power system and determine per unit impedances and per unit source voltage. Also calculate load current both in per unit and in amperes.

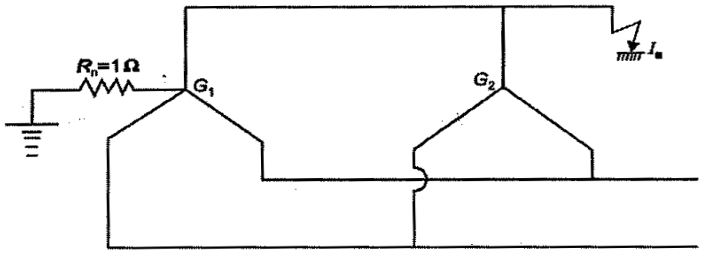


SECTION – II

4. Attempt **any 4** questions : **(4 marks each)**

a) 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 voltage E_Y and E_B.

b) Two 11 KV, 12 MVA, star connected generators operate in parallel. The positive, negative, zero sequence reactances of each being j0.09, j0.05 and j0.04 pu respectively. If single line to ground fault occurs at terminal of one of the generators determine fault current.



c) Derive an expression for fault current for a single line to ground fault.

d) For the power system shown below draw zero sequence network.

G : x_{g0} = 0.05 pu

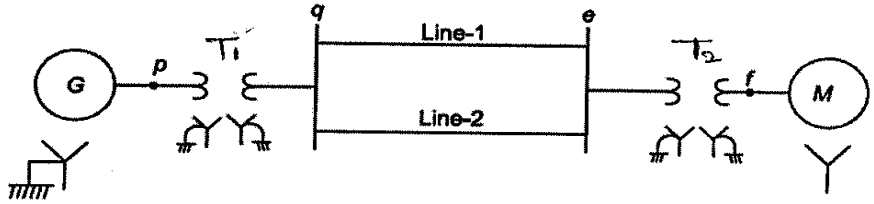
M : x_{m0} = 0.03 pu

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



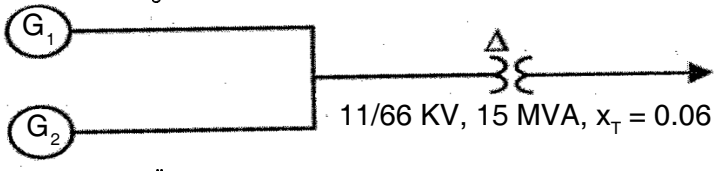
e) Derive the sequence impedances of 3 phase transmission line having self impedances 'Z_s' per phase and mutual impedances 'Z_m' between the phases.

f) Explain how we decide the rating of circuit breaker on the basis of symmetrical short circuit currents.

5. Attempt **any 2** questions : **(6 marks each)**

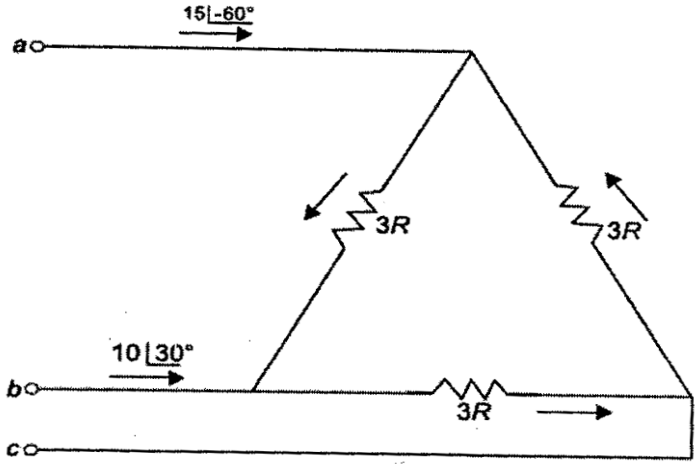
a) For the sample system shown in fig. calculate sub transient current in each generator if three phase fault occurs at high voltage side of the transformer. Choose 100 MVA, 11 KV base in a G1 circuit.

15 MVA, 11 KV, x''_{g1} = 0.10



10 MVA, 11 KV, x''_{g2} = 0.10

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) Explain the short circuit of synchronous machine on 1) no load 2) load.

———————

SLR-VB – 396

Seat No.	

Set **S**

T.E. (E & E) (Part – II) (New) Examination, 2017
POWER SYSTEM ANALYSIS (CGPA)

Day and Date : Friday, 19-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **(1 mark each)**

1) The usual value of δ is about
   a) 30 b) 45 c) 60 d) 90

2) Primitive Y matrix is
   a) singular b) diagonal c) sparse d) null

3) If a new line is added between the buses 2 and 3 in a system, the elements of YBus affected by addition of this line are
   a) Y_{22}, Y_{33} b) Y_{22}, Y_{23}, Y_{32}, Y_{33}
   c) Y_{23}, Y_{32} d) None of the above

4) At PQ bus we assume _____ and _____
   a) P and Q b) $|V|$ and del c) P and del d) Q and del

5) The positive sequence current of the transmission line is
   a) always zero
   b) 1/3 of negative sequence current
   c) equal to the negative sequence current
   d) three time negative sequence current

6) In _____ method of load flow, convergence is dependent on the choice of slack bus.
   a) G-S b) N-R c) FD d) All

7) Zero sequence currents flows in the transmission line when there is
   a) double line to ground fault
   b) an over voltage in the line caused by charged loads
   c) a line to line fault
   d) a fault across all the three lines

P.T.O.

8) Total generation is equal to total load plus
   a) reactive power b) losses c) generation d) demand

9) The magnitude of the fault current depends upon
   a) total impedance upto fault
   b) voltage at the fault point
   c) load current being supplied before occurrence of the fault
   d) both a) and b)

10) I $d^2\delta/dt^2$ =
   a) rotor momentum b) accelerating power
   c) inertia constant d) excitation of generator

11) For limiting short circuits we use
   a) reactors b) resistors c) capacitors d) none of above

12) Transient disturbances are caused by
   a) sudden load changes b) switching operations
   c) faults in the power systems d) all of the above

13) EMF source is present in _____ sequence N/W.
   a) positive b) zero c) negative d) all of the above

14) An acceleration factor is used in load flow studies using G – S method to
   a) to increase the number of iterations
   b) to increase the speed of calculations
   c) both a) and b)
   d) none of above

_____

SLR-VB – 396

Seat No.	

T.E. (E & E) (Part – II) (New) Examination, 2017
POWER SYSTEM ANALYSIS (CGPA)

Day and Date : Friday, 19-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(4 marks each)**

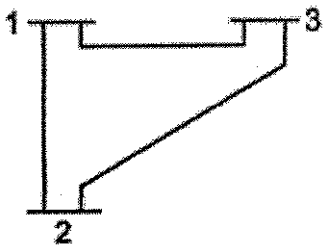
a) Explain various types of buses and their significance in detail.

b) Explain formation of Y bus by singular transformation.

c) Three generators are rated as G_1 : 100 MVA, 33 KV, X_{g1} = 0.1 pu., G_2 : 150 MVA, 32 KV, X_{g2} = 0.08 pu and G_3 : 110 MVA, 30 KV, X_{g3} = 0.12 pu. Determine the reactance of generators in per unit corresponding to base values of 200 MVA and 35 KV.

d) Find out the Y bus matrix for the system shown in fig. data for the system are given in table.

Bus code *i-k*	*Impedance* Z_{ik}	*Line charging* $y'_{ik/2}$
1-2	0.02 + j0.06	j0.03
1-3	0.08 + j0.24	j0.025
2-3	0.06 + j 0.18	j0.020



e) Describe various methods of improving stability.

f) Derive load flow equation and comment on its significance.

3. Solve the following : **(6 marks each)**

a) Explain the G-S method for solution of non – linear algebraic equations.

OR

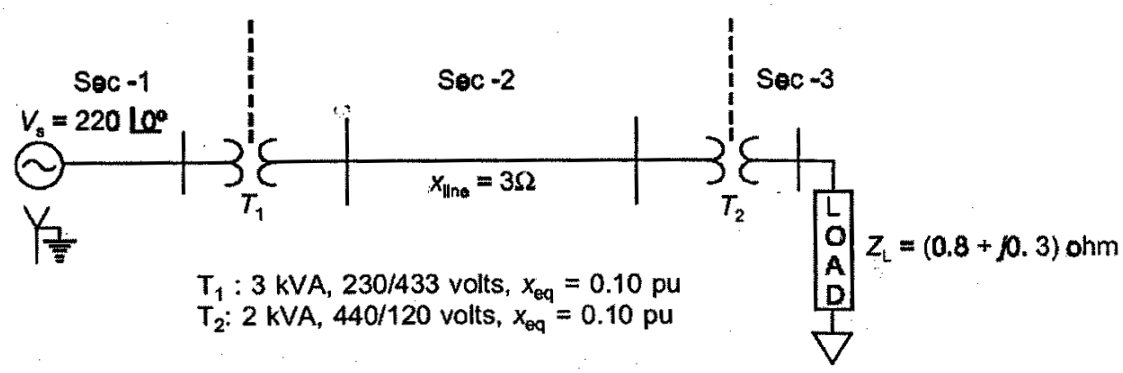
a) Data for the sample three bus system are given in following tables. Using Gauss Siedal method determine values of phase voltages at bus 2 and 3 after first iteration.

		Generation		Load	
Bus code *i*	*Assumed bus voltage*	*MW*	*MVAr*	*MW*	*MVAr*
1 (slack bus)	1.05 + j0.0	–	–	0	0
2	1 + j0.0	50	30	305.6	140.2
3	1 + j0.0	0.0	0.0	138.6	45.2

Base MVA = 100

Bus code *i – k*	*Impedance* Z_{ik}
1 – 2	0.02 + j0.04
1 – 3	0.01 + j0.03
2 – 3	0.0125 + j0.025

b) Using the base values of 3 KVA and 230 V in sec-1 draw per unit reactance diagram of a following power system and determine per unit impedances and per unit source voltage. Also calculate load current both in per unit and in amperes.

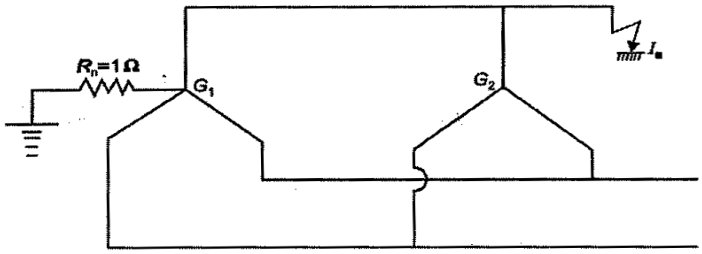


SECTION – II

4. Attempt **any 4** questions : **(4 marks each)**

a) 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 voltage E_Y and E_B.

b) Two 11 KV, 12 MVA, star connected generators operate in parallel. The positive, negative, zero sequence reactances of each being j0.09, j0.05 and j0.04 pu respectively. If single line to ground fault occurs at terminal of one of the generators determine fault current.



c) Derive an expression for fault current for a single line to ground fault.

d) For the power system shown below draw zero sequence network.

G : x_{g0} = 0.05 pu

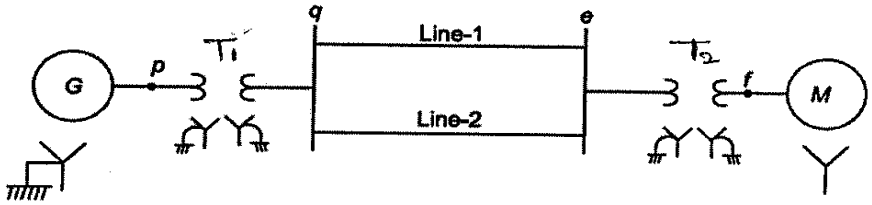
M : x_{m0} = 0.03 pu

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



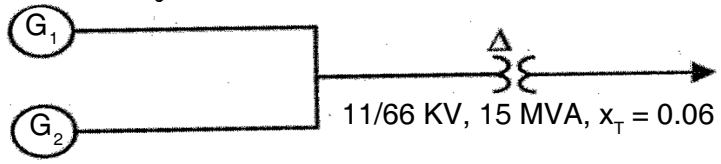
e) Derive the sequence impedances of 3 phase transmission line having self impedances 'Z_s' per phase and mutual impedances 'Z_m' between the phases.

f) Explain how we decide the rating of circuit breaker on the basis of symmetrical short circuit currents.

5. Attempt **any 2** questions : **(6 marks each)**

a) For the sample system shown in fig. calculate sub transient current in each generator if three phase fault occurs at high voltage side of the transformer. Choose 100 MVA, 11 KV base in a G1 circuit.

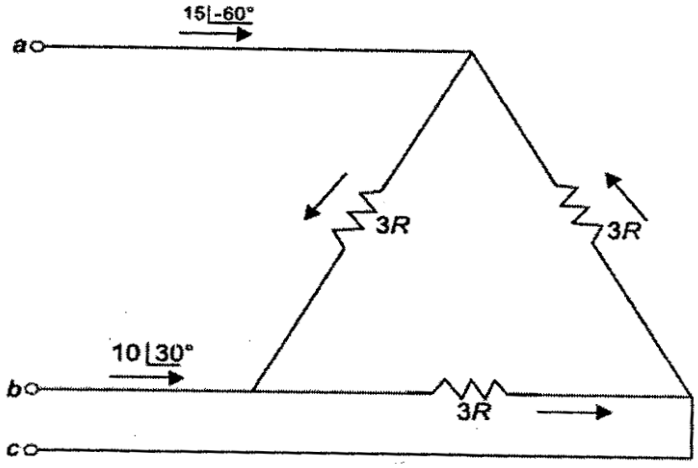
15 MVA, 11 KV, x''_{g1} = 0.10



10 MVA, 11 KV, x''_{g2} = 0.10

Set S

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) Explain the short circuit of synchronous machine on 1) no load 2) load.

———————————

SLR-VB – 397

Seat No.	

Set P

T.E. (E & E Engg.) (Part – II) Examination, 2017
CONTROL SYSTEMS – II (New-CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

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

MCQ/Objective Type Questions

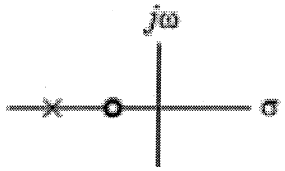
Duration : 30 Minutes Marks : 14

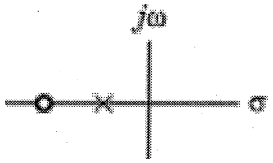
1. Choose the correct answer :

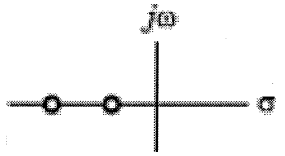
1) The transfer function of a passive network is given by $s + \alpha_1' / s + \beta_1$. Which of the following conditions is necessary such that the network acts as a phase lead controller ?

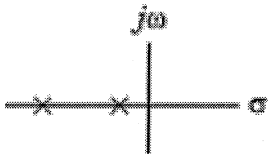
a) $\alpha_1 = \beta_1$ b) $\alpha_1 > \beta_1$ c) $\alpha_1 = 0$ d) $\alpha_1 < \beta_1$

2) The pole zero configuration of a phase lead compensator in s-plane is given by

a) 

b) 

c) 

d) 

3) Which of the following properties are associated with the state transition matrix $\varphi(t)$?

1) $\varphi(-t) = \varphi^{-1}(t)$

2) $\varphi(t_1/t_2) = \varphi(t_1).\Phi^{-1}(t_2)$

3) $\varphi(t_1 - t_2) = \varphi(-t_2).\ \varphi(t_1)$

Select the correct answer using the codes given below :

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

P.T.O.

4) The compensator $G(s)=\frac{5(1+0.3S)}{(1+0.1S)}$ would provide a maximum phase shift of
   a) 20° b) 30° c) 45° d) 60°
5) Slope of factor K in plotting bode magnitude plot is
   a) 0° b) ∞ c) 90° d) None of these
6) A system with gain margin close to unity or a phase margin close to zero is
   a) highly stable b) Oscillatory c) Relatively stable d) Unstable
7) In case of phase-lag compensation used in system, gain crossover frequency; band width and undamped frequency are respectively.
   a) Decreased, decreased, decreased b) Increased, increased, increased
   c) Increased, increased, decreased d) Increased, decreased, decreased
8) The transfer function of a multi-input multi-output system, with the state-space representation of $X = AX + BU$ $Y = CX + DU$
   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) $(sI - A)^{-1} B + D$ d) $D(sI - A)^{-1} B + A$
9) For an n^{th} order system state equations will be of the order of
   a) n b) 1 c) $\frac{n}{2}$ d) $\frac{n+1}{2}$
10) The singular points around which the state trajectories are concentric circles or ellipses, are called
   a) Focus point b) Centre or vortex
   c) Saddle point d) Nodal point
11) 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
12) Non-linearities can be
   a) Incidental b) Intentional
   c) Either incidental or intentional d) Linearized
13) In phase plane
   a) X1 is represented in x-axis and x2 in y-axis
   b) X2 is represented in x-axis and x1 in y-axis
   c) Any one of above
   d) None of the above
14) For a given gain constant K, the phase-lead compensator.
   a) Reduces the slope of the magnitude curve in the entire range of frequency
   b) Decreases the gain cross-over frequency
   c) Reduces the phase margin
   d) Reduces the resonance peak Mp

SLR-VB – 397

Seat No.	

T.E. (E & E Engg.) (Part – II) Examination, 2017
CONTROL SYSTEMS – II (New-CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Give steps to design lag compensator using Root Locus Method.

2) Draw electrical equivalent of lead compensator and obtain its transfer function.

3) Explain the properties of state transition matrix.

4) Consider a state model with matrix A as

$$A = \begin{bmatrix} 0 & 2 & 0 \\ 4 & 0 & 1 \\ -48 & -34 & -9 \end{bmatrix}$$

Determine the characteristic equation.

5) What are the different methods to obtain state feedback gain matrix ? Explain any one.

6) Find the transfer matrix for system below :
$x_1 = -2x_1 - x_2 + 3u$ $x_2 = -3x_1 - 2x_2 + 4u$ and output equation $Y = 2x_1 + x_2$.

3. Solve **any two** : **(2×6=12)**

1) Obtain state transition matrix whose system matrix is given by $A = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix}$.

2) Design a suitable lead compensator for a system whose OLTF is
$G(S) = \dfrac{k}{s(s+8)}$ to meet the following specifications,

i) %Mp = 9.5%

ii) Natural frequency of oscillations = 12 rad/sec

iii) Kv $\geq$ 10.

Set P

3) Check the controllability of the system below :

$$A=\begin{bmatrix} -1 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix} \quad B=\begin{bmatrix} 1 & 0 \\ 1 & 2 \\ 2 & 1 \end{bmatrix}$$

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain in short D/A converter.

b) Explain isocline method for phase trajectories.

c) Derive pulse transfer function of cascaded elements.

d) Explain in short mapping between s-plane and z-plane.

e) Determine the kind of singularity for the following differential equation :

$\ddot{y}+0.5\dot{y}+2y=0$.

5. Solve **any two** : **(2×6=12)**

a) Examine the stability by using Bilinear transformation coupled with Routh's criteria for the system with characteristic equation

$z^4 - 1.7\ z^3 + 1.04\ z^2 - 0.268\ z + 0.024 = 0.$

b) Explain describing function for ideal relay.

c) Explain the digital controller.

———————

SLR-VB – 397

Seat No.	

Set Q

T.E. (E & E Engg.) (Part – II) Examination, 2017
CONTROL SYSTEMS – II (New-CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) The transfer function of a multi-input multi-output system, with the state-space representation of $X = AX + BU \quad Y = CX + DU$

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) $(sI - A)^{-1} B + D$ d) $D(sI - A)^{-1} B + A$

2) For an n^{th} order system state equations will be of the order of

a) n b) 1 c) $\frac{n}{2}$ d) $\frac{n+1}{2}$

3) The singular points around which the state trajectories are concentric circles or ellipses, are called

a) Focus point b) Centre or vortex
c) Saddle point d) Nodal point

4) 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

5) Non-linearities can be

a) Incidental b) Intentional
c) Either incidental or intentional d) Linearized

6) In phase plane

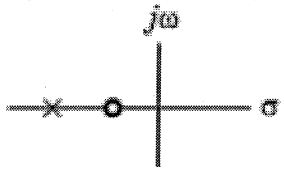
a) X1 is represented in x-axis and x2 in y-axis
b) X2 is represented in x-axis and x1 in y-axis
c) Any one of above
d) None of the above

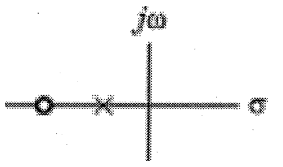
7) For a given gain constant K, the phase-lead compensator.
   a) Reduces the slope of the magnitude curve in the entire range of frequency
   b) Decreases the gain cross-over frequency
   c) Reduces the phase margin
   d) Reduces the resonance peak Mp

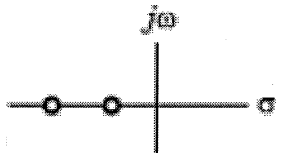
8) The transfer function of a passive network is given by $s + \alpha_1' / s + \beta_1$. Which of the following conditions is necessary such that the network acts as a phase lead controller ?

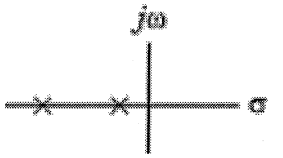
   a) $\alpha_1 = \beta_1$ b) $\alpha_1 > \beta_1$ c) $\alpha_1 = 0$ d) $\alpha_1 < \beta_1$

9) The pole zero configuration of a phase lead compensator in s-plane is given by

a) 

b) 

c) 

d) 

10) Which of the following properties are associated with the state transition matrix $\varphi(t)$?

   1) $\varphi(-t) = \varphi^{-1}(t)$

   2) $\varphi(t_1/t_2) = \varphi(t_1).\Phi^{-1}(t_2)$

   3) $\varphi(t_1 - t_2) = \varphi(-t_2).\ \varphi(t_1)$

   Select the correct answer using the codes given below :

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

11) The compensator $G(s)=\frac{5(1+0.3S)}{(1+0.1S)}$ would provide a maximum phase shift of

   a) 20° b) 30° c) 45° d) 60°

12) Slope of factor K in plotting bode magnitude plot is
   a) 0° b) ∞ c) 90° d) None of these

13) A system with gain margin close to unity or a phase margin close to zero is
   a) highly stable b) Oscillatory c) Relatively stable d) Unstable

14) In case of phase-lag compensation used in system, gain crossover frequency; band width and undamped frequency are respectively.
   a) Decreased, decreased, decreased b) Increased, increased, increased
   c) Increased, increased, decreased d) Increased, decreased, decreased

SLR-VB – 397

Seat No.	

T.E. (E & E Engg.) (Part – II) Examination, 2017
CONTROL SYSTEMS – II (New-CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Give steps to design lag compensator using Root Locus Method.

2) Draw electrical equivalent of lead compensator and obtain its transfer function.

3) Explain the properties of state transition matrix.

4) Consider a state model with matrix A as

$$A = \begin{bmatrix} 0 & 2 & 0 \\ 4 & 0 & 1 \\ -48 & -34 & -9 \end{bmatrix}$$

Determine the characteristic equation.

5) What are the different methods to obtain state feedback gain matrix ? Explain any one.

6) Find the transfer matrix for system below :
$x_1 = -2x_1 - x_2 + 3u$ $x_2 = -3x_1 - 2x_2 + 4u$ and output equation $Y = 2x_1 + x_2$.

3. Solve **any two** : **(2×6=12)**

1) Obtain state transition matrix whose system matrix is given by $A = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix}$.

2) Design a suitable lead compensator for a system whose OLTF is
$G(S) = \dfrac{k}{s(s+8)}$ to meet the following specifications,

i) %Mp = 9.5%

ii) Natural frequency of oscillations = 12 rad/sec

iii) Kv ≥ 10.

Set Q

3) Check the controllability of the system below :

$$A=\begin{bmatrix} -1 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix} \quad B=\begin{bmatrix} 1 & 0 \\ 1 & 2 \\ 2 & 1 \end{bmatrix}$$

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain in short D/A converter.

b) Explain isocline method for phase trajectories.

c) Derive pulse transfer function of cascaded elements.

d) Explain in short mapping between s-plane and z-plane.

e) Determine the kind of singularity for the following differential equation :

$\ddot{y}+0.5\dot{y}+2y=0$.

5. Solve **any two** : **(2×6=12)**

a) Examine the stability by using Bilinear transformation coupled with Routh's criteria for the system with characteristic equation

$z^4 - 1.7\ z^3 + 1.04\ z^2 - 0.268\ z + 0.024 = 0.$

b) Explain describing function for ideal relay.

c) Explain the digital controller.

SLR-VB – 397

Seat No.	

Set R

T.E. (E & E Engg.) (Part – II) Examination, 2017
CONTROL SYSTEMS – II (New-CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Slope of factor K in plotting bode magnitude plot is
a) 0° b) ∞ c) 90° d) None of these

2) A system with gain margin close to unity or a phase margin close to zero is
a) highly stable b) Oscillatory c) Relatively stable d) Unstable

3) In case of phase-lag compensation used in system, gain crossover frequency; band width and undamped frequency are respectively.
a) Decreased, decreased, decreased b) Increased, increased, increased
c) Increased, increased, decreased d) Increased, decreased, decreased

4) The transfer function of a multi-input multi-output system, with the state-space representation of $X = AX + BU \quad Y = CX + DU$

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) $(sI - A)^{-1} B + D$ d) $D(sI - A)^{-1} B + A$

5) For an n^{th} order system state equations will be of the order of
a) n b) 1 c) $\frac{n}{2}$ d) $\frac{n+1}{2}$

6) The singular points around which the state trajectories are concentric circles or ellipses, are called
a) Focus point b) Centre or vortex
c) Saddle point d) Nodal point

7) 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

P.T.O.

8) Non-linearities can be
   a) Incidental
   b) Intentional
   c) Either incidental or intentional
   d) Linearized

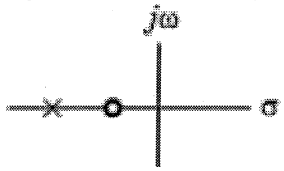
9) In phase plane
   a) X1 is represented in x-axis and x2 in y-axis
   b) X2 is represented in x-axis and x1 in y-axis
   c) Any one of above
   d) None of the above

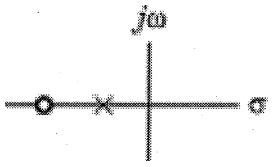
10) For a given gain constant K, the phase-lead compensator.
   a) Reduces the slope of the magnitude curve in the entire range of frequency
   b) Decreases the gain cross-over frequency
   c) Reduces the phase margin
   d) Reduces the resonance peak Mp

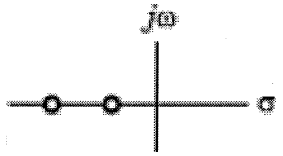
11) The transfer function of a passive network is given by $s + \alpha_1' / s + \beta_1$. Which of the following conditions is necessary such that the network acts as a phase lead controller ?

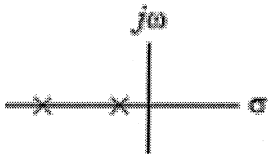
   a) $\alpha_1 = \beta_1$ b) $\alpha_1 > \beta_1$ c) $\alpha_1 = 0$ d) $\alpha_1 < \beta_1$

12) The pole zero configuration of a phase lead compensator in s-plane is given by

   a) 

   b) 

   c) 

   d) 

13) Which of the following properties are associated with the state transition matrix $\varphi(t)$?

   1) $\varphi(-t) = \varphi^{-1}(t)$

   2) $\varphi(t_1/t_2) = \varphi(t_1).\Phi^{-1}(t_2)$

   3) $\varphi(t_1 - t_2) = \varphi(-t_2).\ \varphi(t_1)$

   Select the correct answer using the codes given below :

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

14) The compensator $G(s)=\frac{5(1+0.3S)}{(1+0.1S)}$ would provide a maximum phase shift of

   a) 20° b) 30° c) 45° d) 60°

SLR-VB – 397

Seat No.	

T.E. (E & E Engg.) (Part – II) Examination, 2017
CONTROL SYSTEMS – II (New-CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Give steps to design lag compensator using Root Locus Method.

2) Draw electrical equivalent of lead compensator and obtain its transfer function.

3) Explain the properties of state transition matrix.

4) Consider a state model with matrix A as

$$A = \begin{bmatrix} 0 & 2 & 0 \\ 4 & 0 & 1 \\ -48 & -34 & -9 \end{bmatrix}$$

Determine the characteristic equation.

5) What are the different methods to obtain state feedback gain matrix ? Explain any one.

6) Find the transfer matrix for system below :
$x_1 = -2x_1 - x_2 + 3u$ $x_2 = -3x_1 - 2x_2 + 4u$ and output equation $Y = 2x_1 + x_2$.

3. Solve **any two** : **(2×6=12)**

1) Obtain state transition matrix whose system matrix is given by $A = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix}$.

2) Design a suitable lead compensator for a system whose OLTF is
$G(S) = \dfrac{k}{s(s+8)}$ to meet the following specifications,

i) %Mp = 9.5%

ii) Natural frequency of oscillations = 12 rad/sec

iii) $Kv \geq 10$.

Set R

3) Check the controllability of the system below :

$$A=\begin{bmatrix} -1 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix} \quad B=\begin{bmatrix} 1 & 0 \\ 1 & 2 \\ 2 & 1 \end{bmatrix}$$

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain in short D/A converter.

b) Explain isocline method for phase trajectories.

c) Derive pulse transfer function of cascaded elements.

d) Explain in short mapping between s-plane and z-plane.

e) Determine the kind of singularity for the following differential equation :

$\ddot{y}+0.5\dot{y}+2y=0$.

5. Solve **any two** : **(2×6=12)**

a) Examine the stability by using Bilinear transformation coupled with Routh's criteria for the system with characteristic equation

$z^4 - 1.7\ z^3 + 1.04\ z^2 - 0.268\ z + 0.024 = 0.$

b) Explain describing function for ideal relay.

c) Explain the digital controller.

SLR-VB – 397

Seat No.	

Set S

T.E. (E & E Engg.) (Part – II) Examination, 2017
CONTROL SYSTEMS – II (New-CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) The singular points around which the state trajectories are concentric circles or ellipses, are called
   a) Focus point b) Centre or vortex
   c) Saddle point d) Nodal point

2) 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

3) Non-linearities can be
   a) Incidental b) Intentional
   c) Either incidental or intentional d) Linearized

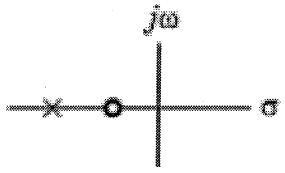
4) In phase plane
   a) X1 is represented in x-axis and x2 in y-axis
   b) X2 is represented in x-axis and x1 in y-axis
   c) Any one of above
   d) None of the above

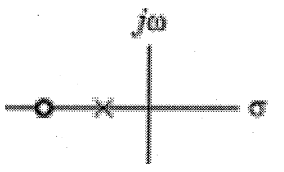
5) For a given gain constant K, the phase-lead compensator.
   a) Reduces the slope of the magnitude curve in the entire range of frequency
   b) Decreases the gain cross-over frequency
   c) Reduces the phase margin
   d) Reduces the resonance peak Mp

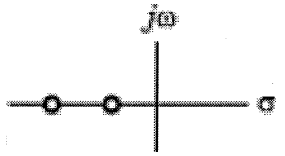
6) The transfer function of a passive network is given by $s + \alpha_1' / s + \beta_1$. Which of the following conditions is necessary such that the network acts as a phase lead controller ?
   a) $\alpha_1 = \beta_1$ b) $\alpha_1 > \beta_1$ c) $\alpha_1 = 0$ d) $\alpha_1 < \beta_1$

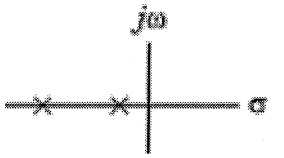
P.T.O.

7) The pole zero configuration of a phase lead compensator in s-plane is given by

a) 

b) 

c) 

d) 

8) Which of the following properties are associated with the state transition matrix $\varphi(t)$?

1) $\varphi(-t) = \varphi^{-1}(t)$

2) $\varphi(t_1/t_2) = \varphi(t_1).\Phi^{-1}(t_2)$

3) $\varphi(t_1 - t_2) = \varphi(-t_2).\ \varphi(t_1)$

Select the correct answer using the codes given below :

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

9) The compensator $G(s)=\frac{5(1+0.3S)}{(1+0.1S)}$ would provide a maximum phase shift of

a) 20° b) 30° c) 45° d) 60°

10) Slope of factor K in plotting bode magnitude plot is

a) 0° b) ∞ c) 90° d) None of these

11) A system with gain margin close to unity or a phase margin close to zero is

a) highly stable b) Oscillatory c) Relatively stable d) Unstable

12) In case of phase-lag compensation used in system, gain crossover frequency; band width and undamped frequency are respectively.

a) Decreased, decreased, decreased b) Increased, increased, increased
c) Increased, increased, decreased d) Increased, decreased, decreased

13) The transfer function of a multi-input multi-output system, with the state-space representation of $X = AX + BU \quad Y = CX + DU$

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) $(sI - A)^{-1} B + D$ d) $D(sI - A)^{-1} B + A$

14) For an n^{th} order system state equations will be of the order of

a) n b) 1 c) $\frac{n}{2}$ d) $\frac{n+1}{2}$

SLR-VB – 397

Seat No.	

T.E. (E & E Engg.) (Part – II) Examination, 2017
CONTROL SYSTEMS – II (New-CGPA)

Day and Date : Monday, 22-5-2017 Max. Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Give steps to design lag compensator using Root Locus Method.

2) Draw electrical equivalent of lead compensator and obtain its transfer function.

3) Explain the properties of state transition matrix.

4) Consider a state model with matrix A as

$$A = \begin{bmatrix} 0 & 2 & 0 \\ 4 & 0 & 1 \\ -48 & -34 & -9 \end{bmatrix}$$

Determine the characteristic equation.

5) What are the different methods to obtain state feedback gain matrix ? Explain any one.

6) Find the transfer matrix for system below :
$x_1 = -2x_1 - x_2 + 3u$ $x_2 = -3x_1 - 2x_2 + 4u$ and output equation $Y = 2x_1 + x_2$.

3. Solve **any two** : **(2×6=12)**

1) Obtain state transition matrix whose system matrix is given by $A = \begin{bmatrix} 0 & 1 \\ -6 & -5 \end{bmatrix}$.

2) Design a suitable lead compensator for a system whose OLTF is
$G(S) = \dfrac{k}{s(s+8)}$ to meet the following specifications,

i) %Mp = 9.5%

ii) Natural frequency of oscillations = 12 rad/sec

iii) Kv $\geq$ 10.

Set S

3) Check the controllability of the system below :

$$A = \begin{bmatrix} -1 & 0 & 0 \\ 0 & -2 & 0 \\ 0 & 0 & -3 \end{bmatrix} \quad B = \begin{bmatrix} 1 & 0 \\ 1 & 2 \\ 2 & 1 \end{bmatrix}$$

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain in short D/A converter.

b) Explain isocline method for phase trajectories.

c) Derive pulse transfer function of cascaded elements.

d) Explain in short mapping between s-plane and z-plane.

e) Determine the kind of singularity for the following differential equation :

$\ddot{y} + 0.5\dot{y} + 2y = 0$.

5. Solve **any two** : **(2×6=12)**

a) Examine the stability by using Bilinear transformation coupled with Routh's criteria for the system with characteristic equation

$z^4 - 1.7\ z^3 + 1.04\ z^2 - 0.268\ z + 0.024 = 0.$

b) Explain describing function for ideal relay.

c) Explain the digital controller.

———————

SLR-VB – 398

Seat No.	

Set P

T.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2017
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 24-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) SP is set to _____ when 8051 is reset.
A) 00h B) FFh C) 07h D) F0h

2) If the crystal frequency is 16 Mhz then the time to execute ADD A, R1 one cycle in microseconds instruction is
A) 0.75 B) 0.0075
C) 75000 D) None of these

3) IE1 interrupt vector address is
A) 0003h B) 000Bh C) 0013h D) 001Bh

4) MOVC instruction is normally used for data transfer of
A) Internal ROM B) External ROM
C) A) or B) D) Internal RAM

5) Which one of the following is invalid instruction ?
A) ADDC A, @Rp B) SUB A,#n
C) DEC DPTR D) Both B) and C)

P.T.O.

6) The instruction JNZ checks the contents of _____ for zero.
A) Zero flag B) A register C) PSW D) All of above

7) The capacity of this chip is 1KB they are organized in the form of 1024 words with 8 bit word then what is the site of address bus ?
A) 8 bit B) 10 bit C) 12 bit D) 16 bit

8) ACALL instruction allows specifying _____ address in the instruction and calling subroutine within _____ program memory block.
A) 2 byte, 3K B) 11 bit, 2K C) 9 bit, 2K D) 1 byte, 3K

9) The internal RAM memory for 8051 is
A) 32 bytes B) 64 bytes
C) 128 bytes D) 256 bytes

10) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 2400
A) FD B) FA C) F4 D) E8

11) The I/O port that does not have a dual-purpose role is
A) Port 0 B) Port 1 C) Port 2 D) Port 3

12) The total amount of external code memory that can be interfaced to the 8051 is
A) 32 K B) 64 K C) 128 K D) 256 K

13) For ADC 0808, the _____ analog input channels are multiplexed and selected according using _____ address pins.
A) 16, 4 B) 8, 4 C) 4, 2 D) 8, 3

14) PSEN (Program Store Enable) signal is an _____ signal for the 8031/51 microcontroller and must be connected to the OE pin of a _____ containing the program code.
A) Output, RAM B) Input, ROM
C) Output, ROM D) Input, RAM

_____

SLR-VB – 398

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2017
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 24-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figure to the* ***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 PUSH and POP instruction makes the utilization of stack memory ? Explain with suitable example.

2) Explain mode 1 of UART serial communication. How baud rate can be calculated for this mode ?

3) Draw and explain the operation of port 3 pin internal logic circuit.

4) A switch is connected to pin P1.7. Write a program to check the status of the switch and make the following decision.
   a) If SW = 0, send "0" to P2
   b) If SW = 1, send "1" to P2

5) Give the significance of loading 8F hex in the SFR IE.

3. Solve **any two** questions : **(8×2=16)**

1) What is the difference between timer and counter ? Explain different timer modes for 8051 microcontroller.

2) Write a program to generate a square wave if 50Hz frequency on pin P1.2 using an interrupt for timer 0. Assume that XTAL = 11.0592 MHz.

3) Explain the operation of following instructions with one example.

A	XRL A, add
B	MOV A, @R0
C	SETB b
D	DIV AB
E	CJNE A, # n, radd

SECTION – II

4. Solve **any three** questions : **(4×3=12)**

1) How common cathode seven segment display can be interfaced with 8051 ? What should be done to display digit 3 on it ?

2) Explain Multiprocessor communication mode of microcontroller.

3) What is the use of RTC IC ? How DS1307 RTC can be interfaced with microcontroller ?

4) Draw and explain serial EEPROM interfacing.

5) Explain I2C protocol for serial communication.

5. Solve **any two** questions : **(8×2=16)**

1) Explain Multiprocessor mode (Mode2) of UART serial communication module of 8051 microcontroller. What is the use of PCON register in UART serial communication ?

2) Discuss microcontroller based ON-OFF temperature control system in detail.

3) Interface DAC 0808 to the microcontroller and write a program to generate rising ramp.

———————

SLR-VB – 398

Seat No.	

Set Q

T.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2017
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 24-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) ACALL instruction allows specifying _____ address in the instruction and calling subroutine within _____ program memory block.
A) 2 byte, 3K B) 11 bit, 2K C) 9 bit, 2K D) 1 byte, 3K

2) The internal RAM memory for 8051 is
A) 32 bytes B) 64 bytes
C) 128 bytes D) 256 bytes

3) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 2400
A) FD B) FA C) F4 D) E8

4) The I/O port that does not have a dual-purpose role is
A) Port 0 B) Port 1 C) Port 2 D) Port 3

P.T.O.

5) The total amount of external code memory that can be interfaced to the 8051 is
A) 32 K B) 64 K C) 128 K D) 256 K

6) For ADC 0808, the _____ analog input channels are multiplexed and selected according using _____ address pins.
A) 16, 4 B) 8, 4 C) 4, 2 D) 8, 3

7) 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

8) SP is set to _____ when 8051 is reset.
A) 00h B) FFh C) 07h D) F0h

9) If the crystal frequency is 16 Mhz then the time to execute ADD A, R1 one cycle in microseconds instruction is
A) 0.75 B) 0.0075
C) 75000 D) None of these

10) IE1 interrupt vector address is
A) 0003h B) 000Bh C) 0013h D) 001Bh

11) MOVC instruction is normally used for data transfer of
A) Internal ROM B) External ROM
C) A) or B) D) Internal RAM

12) Which one of the following is invalid instruction ?
A) ADDC A, @Rp B) SUB A,#n
C) DEC DPTR D) Both B) and C)

13) The instruction JNZ checks the contents of _____ for zero.
A) Zero flag B) A register C) PSW D) All of above

14) The capacity of this chip is 1KB they are organized in the form of 1024 words with 8 bit word then what is the site of address bus ?
A) 8 bit B) 10 bit C) 12 bit D) 16 bit

_____

SLR-VB – 398

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2017
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 24-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figure to the* ***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 PUSH and POP instruction makes the utilization of stack memory ? Explain with suitable example.

2) Explain mode 1 of UART serial communication. How baud rate can be calculated for this mode ?

3) Draw and explain the operation of port 3 pin internal logic circuit.

4) A switch is connected to pin P1.7. Write a program to check the status of the switch and make the following decision.
   a) If SW = 0, send "0" to P2
   b) If SW = 1, send "1" to P2

5) Give the significance of loading 8F hex in the SFR IE.

3. Solve **any two** questions : **(8×2=16)**

1) What is the difference between timer and counter ? Explain different timer modes for 8051 microcontroller.

2) Write a program to generate a square wave if 50Hz frequency on pin P1.2 using an interrupt for timer 0. Assume that XTAL = 11.0592 MHz.

3) Explain the operation of following instructions with one example.

A	XRL A, add
B	MOV A, @R0
C	SETB b
D	DIV AB
E	CJNE A, # n, radd

SECTION – II

4. Solve **any three** questions : **(4×3=12)**

1) How common cathode seven segment display can be interfaced with 8051 ? What should be done to display digit 3 on it ?

2) Explain Multiprocessor communication mode of microcontroller.

3) What is the use of RTC IC ? How DS1307 RTC can be interfaced with microcontroller ?

4) Draw and explain serial EEPROM interfacing.

5) Explain I2C protocol for serial communication.

5. Solve **any two** questions : **(8×2=16)**

1) Explain Multiprocessor mode (Mode2) of UART serial communication module of 8051 microcontroller. What is the use of PCON register in UART serial communication ?

2) Discuss microcontroller based ON-OFF temperature control system in detail.

3) Interface DAC 0808 to the microcontroller and write a program to generate rising ramp.

SLR-VB – 398

Seat No.	

Set R

T.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2017
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 24-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) Which one of the following is invalid instruction ?
A) ADDC A, @Rp B) SUB A,#n
C) DEC DPTR D) Both B) and C)

2) The instruction JNZ checks the contents of _____ for zero.
A) Zero flag B) A register C) PSW D) All of above

3) The capacity of this chip is 1KB they are organized in the form of 1024 words with 8 bit word then what is the site of address bus ?
A) 8 bit B) 10 bit C) 12 bit D) 16 bit

4) ACALL instruction allows specifying _____ address in the instruction and calling subroutine within _____ program memory block.
A) 2 byte, 3K B) 11 bit, 2K C) 9 bit, 2K D) 1 byte, 3K

5) The internal RAM memory for 8051 is
   A) 32 bytes B) 64 bytes
   C) 128 bytes D) 256 bytes

6) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 2400
   A) FD B) FA C) F4 D) E8

7) The I/O port that does not have a dual-purpose role is
   A) Port 0 B) Port 1 C) Port 2 D) Port 3

8) The total amount of external code memory that can be interfaced to the 8051 is
   A) 32 K B) 64 K C) 128 K D) 256 K

9) For ADC 0808, the _____ analog input channels are multiplexed and selected according using _____ address pins.
   A) 16, 4 B) 8, 4 C) 4, 2 D) 8, 3

10) 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

11) SP is set to _____ when 8051 is reset.
   A) 00h B) FFh C) 07h D) F0h

12) If the crystal frequency is 16 Mhz then the time to execute ADD A, R1 one cycle in microseconds instruction is
   A) 0.75 B) 0.0075
   C) 75000 D) None of these

13) IE1 interrupt vector address is
   A) 0003h B) 000Bh C) 0013h D) 001Bh

14) MOVC instruction is normally used for data transfer of
   A) Internal ROM B) External ROM
   C) A) or B) D) Internal RAM

_____

SLR-VB – 398

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2017
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 24-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figure to the* ***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 PUSH and POP instruction makes the utilization of stack memory ? Explain with suitable example.

2) Explain mode 1 of UART serial communication. How baud rate can be calculated for this mode ?

3) Draw and explain the operation of port 3 pin internal logic circuit.

4) A switch is connected to pin P1.7. Write a program to check the status of the switch and make the following decision.
   a) If SW = 0, send "0" to P2
   b) If SW = 1, send "1" to P2

5) Give the significance of loading 8F hex in the SFR IE.

3. Solve **any two** questions : **(8×2=16)**

1) What is the difference between timer and counter ? Explain different timer modes for 8051 microcontroller.

2) Write a program to generate a square wave if 50Hz frequency on pin P1.2 using an interrupt for timer 0. Assume that XTAL = 11.0592 MHz.

3) Explain the operation of following instructions with one example.

A	XRL A, add
B	MOV A, @R0
C	SETB b
D	DIV AB
E	CJNE A, # n, radd

SECTION – II

4. Solve **any three** questions : **(4×3=12)**

1) How common cathode seven segment display can be interfaced with 8051 ? What should be done to display digit 3 on it ?

2) Explain Multiprocessor communication mode of microcontroller.

3) What is the use of RTC IC ? How DS1307 RTC can be interfaced with microcontroller ?

4) Draw and explain serial EEPROM interfacing.

5) Explain I2C protocol for serial communication.

5. Solve **any two** questions : **(8×2=16)**

1) Explain Multiprocessor mode (Mode2) of UART serial communication module of 8051 microcontroller. What is the use of PCON register in UART serial communication ?

2) Discuss microcontroller based ON-OFF temperature control system in detail.

3) Interface DAC 0808 to the microcontroller and write a program to generate rising ramp.

———————

SLR-VB – 398

Seat No.	

Set S

T.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2017
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 24-5-2017 Max. Marks : 70
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer : **14**

1) With XTAL = 11.0592 MHz, find the TH1 value needed to have the baud rate 2400
A) FD B) FA C) F4 D) E8

2) The I/O port that does not have a dual-purpose role is
A) Port 0 B) Port 1 C) Port 2 D) Port 3

3) The total amount of external code memory that can be interfaced to the 8051 is
A) 32 K B) 64 K C) 128 K D) 256 K

4) For ADC 0808, the _____ analog input channels are multiplexed and selected according using _____ address pins.
A) 16, 4 B) 8, 4 C) 4, 2 D) 8, 3

P.T.O.

5) PSEN (Program Store Enable) signal is an _____ signal for the 8031/51 microcontroller and must be connected to the OE pin of a _____ containing the program code.
   A) Output, RAM B) Input, ROM
   C) Output, ROM D) Input, RAM

6) SP is set to _____ when 8051 is reset.
   A) 00h B) FFh C) 07h D) F0h

7) If the crystal frequency is 16 Mhz then the time to execute ADD A, R1 one cycle in microseconds instruction is
   A) 0.75 B) 0.0075
   C) 75000 D) None of these

8) IE1 interrupt vector address is
   A) 0003h B) 000Bh C) 0013h D) 001Bh

9) MOVC instruction is normally used for data transfer of
   A) Internal ROM B) External ROM
   C) A) or B) D) Internal RAM

10) Which one of the following is invalid instruction ?
   A) ADDC A, @Rp B) SUB A,#n
   C) DEC DPTR D) Both B) and C)

11) The instruction JNZ checks the contents of _____ for zero.
   A) Zero flag B) A register C) PSW D) All of above

12) The capacity of this chip is 1KB they are organized in the form of 1024 words with 8 bit word then what is the site of address bus ?
   A) 8 bit B) 10 bit C) 12 bit D) 16 bit

13) ACALL instruction allows specifying _____ address in the instruction and calling subroutine within _____ program memory block.
   A) 2 byte, 3K B) 11 bit, 2K C) 9 bit, 2K D) 1 byte, 3K

14) The internal RAM memory for 8051 is
   A) 32 bytes B) 64 bytes
   C) 128 bytes D) 256 bytes

_____

SLR-VB – 398

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) (New-CGPA) Examination, 2017
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Wednesday, 24-5-2017 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Figure to the* ***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 PUSH and POP instruction makes the utilization of stack memory ? Explain with suitable example.

2) Explain mode 1 of UART serial communication. How baud rate can be calculated for this mode ?

3) Draw and explain the operation of port 3 pin internal logic circuit.

4) A switch is connected to pin P1.7. Write a program to check the status of the switch and make the following decision.
   a) If SW = 0, send "0" to P2
   b) If SW = 1, send "1" to P2

5) Give the significance of loading 8F hex in the SFR IE.

3. Solve **any two** questions : **(8×2=16)**

1) What is the difference between timer and counter ? Explain different timer modes for 8051 microcontroller.

2) Write a program to generate a square wave if 50Hz frequency on pin P1.2 using an interrupt for timer 0. Assume that XTAL = 11.0592 MHz.

3) Explain the operation of following instructions with one example.

A	XRL A, add
B	MOV A, @R0
C	SETB b
D	DIV AB
E	CJNE A, # n, radd

SECTION – II

4. Solve **any three** questions : **(4×3=12)**

1) How common cathode seven segment display can be interfaced with 8051 ? What should be done to display digit 3 on it ?

2) Explain Multiprocessor communication mode of microcontroller.

3) What is the use of RTC IC ? How DS1307 RTC can be interfaced with microcontroller ?

4) Draw and explain serial EEPROM interfacing.

5) Explain I2C protocol for serial communication.

5. Solve **any two** questions : **(8×2=16)**

1) Explain Multiprocessor mode (Mode2) of UART serial communication module of 8051 microcontroller. What is the use of PCON register in UART serial communication ?

2) Discuss microcontroller based ON-OFF temperature control system in detail.

3) Interface DAC 0808 to the microcontroller and write a program to generate rising ramp.

———————

SLR-VB – 399

Seat No.	

Set **P**

T.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
Self Learning (Technical) (New – CGPA)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 26-5-2017 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) _____ is the process by which goods and services are created.
a) Marketing b) Production c) Advertising d) Selling

2) _____ in any paid form of non personal presentation and promotion of goods and services ideal by an identified sponsors.
a) Marketing b) Selling c) Advertising d) None of these

3) Radio television, cinema and slides, fairs and exhibitions, loudspeakers are type of _____
a) Poses, advertising media b) Audio visual media
c) Distribution media d) None of the above

4) _____ is the greatest importance at the supervisory level.
a) Technical skill b) Human skill c) Analytical skill d) None of these

5) _____ are constructed to discover interests, existing skills and potential for acquiring skills.
a) Proficiency and optimize tests b) Intelligent test
c) Vocational test d) Personality test

6) The art of getting work done through people is called as _____

a) Business b) Management c) Industry d) Ownership

7) In _____ concept product enjoys the supreme importance.

a) Selling b) Marketing c) Advertising d) Distribution

8) _____ communication can occurs in a face to face meeting of two people or in managers in meeting.

a) Oral b) Written

c) Down ward d) Upward

9) _____ are designated to measure mental capacity and to test memory, speed of through and ability to see relationships in complete problem situations.

a) Aptitude test b) Personality test

c) Intelligence test d) Vocational test

10) _____ Leaders uses his/her power very little it at all, giving subordinates a high degree of independence in their operation.

a) Autocratic b) The free rein

c) Democratic d) Ideal

_____

SLR-VB – 399

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
Self Learning (Technical) (New – CGPA)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

Solve **any four** from Q. no. **2** to Q. no.**6**.

2. a) Explain various types of production system. **5**

   b) Explain Core concept of marketing. **5**

3. a) Explain the payback period and accounting rate of return. **5**

   b) Explain the significance of Human resource, what are the duties of HR manager ? **5**

4. a) What are the factors to be considered in selecting plant location ? **5**

   b) Explain the impact of liberalization and globalization. **5**

5. a) What are the functions of bank ? Explain briefly. **5**

   b) Explain the Taxation-principles. **5**

6. Write short note on **any two**. **(2×5=10)**
   a) Evaluation of scientific management.
   b) Types of plant layout.
   c) The performance appraisal in human resource.

Set P

SLR-VB – 399

Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
Self Learning (Technical) (New – CGPA)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 26-5-2017 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) _____ are designated to measure mental capacity and to test memory, speed of through and ability to see relationships in complete problem situations.

a) Aptitude test b) Personality test
c) Intelligence test d) Vocational test

2) _____ Leaders uses his/her power very little it at all, giving subordinates a high degree of independence in their operation.

a) Autocratic b) The free rein
c) Democratic d) Ideal

3) In _____ concept product enjoys the supreme importance.

a) Selling b) Marketing c) Advertising d) Distribution

4) _____ communication can occurs in a face to face meeting of two people or in managers in meeting.

a) Oral b) Written
c) Down ward d) Upward

P.T.O.

5) _____ is the process by which goods and services are created.

a) Marketing b) Production c) Advertising d) Selling

6) _____ in any paid form of non personal presentation and promotion of goods and services ideal by an identified sponsors.

a) Marketing b) Selling c) Advertising d) None of these

7) Radio television, cinema and slides, fairs and exhibitions, loudspeakers are type of _____

a) Poses, advertising media b) Audio visual media

c) Distribution media d) None of the above

8) _____ is the greatest importance at the supervisory level.

a) Technical skill b) Human skill c) Analytical skill d) None of these

9) _____ are constructed to discover interests, existing skills and potential for acquiring skills.

a) Proficiency and optimize tests b) Intelligent test

c) Vocational test d) Personality test

10) The art of getting work done through people is called as _____

a) Business b) Management c) Industry d) Ownership

_____

SLR-VB – 399

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
Self Learning (Technical) (New – CGPA)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

Solve **any four** from Q. no. **2** to Q. no.**6**.

2. a) Explain various types of production system. **5**
   b) Explain Core concept of marketing. **5**

3. a) Explain the payback period and accounting rate of return. **5**
   b) Explain the significance of Human resource, what are the duties of HR manager ? **5**

4. a) What are the factors to be considered in selecting plant location ? **5**
   b) Explain the impact of liberalization and globalization. **5**

5. a) What are the functions of bank ? Explain briefly. **5**
   b) Explain the Taxation-principles. **5**

6. Write short note on **any two**. **(2×5=10)**
   a) Evaluation of scientific management.
   b) Types of plant layout.
   c) The performance appraisal in human resource.

Set Q

SLR-VB – 399

Seat No.	

Set **R**

T.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
Self Learning (Technical) (New – CGPA)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 26-5-2017 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) _____ are constructed to discover interests, existing skills and potential for acquiring skills.

a) Proficiency and optimize tests b) Intelligent test
c) Vocational test d) Personality test

2) The art of getting work done through people is called as _____

a) Business b) Management c) Industry d) Ownership

3) _____ are designated to measure mental capacity and to test memory, speed of through and ability to see relationships in complete problem situations.

a) Aptitude test b) Personality test
c) Intelligence test d) Vocational test

4) _____ Leaders uses his/her power very little it at all, giving subordinates a high degree of independence in their operation.

a) Autocratic b) The free rein
c) Democratic d) Ideal

P.T.O.

5) Radio television, cinema and slides, fairs and exhibitions, loudspeakers are type of _____

a) Poses, advertising media b) Audio visual media

c) Distribution media d) None of the above

6) _____ is the greatest importance at the supervisory level.

a) Technical skill b) Human skill c) Analytical skill d) None of these

7) _____ is the process by which goods and services are created.

a) Marketing b) Production c) Advertising d) Selling

8) _____ in any paid form of non personal presentation and promotion of goods and services ideal by an identified sponsors.

a) Marketing b) Selling c) Advertising d) None of these

9) In _____ concept product enjoys the supreme importance.

a) Selling b) Marketing c) Advertising d) Distribution

10) _____ communication can occurs in a face to face meeting of two people or in managers in meeting.

a) Oral b) Written

c) Down ward d) Upward

_____

SLR-VB – 399

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
Self Learning (Technical) (New – CGPA)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

Solve **any four** from Q. no. **2** to Q. no.**6**.

2. a) Explain various types of production system. **5**

   b) Explain Core concept of marketing. **5**

3. a) Explain the payback period and accounting rate of return. **5**

   b) Explain the significance of Human resource, what are the duties of HR manager ? **5**

4. a) What are the factors to be considered in selecting plant location ? **5**

   b) Explain the impact of liberalization and globalization. **5**

5. a) What are the functions of bank ? Explain briefly. **5**

   b) Explain the Taxation-principles. **5**

6. Write short note on **any two**. **(2×5=10)**
   a) Evaluation of scientific management.
   b) Types of plant layout.
   c) The performance appraisal in human resource.

Set R

SLR-VB – 399

Seat No.	

Set **S**

T.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
Self Learning (Technical) (New – CGPA)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 26-5-2017 Total Marks : 50
Time : 3.00 p.m. to 5.00 p.m.

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

MCQ/Objective Type Questions

Marks : 10

1. Choose the correct answer : **(10×1=10)**

1) Radio television, cinema and slides, fairs and exhibitions, loudspeakers are type of _____
   a) Poses, advertising media b) Audio visual media
   c) Distribution media d) None of the above

2) _____ is the greatest importance at the supervisory level.
   a) Technical skill b) Human skill c) Analytical skill d) None of these

3) _____ are constructed to discover interests, existing skills and potential for acquiring skills.
   a) Proficiency and optimize tests b) Intelligent test
   c) Vocational test d) Personality test

4) The art of getting work done through people is called as _____
   a) Business b) Management c) Industry d) Ownership

5) In _____ concept product enjoys the supreme importance.
   a) Selling b) Marketing c) Advertising d) Distribution

P.T.O.

6) _____ communication can occurs in a face to face meeting of two people or in managers in meeting.

a) Oral b) Written

c) Down ward d) Upward

7) _____ are designated to measure mental capacity and to test memory, speed of through and ability to see relationships in complete problem situations.

a) Aptitude test b) Personality test

c) Intelligence test d) Vocational test

8) _____ Leaders uses his/her power very little it at all, giving subordinates a high degree of independence in their operation.

a) Autocratic b) The free rein

c) Democratic d) Ideal

9) _____ is the process by which goods and services are created.

a) Marketing b) Production c) Advertising d) Selling

10) _____ in any paid form of non personal presentation and promotion of goods and services ideal by an identified sponsors.

a) Marketing b) Selling c) Advertising d) None of these

_____

SLR-VB – 399

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
Self Learning (Technical) (New – CGPA)
INDUSTRIAL MANAGEMENT

Day and Date : Friday, 26-5-2017 Marks : 40
Time : 3.00 p.m. to 5.00 p.m.

Solve **any four** from Q. no. **2** to Q. no.**6**.

2. a) Explain various types of production system. **5**

   b) Explain Core concept of marketing. **5**

3. a) Explain the payback period and accounting rate of return. **5**

   b) Explain the significance of Human resource, what are the duties of HR manager ? **5**

4. a) What are the factors to be considered in selecting plant location ? **5**

   b) Explain the impact of liberalization and globalization. **5**

5. a) What are the functions of bank ? Explain briefly. **5**

   b) Explain the Taxation-principles. **5**

6. Write short note on **any two**. **(2×5=10)**
   a) Evaluation of scientific management.
   b) Types of plant layout.
   c) The performance appraisal in human resource.

Set S

SLR-VB – 400

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 4-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) Advantage of AC Drive is
   a) No commutation b) No sparking
   c) Low cost d) All of these
2) Necessity of controlled rectifier for DC drive is
   a) To improve efficiency b) To improve reliability
   c) To control the speed d) To improve performance
3) As rotor resistance increases the maximum torque of I.M.
   a) Increases b) Decreases
   c) Remains same d) First increases and then decreases
4) Regenerative braking of DC motor is achieved by
   a) Phase controlled rectifiers b) Inverter
   c) Cyclo-converter d) Chopper
5) Variable frequency supply to I.M. for speed control can be made available using
   a) VSI b) CSI c) Cyclo-converter d) All of these
6) Speed control of I.M. is possible
   a) From rotor side only b) From stator side only
   c) Stator and rotor side d) None of the above
7) Conduction period for the SCR in a 3-phase full converter connected to a highly inductive load is
   a) 120 degrees b) 60 degrees c) 180 degrees d) 360 degrees
8) Characteristics of the drive for crane hoist and covering each _____
   a) Smooth movement b) Precise control
   c) Fast speed control d) All of these

9) During regenerative braking mode, back emf is _____ than supply voltage.
   a) Less b) Equal c) More d) None of these
10) For higher frequency chopper device proffered is
   a) SCR b) TRIAC c) Transistor d) GTO
11) A chopper can be used on
   a) PWM only b) FM only
   c) AM only d) Both PWM and FM
12) A chopper where voltage as well as current remain positive is known as
   a) Type – A b) Type – B c) Type – C d) Type – D
13) The maximum torque does not depends on the
   a) Voltage b) Stator resistance
   c) Rotor resistance d) Rotor Reactance
14) In V/f control method
   a) Maximum torque constant b) Maximum torque decreases
   c) Motor speed increases d) Maximum torque increases
15) In constant power region
   a) V/f ratio constant
   b) Voltage constant and frequency is increased
   c) Voltage constant and frequency is decreased
   d) Both V and f increased
16) In static rotor resistance control, R = 10 Ω , α = 0.6. The effective external resistance is
   a) 2Ω b) 3Ω c) 5Ω d) 4Ω
17) Slip power control scheme provide a range of speed control of a 3-phase IM. The range is
   a) 0 to Ns b) –Ns to Ns c) 0 to 2 Ns d) –2 Ns to 2 Ns
18) Damper winding is required in a
   a) Self control mode b) Separate control mode
   c) Both a) and b) d) None of these
19) A drive consisting of load side converter and S.M. is known as
   a) DC Motor b) AC Motor
   c) Commutator less DC Motor d) Commutator less AC Motor
20) In case belt conveyors
   a) Squirrel cage motors with direct-on-line starters are used
   b) Single phase induction motors are used
   c) DC shunt motors are used
   d) Induction motors with star-delta starters are used

_____

SLR-VB – 400

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 4-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**
   a) Write and explain different parts of electrical drive system.
   b) A 200 V, 10.5 A, 2000 rpm d.c. shunt motor has armature and field resistances of 0.5 and 400 ohms respectively, is drives the load whose torque is constant at rated motor torque. Calculate motor speed if the source voltage drops to 175 V.
   c) For d.c. :
      i) Series motor
      ii) Shunt Motor,
      Draw and explain :
      i) Speed load characteristics
      ii) Speed torque characteristics.
   d) What are the different methods of speed control of D.C. Motors and explain anyone.
   e) Explain the multi quadrant operation of hoist with neat diagram.

3. Attempt **any two** questions : **(2×10=20)**
   a) Derive the expression for torque and moment of inertia for loads with rotational motion and translational motion.
   b) 220 V, 970 RPM, 100 Amp D.C. separately excited motor has an armature resistance of 0.05 ohms. It is braked by plugging from initial speed of 1000 RPM. Calculate :
      i) Resistance to be placed in armature circuit to limit the braking current twice the full load value
      ii) Braking torque
      iii) Torque when speed has fallen to zero.
   c) What are different electrical braking methods of DC motor ? Derive the braking torque and speed relationship of all with explanation.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**

   a) Explain the operation of IM speed control by AC voltage regulators.

   b) Write the comparison between VSI and CSI.

   c) Explain the operation of slip ring IM by static rotor resistance control and derive the formula for effective resistance R_e.

   d) Explain the 120 degrees conduction inverter fed BLDC motor drive and derive torque equation.

   e) Explain the speed torque and power angle characteristics of synchronous motor drive.

5. Attempt **any two** questions : **(2×10=20)**

   a) A 400 V, star connected, 3-phase, 6-pole, 50 Hz IM has following parameters referred to the stator : $R_s = R_r' = 1\,\Omega$, $X_s = X_r' = 2\,\Omega$.

   For regenerative braking operation of this motor determine :

   i) Maximum overhauling torque it can hold and range of speed for safe operation.

   ii) Speed at which it will hold an overhauling load with a torque of 100 N-m.

   b) Explain the operation of slip power recovery scheme for SLIM by using static Krammer drive.

   c) Draw and explain the operation of self controlled synchronous motor drive employing load commutated thyristor inverter in motoring and generating mode of operation.

SLR-VB – 400

Seat No.	

Set Q

B.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 4-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In static rotor resistance control, R = 10 Ω, α = 0.6. The effective external resistance is
   a) 2Ω b) 3Ω c) 5Ω d) 4Ω

2) Slip power control scheme provide a range of speed control of a 3-phase IM. The range is
   a) 0 to Ns b) –Ns to Ns c) 0 to 2 Ns d) –2 Ns to 2 Ns

3) Damper winding is required in a
   a) Self control mode b) Separate control mode
   c) Both a) and b) d) None of these

4) A drive consisting of load side converter and S.M. is known as
   a) DC Motor b) AC Motor
   c) Commutator less DC Motor d) Commutator less AC Motor

5) In case belt conveyors
   a) Squirrel cage motors with direct-on-line starters are used
   b) Single phase induction motors are used
   c) DC shunt motors are used
   d) Induction motors with star-delta starters are used

6) Advantage of AC Drive is
   a) No commutation b) No sparking
   c) Low cost d) All of these

7) Necessity of controlled rectifier for DC drive is
   a) To improve efficiency b) To improve reliability
   c) To control the speed d) To improve performance

P.T.O.

8) As rotor resistance increases the maximum torque of I.M.
   a) Increases b) Decreases
   c) Remains same d) First increases and then decreases
9) Regenerative braking of DC motor is achieved by
   a) Phase controlled rectifiers b) Inverter
   c) Cyclo-converter d) Chopper
10) Variable frequency supply to I.M. for speed control can be made available using
   a) VSI b) CSI c) Cyclo-converter d) All of these
11) Speed control of I.M. is possible
   a) From rotor side only b) From stator side only
   c) Stator and rotor side d) None of the above
12) Conduction period for the SCR in a 3-phase full converter connected to a highly inductive load is
   a) 120 degrees b) 60 degrees c) 180 degrees d) 360 degrees
13) Characteristics of the drive for crane hoist and covering each _____
   a) Smooth movement b) Precise control
   c) Fast speed control d) All of these
14) During regenerative braking mode, back emf is _____ than supply voltage.
   a) Less b) Equal c) More d) None of these
15) For higher frequency chopper device proffered is
   a) SCR b) TRIAC c) Transistor d) GTO
16) A chopper can be used on
   a) PWM only b) FM only
   c) AM only d) Both PWM and FM
17) A chopper where voltage as well as current remain positive is known as
   a) Type – A b) Type – B c) Type – C d) Type – D
18) The maximum torque does not depends on the
   a) Voltage b) Stator resistance
   c) Rotor resistance d) Rotor Reactance
19) In V/f control method
   a) Maximum torque constant b) Maximum torque decreases
   c) Motor speed increases d) Maximum torque increases
20) In constant power region
   a) V/f ratio constant
   b) Voltage constant and frequency is increased
   c) Voltage constant and frequency is decreased
   d) Both V and f increased

_____

SLR-VB – 400

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 4-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**
   a) Write and explain different parts of electrical drive system.
   b) A 200 V, 10.5 A, 2000 rpm d.c. shunt motor has armature and field resistances of 0.5 and 400 ohms respectively, is drives the load whose torque is constant at rated motor torque. Calculate motor speed if the source voltage drops to 175 V.
   c) For d.c. :
      i) Series motor
      ii) Shunt Motor,
      Draw and explain :
      i) Speed load characteristics
      ii) Speed torque characteristics.
   d) What are the different methods of speed control of D.C. Motors and explain anyone.
   e) Explain the multi quadrant operation of hoist with neat diagram.

3. Attempt **any two** questions : **(2×10=20)**
   a) Derive the expression for torque and moment of inertia for loads with rotational motion and translational motion.
   b) 220 V, 970 RPM, 100 Amp D.C. separately excited motor has an armature resistance of 0.05 ohms. It is braked by plugging from initial speed of 1000 RPM. Calculate :
      i) Resistance to be placed in armature circuit to limit the braking current twice the full load value
      ii) Braking torque
      iii) Torque when speed has fallen to zero.
   c) What are different electrical braking methods of DC motor ? Derive the braking torque and speed relationship of all with explanation.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**

   a) Explain the operation of IM speed control by AC voltage regulators.

   b) Write the comparison between VSI and CSI.

   c) Explain the operation of slip ring IM by static rotor resistance control and derive the formula for effective resistance R_e.

   d) Explain the 120 degrees conduction inverter fed BLDC motor drive and derive torque equation.

   e) Explain the speed torque and power angle characteristics of synchronous motor drive.

5. Attempt **any two** questions : **(2×10=20)**

   a) A 400 V, star connected, 3-phase, 6-pole, 50 Hz IM has following parameters referred to the stator : $R_s = R_r' = 1\,\Omega$, $X_s = X_r' = 2\,\Omega$.

   For regenerative braking operation of this motor determine :

   i) Maximum overhauling torque it can hold and range of speed for safe operation.

   ii) Speed at which it will hold an overhauling load with a torque of 100 N-m.

   b) Explain the operation of slip power recovery scheme for SLIM by using static Krammer drive.

   c) Draw and explain the operation of self controlled synchronous motor drive employing load commutated thyristor inverter in motoring and generating mode of operation.

SLR-VB – 400

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 4-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) A chopper can be used on
   a) PWM only b) FM only
   c) AM only d) Both PWM and FM

2) A chopper where voltage as well as current remain positive is known as
   a) Type – A b) Type – B c) Type – C d) Type – D

3) The maximum torque does not depends on the
   a) Voltage b) Stator resistance
   c) Rotor resistance d) Rotor Reactance

4) In V/f control method
   a) Maximum torque constant b) Maximum torque decreases
   c) Motor speed increases d) Maximum torque increases

5) In constant power region
   a) V/f ratio constant
   b) Voltage constant and frequency is increased
   c) Voltage constant and frequency is decreased
   d) Both V and f increased

6) In static rotor resistance control, R = 10 Ω , α = 0.6. The effective external resistance is
   a) 2Ω b) 3Ω c) 5Ω d) 4Ω

7) Slip power control scheme provide a range of speed control of a 3-phase IM. The range is
   a) 0 to Ns b) –Ns to Ns c) 0 to 2 Ns d) –2 Ns to 2 Ns

8) Damper winding is required in a
   a) Self control mode b) Separate control mode
   c) Both a) and b) d) None of these
9) A drive consisting of load side converter and S.M. is known as
   a) DC Motor b) AC Motor
   c) Commutator less DC Motor d) Commutator less AC Motor
10) In case belt conveyors
   a) Squirrel cage motors with direct-on-line starters are used
   b) Single phase induction motors are used
   c) DC shunt motors are used
   d) Induction motors with star-delta starters are used
11) Advantage of AC Drive is
   a) No commutation b) No sparking
   c) Low cost d) All of these
12) Necessity of controlled rectifier for DC drive is
   a) To improve efficiency b) To improve reliability
   c) To control the speed d) To improve performance
13) As rotor resistance increases the maximum torque of I.M.
   a) Increases b) Decreases
   c) Remains same d) First increases and then decreases
14) Regenerative braking of DC motor is achieved by
   a) Phase controlled rectifiers b) Inverter
   c) Cyclo-converter d) Chopper
15) Variable frequency supply to I.M. for speed control can be made available using
   a) VSI b) CSI c) Cyclo-converter d) All of these
16) Speed control of I.M. is possible
   a) From rotor side only b) From stator side only
   c) Stator and rotor side d) None of the above
17) Conduction period for the SCR in a 3-phase full converter connected to a highly inductive load is
   a) 120 degrees b) 60 degrees c) 180 degrees d) 360 degrees
18) Characteristics of the drive for crane hoist and covering each _____
   a) Smooth movement b) Precise control
   c) Fast speed control d) All of these
19) During regenerative braking mode, back emf is _____ than supply voltage.
   a) Less b) Equal c) More d) None of these
20) For higher frequency chopper device proffered is
   a) SCR b) TRIAC c) Transistor d) GTO

_____

SLR-VB – 400

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 4-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**
   a) Write and explain different parts of electrical drive system.
   b) A 200 V, 10.5 A, 2000 rpm d.c. shunt motor has armature and field resistances of 0.5 and 400 ohms respectively, is drives the load whose torque is constant at rated motor torque. Calculate motor speed if the source voltage drops to 175 V.
   c) For d.c. :
      i) Series motor
      ii) Shunt Motor,
      Draw and explain :
      i) Speed load characteristics
      ii) Speed torque characteristics.
   d) What are the different methods of speed control of D.C. Motors and explain anyone.
   e) Explain the multi quadrant operation of hoist with neat diagram.

3. Attempt **any two** questions : **(2×10=20)**
   a) Derive the expression for torque and moment of inertia for loads with rotational motion and translational motion.
   b) 220 V, 970 RPM, 100 Amp D.C. separately excited motor has an armature resistance of 0.05 ohms. It is braked by plugging from initial speed of 1000 RPM. Calculate :
      i) Resistance to be placed in armature circuit to limit the braking current twice the full load value
      ii) Braking torque
      iii) Torque when speed has fallen to zero.
   c) What are different electrical braking methods of DC motor ? Derive the braking torque and speed relationship of all with explanation.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**

   a) Explain the operation of IM speed control by AC voltage regulators.

   b) Write the comparison between VSI and CSI.

   c) Explain the operation of slip ring IM by static rotor resistance control and derive the formula for effective resistance R_e.

   d) Explain the 120 degrees conduction inverter fed BLDC motor drive and derive torque equation.

   e) Explain the speed torque and power angle characteristics of synchronous motor drive.

5. Attempt **any two** questions : **(2×10=20)**

   a) A 400 V, star connected, 3-phase, 6-pole, 50 Hz IM has following parameters referred to the stator : $R_s = R_r' = 1\,\Omega$, $X_s = X_r' = 2\,\Omega$.

   For regenerative braking operation of this motor determine :

   i) Maximum overhauling torque it can hold and range of speed for safe operation.

   ii) Speed at which it will hold an overhauling load with a torque of 100 N-m.

   b) Explain the operation of slip power recovery scheme for SLIM by using static Krammer drive.

   c) Draw and explain the operation of self controlled synchronous motor drive employing load commutated thyristor inverter in motoring and generating mode of operation.

SLR-VB – 400

Seat No.	

Set S

B.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 4-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) Speed control of I.M. is possible
   a) From rotor side only b) From stator side only
   c) Stator and rotor side d) None of the above

2) Conduction period for the SCR in a 3-phase full converter connected to a highly inductive load is
   a) 120 degrees b) 60 degrees c) 180 degrees d) 360 degrees

3) Characteristics of the drive for crane hoist and covering each _____
   a) Smooth movement b) Precise control
   c) Fast speed control d) All of these

4) During regenerative braking mode, back emf is _____ than supply voltage.
   a) Less b) Equal c) More d) None of these

5) For higher frequency chopper device proffered is
   a) SCR b) TRIAC c) Transistor d) GTO

6) A chopper can be used on
   a) PWM only b) FM only
   c) AM only d) Both PWM and FM

7) A chopper where voltage as well as current remain positive is known as
   a) Type – A b) Type – B c) Type – C d) Type – D

8) The maximum torque does not depends on the
   a) Voltage b) Stator resistance
   c) Rotor resistance d) Rotor Reactance

9) In V/f control method
   a) Maximum torque constant b) Maximum torque decreases
   c) Motor speed increases d) Maximum torque increases

P.T.O.

10) In constant power region
    a) V/f ratio constant
    b) Voltage constant and frequency is increased
    c) Voltage constant and frequency is decreased
    d) Both V and f increased

11) In static rotor resistance control, R = 10 Ω , α = 0.6. The effective external resistance is
    a) 2Ω b) 3Ω c) 5Ω d) 4Ω

12) Slip power control scheme provide a range of speed control of a 3-phase IM. The range is
    a) 0 to Ns b) –Ns to Ns c) 0 to 2 Ns d) –2 Ns to 2 Ns

13) Damper winding is required in a
    a) Self control mode b) Separate control mode
    c) Both a) and b) d) None of these

14) A drive consisting of load side converter and S.M. is known as
    a) DC Motor b) AC Motor
    c) Commutator less DC Motor d) Commutator less AC Motor

15) In case belt conveyors
    a) Squirrel cage motors with direct-on-line starters are used
    b) Single phase induction motors are used
    c) DC shunt motors are used
    d) Induction motors with star-delta starters are used

16) Advantage of AC Drive is
    a) No commutation b) No sparking
    c) Low cost d) All of these

17) Necessity of controlled rectifier for DC drive is
    a) To improve efficiency b) To improve reliability
    c) To control the speed d) To improve performance

18) As rotor resistance increases the maximum torque of I.M.
    a) Increases b) Decreases
    c) Remains same d) First increases and then decreases

19) Regenerative braking of DC motor is achieved by
    a) Phase controlled rectifiers b) Inverter
    c) Cyclo-converter d) Chopper

20) Variable frequency supply to I.M. for speed control can be made available using
    a) VSI b) CSI c) Cyclo-converter d) All of these

———————

SLR-VB – 400

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) Examination, 2017
INDUSTRIAL DRIVES AND CONTROL

Day and Date : Thursday, 4-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**
   a) Write and explain different parts of electrical drive system.
   b) A 200 V, 10.5 A, 2000 rpm d.c. shunt motor has armature and field resistances of 0.5 and 400 ohms respectively, is drives the load whose torque is constant at rated motor torque. Calculate motor speed if the source voltage drops to 175 V.
   c) For d.c. :
      i) Series motor
      ii) Shunt Motor,
      Draw and explain :
      i) Speed load characteristics
      ii) Speed torque characteristics.
   d) What are the different methods of speed control of D.C. Motors and explain anyone.
   e) Explain the multi quadrant operation of hoist with neat diagram.

3. Attempt **any two** questions : **(2×10=20)**
   a) Derive the expression for torque and moment of inertia for loads with rotational motion and translational motion.
   b) 220 V, 970 RPM, 100 Amp D.C. separately excited motor has an armature resistance of 0.05 ohms. It is braked by plugging from initial speed of 1000 RPM. Calculate :
      i) Resistance to be placed in armature circuit to limit the braking current twice the full load value
      ii) Braking torque
      iii) Torque when speed has fallen to zero.
   c) What are different electrical braking methods of DC motor ? Derive the braking torque and speed relationship of all with explanation.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**

   a) Explain the operation of IM speed control by AC voltage regulators.

   b) Write the comparison between VSI and CSI.

   c) Explain the operation of slip ring IM by static rotor resistance control and derive the formula for effective resistance R_e.

   d) Explain the 120 degrees conduction inverter fed BLDC motor drive and derive torque equation.

   e) Explain the speed torque and power angle characteristics of synchronous motor drive.

5. Attempt **any two** questions : **(2×10=20)**

   a) A 400 V, star connected, 3-phase, 6-pole, 50 Hz IM has following parameters referred to the stator : $R_s = R_r' = 1\,\Omega$, $X_s = X_r' = 2\,\Omega$.

   For regenerative braking operation of this motor determine :

   i) Maximum overhauling torque it can hold and range of speed for safe operation.

   ii) Speed at which it will hold an overhauling load with a torque of 100 N-m.

   b) Explain the operation of slip power recovery scheme for SLIM by using static Krammer drive.

   c) Draw and explain the operation of self controlled synchronous motor drive employing load commutated thyristor inverter in motoring and generating mode of operation.

SLR-VB – 401

Seat No.	

Set **P**

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 5-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) The coasting retardation on trains is approximately
A) 0.16 kmphps B) 1.6 kmphps C) 16 kmphps D) 25 kmphps

2) The co-efficient of adhesion is
A) Same on ac and dc traction systems
B) High in case of dc traction and low in ac traction
C) Low in case of ac traction and high in dc traction
D) None of the above

3) When a body reflects entire radiation incident on it, then it is known as
A) Grey body B) White body C) Black body D) Transparent body

4) Which of the following traction system is latest used in the world ?
A) 3 phase 3.7 kV B) 20 kV, 50 Hz single phase
C) 600 V, DC D) 3 kV, DC

5) A human body feels comfortable when the heat produced by the metabolism of human body is equal to
A) Heat dissipated to the surroundings B) Heat stored in the human body
C) Sum of A) and B) D) Difference of A) and B)

6) _____ has the highest value of thermal conductivity.
A) Brass B) Aluminium C) Copper D) Steel

7) The condition of refrigerant after passing through the condenser in a vapour compression system is
A) Saturated liquid B) Wet vapour
C) Dry saturated vapour D) Superheated vapour

8) Which of the following will need lowest level of illumination ?
A) Displays B) Fine engraving C) Railway platform D) Auditoriums

9) Heat from one body to another cannot be transfer if
A) Temperature of the two bodies are same B) Both bodies must be solids
C) Both bodies must be in contact D) None of the above

P.T.O.

10) The bank of tubes at the back of domestic refrigerator is
A) Condenser tubes B) Evaporator tubes
C) Refrigerant cooling tubes D) Capillary tubes

11) The illumination level in houses is in the range
A) 10-20 lumen/m^2 B) 30-50 lumen/m^2 C) 40-75 lumen/m^2 D) 100-140 lumen/m^2

12) Maintenance requirements are least in case of
A) Electric locomotives B) Diesel locomotives
C) Steam locomotives D) None of the above

13) In a resistance furnace the atmosphere is
A) Oxidizing B) Deoxidizing C) Reducing D) Neutral

14) Luminous efficiency of a fluorescent tube is
A) 5-10 lumens/watt B) 15-20 lumens/watt
C) 30-40 lumens/watt D) 60-65 lumens/watt

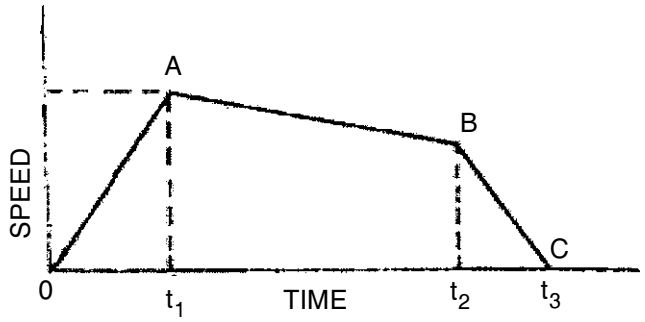
15) Which of the following methods of heating is not dependent on the frequency of supply ?
A) Induction heating B) Dielectric heating
C) Electric resistance heating D) All of the above

16) One lumen per square meter is the same as
A) One lux B) One candela C) One foot candle D) One lumen meter

17) Specific energy consumption is least in
A) Urban service B) Sub-urban service
C) Main-line service D) Equal for all types of services

18) Freon group of refrigerant are
A) Inflammable B) Toxic
C) Nontoxic and no-inflammable D) None of the above

19) The speed time curve for a local train is shown in Figure. In this OA represents



A) Coasting B) Acceleration C) Braking D) Regeneration

20) In induction heating _____ is abnormally high.
A) Phase angle B) Frequency C) Current D) Voltage

_____

SLR-VB – 401

Seat No.	

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 5-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** : **20**
   1) With neat sketch explain Ajax-Wyatt furnace.
   2) What are the factors affecting in designing of lightning scheme ?
   3) Give the broad classification of electric heating.
   4) Explain refrigeration cycle.
   5) Explain the following terms :
      Candle power, space height ratio, utilization factor, maintenance factor and waste light factor.

3. Solve **any two** : **20**
   1) Describe the transformer used in an electric heating. Also derive the condition for maximum output from it.
   2) Draw and explain Vapour Compression Refrigeration System.
   3) Draw and explain circuit of high pressure mercury vapour discharge lamp.

SECTION – II

4. Solve **any four** : **20**
   1) The speed-time curve of train consist of,
      i) Uniform acceleration of 6 kmphps for 25 sec.,
      ii) Free run for 10 minutes,
      iii) Retardation of 6 kmphps to stop,
      iv) Stop time is 5 minute. Find distance between station, average and schedule speed.
   2) Draw and explain discharging operation of Battery in EV.
   3) Define average speed, schedule speed, crests speed. Also explain factors affecting schedule speed.
   4) Explain diesel electric traction in detail.
   5) Give the characteristics of traction motor to be required for traction system.

5. Solve **any two** : **20**
   1) The quadrilateral speed-time curve of train consist of,
      i) Uniform acceleration of 2 kmphps for 30 sec.,
      ii) Coasting for 50 sec.,
      iii) Braking for 20 sec.
      The train is moving a uniform up gradient of 1% ; tractive resistance is 40 N/T. Rotational inertia effect is 10% of dead weight, duration of stop is 15 sec. and overall efficiency of transmission gear and motor is 75%. Find schedule speed and specific energy consumption.
   2) Draw and explain traction substation.
   3) Draw and explain block diagram of EV and HEV.

Set P

Set P

SLR-VB – 401

Seat No.	

Set **Q**

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 5-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

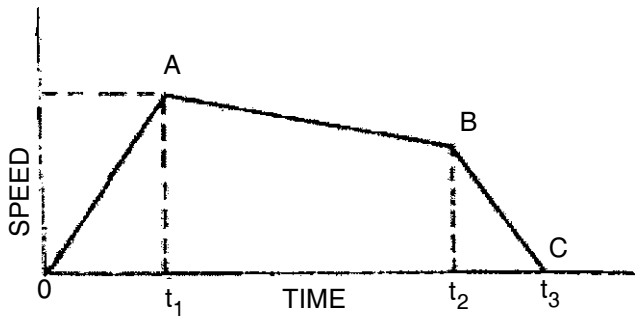
1. Choose the correct answer : **20**

1) One lumen per square meter is the same as
A) One lux B) One candela
C) One foot candle D) One lumen meter

2) Specific energy consumption is least in
A) Urban service B) Sub-urban service
C) Main-line service D) Equal for all types of services

3) Freon group of refrigerant are
A) Inflammable B) Toxic
C) Nontoxic and no-inflammable D) None of the above

4) The speed time curve for a local train is shown in Figure. In this OA represents



A) Coasting B) Acceleration C) Braking D) Regeneration

5) In induction heating _____ is abnormally high.
A) Phase angle B) Frequency
C) Current D) Voltage

6) The coasting retardation on trains is approximately
A) 0.16 kmphps B) 1.6 kmphps C) 16 kmphps D) 25 kmphps

P.T.O.

7) The co-efficient of adhesion is
   A) Same on ac and dc traction systems
   B) High in case of dc traction and low in ac traction
   C) Low in case of ac traction and high in dc traction
   D) None of the above

8) When a body reflects entire radiation incident on it, then it is known as
   A) Grey body B) White body C) Black body D) Transparent body

9) Which of the following traction system is latest used in the world ?
   A) 3 phase 3.7 kV B) 20 kV, 50 Hz single phase
   C) 600 V, DC D) 3 kV, DC

10) A human body feels comfortable when the heat produced by the metabolism of human body is equal to
   A) Heat dissipated to the surroundings B) Heat stored in the human body
   C) Sum of A) and B) D) Difference of A) and B)

11) _____ has the highest value of thermal conductivity.
   A) Brass B) Aluminium C) Copper D) Steel

12) The condition of refrigerant after passing through the condenser in a vapour compression system is
   A) Saturated liquid B) Wet vapour
   C) Dry saturated vapour D) Superheated vapour

13) Which of the following will need lowest level of illumination ?
   A) Displays B) Fine engraving C) Railway platform D) Auditoriums

14) Heat from one body to another cannot be transfer if
   A) Temperature of the two bodies are same B) Both bodies must be solids
   C) Both bodies must be in contact D) None of the above

15) The bank of tubes at the back of domestic refrigerator is
   A) Condenser tubes B) Evaporator tubes
   C) Refrigerant cooling tubes D) Capillary tubes

16) The illumination level in houses is in the range
   A) 10-20 lumen/m^2 B) 30-50 lumen/m^2 C) 40-75 lumen/m^2 D) 100-140 lumen/m^2

17) Maintenance requirements are least in case of
   A) Electric locomotives B) Diesel locomotives
   C) Steam locomotives D) None of the above

18) In a resistance furnace the atmosphere is
   A) Oxidizing B) Deoxidizing C) Reducing D) Neutral

19) Luminous efficiency of a fluorescent tube is
   A) 5-10 lumens/watt B) 15-20 lumens/watt
   C) 30-40 lumens/watt D) 60-65 lumens/watt

20) Which of the following methods of heating is not dependent on the frequency of supply ?
   A) Induction heating B) Dielectric heating
   C) Electric resistance heating D) All of the above

SLR-VB – 401

Seat No.	

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 5-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** : **20**
   1) With neat sketch explain Ajax-Wyatt furnace.
   2) What are the factors affecting in designing of lightning scheme ?
   3) Give the broad classification of electric heating.
   4) Explain refrigeration cycle.
   5) Explain the following terms :
      Candle power, space height ratio, utilization factor, maintenance factor and waste light factor.

3. Solve **any two** : **20**
   1) Describe the transformer used in an electric heating. Also derive the condition for maximum output from it.
   2) Draw and explain Vapour Compression Refrigeration System.
   3) Draw and explain circuit of high pressure mercury vapour discharge lamp.

SECTION – II

4. Solve **any four** : **20**
   1) The speed-time curve of train consist of,
      i) Uniform acceleration of 6 kmphps for 25 sec.,
      ii) Free run for 10 minutes,
      iii) Retardation of 6 kmphps to stop,
      iv) Stop time is 5 minute. Find distance between station, average and schedule speed.
   2) Draw and explain discharging operation of Battery in EV.
   3) Define average speed, schedule speed, crests speed. Also explain factors affecting schedule speed.
   4) Explain diesel electric traction in detail.
   5) Give the characteristics of traction motor to be required for traction system.

5. Solve **any two** : **20**
   1) The quadrilateral speed-time curve of train consist of,
      i) Uniform acceleration of 2 kmphps for 30 sec.,
      ii) Coasting for 50 sec.,
      iii) Braking for 20 sec.
      The train is moving a uniform up gradient of 1% ; tractive resistance is 40 N/T. Rotational inertia effect is 10% of dead weight, duration of stop is 15 sec. and overall efficiency of transmission gear and motor is 75%. Find schedule speed and specific energy consumption.
   2) Draw and explain traction substation.
   3) Draw and explain block diagram of EV and HEV.

Set Q

Set Q

SLR-VB – 401

Seat No.	

Set **R**

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 5-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) The illumination level in houses is in the range
   A) 10-20 lumen/m^2 B) 30-50 lumen/m^2
   C) 40-75 lumen/m^2 D) 100-140 lumen/m^2

2) Maintenance requirements are least in case of
   A) Electric locomotives B) Diesel locomotives
   C) Steam locomotives D) None of the above

3) In a resistance furnace the atmosphere is
   A) Oxidizing B) Deoxidizing
   C) Reducing D) Neutral

4) Luminous efficiency of a fluorescent tube is
   A) 5-10 lumens/watt B) 15-20 lumens/watt
   C) 30-40 lumens/watt D) 60-65 lumens/watt

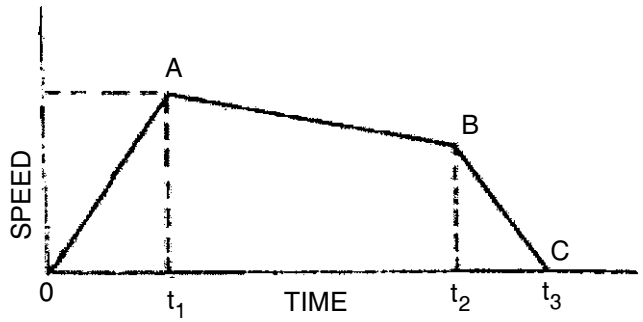
5) Which of the following methods of heating is not dependent on the frequency of supply ?
   A) Induction heating B) Dielectric heating
   C) Electric resistance heating D) All of the above

6) One lumen per square meter is the same as
   A) One lux B) One candela
   C) One foot candle D) One lumen meter

7) Specific energy consumption is least in
   A) Urban service B) Sub-urban service
   C) Main-line service D) Equal for all types of services

8) Freon group of refrigerant are
   A) Inflammable B) Toxic
   C) Nontoxic and no-inflammable D) None of the above

9) The speed time curve for a local train is shown in Figure. In this OA represents



A) Coasting B) Acceleration C) Braking D) Regeneration

10) In induction heating _____ is abnormally high.
A) Phase angle B) Frequency C) Current D) Voltage

11) The coasting retardation on trains is approximately
A) 0.16 kmphps B) 1.6 kmphps C) 16 kmphps D) 25 kmphps

12) The co-efficient of adhesion is
A) Same on ac and dc traction systems
B) High in case of dc traction and low in ac traction
C) Low in case of ac traction and high in dc traction
D) None of the above

13) When a body reflects entire radiation incident on it, then it is known as
A) Grey body B) White body C) Black body D) Transparent body

14) Which of the following traction system is latest used in the world ?
A) 3 phase 3.7 kV B) 20 kV, 50 Hz single phase
C) 600 V, DC D) 3 kV, DC

15) A human body feels comfortable when the heat produced by the metabolism of human body is equal to
A) Heat dissipated to the surroundings B) Heat stored in the human body
C) Sum of A) and B) D) Difference of A) and B)

16) _____ has the highest value of thermal conductivity.
A) Brass B) Aluminium C) Copper D) Steel

17) The condition of refrigerant after passing through the condenser in a vapour compression system is
A) Saturated liquid B) Wet vapour
C) Dry saturated vapour D) Superheated vapour

18) Which of the following will need lowest level of illumination ?
A) Displays B) Fine engraving C) Railway platform D) Auditoriums

19) Heat from one body to another cannot be transfer if
A) Temperature of the two bodies are same B) Both bodies must be solids
C) Both bodies must be in contact D) None of the above

20) The bank of tubes at the back of domestic refrigerator is
A) Condenser tubes B) Evaporator tubes
C) Refrigerant cooling tubes D) Capillary tubes

SLR-VB – 401

Seat No.	

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 5-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** : **20**
   1) With neat sketch explain Ajax-Wyatt furnace.
   2) What are the factors affecting in designing of lightning scheme ?
   3) Give the broad classification of electric heating.
   4) Explain refrigeration cycle.
   5) Explain the following terms :
      Candle power, space height ratio, utilization factor, maintenance factor and waste light factor.

3. Solve **any two** : **20**
   1) Describe the transformer used in an electric heating. Also derive the condition for maximum output from it.
   2) Draw and explain Vapour Compression Refrigeration System.
   3) Draw and explain circuit of high pressure mercury vapour discharge lamp.

SECTION – II

4. Solve **any four** : **20**
   1) The speed-time curve of train consist of,
      i) Uniform acceleration of 6 kmphps for 25 sec.,
      ii) Free run for 10 minutes,
      iii) Retardation of 6 kmphps to stop,
      iv) Stop time is 5 minute. Find distance between station, average and schedule speed.
   2) Draw and explain discharging operation of Battery in EV.
   3) Define average speed, schedule speed, crests speed. Also explain factors affecting schedule speed.
   4) Explain diesel electric traction in detail.
   5) Give the characteristics of traction motor to be required for traction system.

5. Solve **any two** : **20**
   1) The quadrilateral speed-time curve of train consist of,
      i) Uniform acceleration of 2 kmphps for 30 sec.,
      ii) Coasting for 50 sec.,
      iii) Braking for 20 sec.
      The train is moving a uniform up gradient of 1% ; tractive resistance is 40 N/T. Rotational inertia effect is 10% of dead weight, duration of stop is 15 sec. and overall efficiency of transmission gear and motor is 75%. Find schedule speed and specific energy consumption.
   2) Draw and explain traction substation.
   3) Draw and explain block diagram of EV and HEV.

Set R

Set R

SLR-VB – 401

Seat No.	

Set **S**

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 5-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) _____ has the highest value of thermal conductivity.
A) Brass B) Aluminium C) Copper D) Steel

2) The condition of refrigerant after passing through the condenser in a vapour compression system is
A) Saturated liquid B) Wet vapour
C) Dry saturated vapour D) Superheated vapour

3) Which of the following will need lowest level of illumination ?
A) Displays B) Fine engraving C) Railway platform D) Auditoriums

4) Heat from one body to another cannot be transfer if
A) Temperature of the two bodies are same B) Both bodies must be solids
C) Both bodies must be in contact D) None of the above

5) The bank of tubes at the back of domestic refrigerator is
A) Condenser tubes B) Evaporator tubes
C) Refrigerant cooling tubes D) Capillary tubes

6) The illumination level in houses is in the range
A) 10-20 lumen/m^2 B) 30-50 lumen/m^2
C) 40-75 lumen/m^2 D) 100-140 lumen/m^2

7) Maintenance requirements are least in case of
A) Electric locomotives B) Diesel locomotives
C) Steam locomotives D) None of the above

8) In a resistance furnace the atmosphere is
A) Oxidizing B) Deoxidizing
C) Reducing D) Neutral

9) Luminous efficiency of a fluorescent tube is
A) 5-10 lumens/watt B) 15-20 lumens/watt
C) 30-40 lumens/watt D) 60-65 lumens/watt

P.T.O.

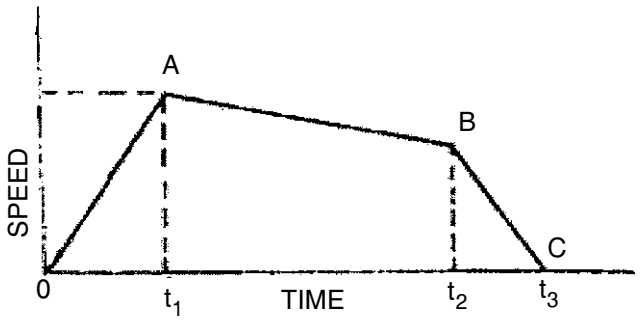
10) Which of the following methods of heating is not dependent on the frequency of supply ?
A) Induction heating B) Dielectric heating
C) Electric resistance heating D) All of the above

11) One lumen per square meter is the same as
A) One lux B) One candela C) One foot candle D) One lumen meter

12) Specific energy consumption is least in
A) Urban service B) Sub-urban service
C) Main-line service D) Equal for all types of services

13) Freon group of refrigerant are
A) Inflammable B) Toxic
C) Nontoxic and no-inflammable D) None of the above

14) The speed time curve for a local train is shown in Figure. In this OA represents



A) Coasting B) Acceleration C) Braking D) Regeneration

15) In induction heating _____ is abnormally high.
A) Phase angle B) Frequency C) Current D) Voltage

16) The coasting retardation on trains is approximately
A) 0.16 kmphps B) 1.6 kmphps C) 16 kmphps D) 25 kmphps

17) The co-efficient of adhesion is
A) Same on ac and dc traction systems
B) High in case of dc traction and low in ac traction
C) Low in case of ac traction and high in dc traction
D) None of the above

18) When a body reflects entire radiation incident on it, then it is known as
A) Grey body B) White body C) Black body D) Transparent body

19) Which of the following traction system is latest used in the world ?
A) 3 phase 3.7 kV B) 20 kV, 50 Hz single phase
C) 600 V, DC D) 3 kV, DC

20) A human body feels comfortable when the heat produced by the metabolism of human body is equal to
A) Heat dissipated to the surroundings B) Heat stored in the human body
C) Sum of A) and B) D) Difference of A) and B)

SLR-VB – 401

Seat No.	

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Friday, 5-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** : **20**
   1) With neat sketch explain Ajax-Wyatt furnace.
   2) What are the factors affecting in designing of lightning scheme ?
   3) Give the broad classification of electric heating.
   4) Explain refrigeration cycle.
   5) Explain the following terms :
      Candle power, space height ratio, utilization factor, maintenance factor and waste light factor.

3. Solve **any two** : **20**
   1) Describe the transformer used in an electric heating. Also derive the condition for maximum output from it.
   2) Draw and explain Vapour Compression Refrigeration System.
   3) Draw and explain circuit of high pressure mercury vapour discharge lamp.

SECTION – II

4. Solve **any four** : **20**
   1) The speed-time curve of train consist of,
      i) Uniform acceleration of 6 kmphps for 25 sec.,
      ii) Free run for 10 minutes,
      iii) Retardation of 6 kmphps to stop,
      iv) Stop time is 5 minute. Find distance between station, average and schedule speed.
   2) Draw and explain discharging operation of Battery in EV.
   3) Define average speed, schedule speed, crests speed. Also explain factors affecting schedule speed.
   4) Explain diesel electric traction in detail.
   5) Give the characteristics of traction motor to be required for traction system.

5. Solve **any two** : **20**
   1) The quadrilateral speed-time curve of train consist of,
      i) Uniform acceleration of 2 kmphps for 30 sec.,
      ii) Coasting for 50 sec.,
      iii) Braking for 20 sec.
      The train is moving a uniform up gradient of 1% ; tractive resistance is 40 N/T. Rotational inertia effect is 10% of dead weight, duration of stop is 15 sec. and overall efficiency of transmission gear and motor is 75%. Find schedule speed and specific energy consumption.
   2) Draw and explain traction substation.
   3) Draw and explain block diagram of EV and HEV.

Set S

Set S

SLR-VB – 402

Seat No.	

Set P

B.E. (Electrical & Electronics Engineering) (Part – I) Examination, 2017
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 6-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) Two things which are same for primary and secondary of transformer are
   a) Ampere turns and voltage per turn b) Resistances and leakage reactances
   c) Current and induced voltages d) None of the above

2) A transformer operates poorly at very low frequencies because
   a) Permeability of core is increased
   b) Magnetizing current is abnormally high
   c) Primary reactance is too much increased
   d) None of the above

3) If a power transformer is operated at very high frequency then
   a) Primary reactance is too much increased
   b) Primary will draw large power
   c) Core losses will be excessive
   d) None of the above

4) The primary leakage flux links
   a) Primary winding only b) Secondary winding only
   c) Both a) and b) d) None of the above

5) The effect of leakage flux in a transformer is to
   a) Increase copper losses b) Decrease copper losses
   c) Cause voltage drop in the windings d) None of the above

6) The mutual flux in a transformer remains constant at all loads because
   a) Applied voltage and frequency are constant
   b) Leakage flux is small
   c) Iron core is used
   d) Losses are small

7) A transformer will work on
a) AC only b) DC only c) Both a) and b) d) None of the above

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

9) A transformer is a efficient device because it
a) Is a static device b) Uses inductive coupling
c) Uses capacitive coupling d) Uses electric coupling

10) The winding of the transformer with greater number of turns will be
a) high voltage winding b) low voltage winding
c) either high or low voltage winding d) none of the above

11) The rotor of a synchronous motor is
a) salient-pole type b) nonsalient-pole type
c) identical to that of d.c. motor d) none of the above

12) Damper winding in a synchronous motor
a) reduces winding losses b) serves to start the motor
c) improves p.f. of the motor d) increases hunting of the motor

13) When the synchronous motor is on no load, the axes of the rotor poles _____ that of stator poles.
a) nearly coincide with b) are far a head
c) are far behind d) none of the above

14) A 3-phase induction motor is
a) essentially a constant-speed motor b) a variable speed motor
c) very costly d) not easily maintainable

15) The air-gap between and rotor of a 3-phase induction motor ranges from
a) 2 cm to 4 cm b) 0.4 mm to 4 mm
c) 1 cm to 2 cm d) 4 cm to 6 cm

16) If the frequency of 3-phase supply to the stator of a 3-phase induction motor is increased, then synchronous speed
a) is decreased b) is increased
c) remains unchanged d) none of above

17) Under normal operating conditions, the contacts of the circuit breaker remain
a) closed b) open c) semi-closed d) none of above

18) An arc is produced when the switch of a high-voltage and large-current circuit is
a) opened b) closed c) opened or closed d) none of above

19) When the circuit breaker operates under fault conditions, the greatest noise is produced in
a) oil circuit breaker b) air-blast circuit breaker
c) vacuum circuit breaker d) SF_6 circuit breaker

20) A circuit breaker must perform the duty of
a) opening the fault circuit and breaking the fault current
b) being closed on to a fault
c) carrying fault current for a short time
d) all above

SLR-VB – 402

Seat No.	

B.E. (Electrical & Electronics Engineering) (Part – I) Examination, 2017
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 6-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve any **four** : **(5×4=20)**
   1) Basic principle of power transformer.
   2) Distinguish between major and minor repair work.
   3) Explain the method of winding resistance measurement.
   4) Explain the procedure of testing the BDV of oil.
   5) Explain the procedure of maintenance of transformer oil.

3. Solve **any two** : **(10×2=20)**
   1) What is the difference between the following test on power transformers_Type tests-Routine tests, Special tests, Commissioning tests ?
   2) Explain the significance of maintenance of a power transformer and explain repair work of medium power transformer.
   3) State the troubles, causes, remedies and protection device operating during respective abnormal condition in low voltage induction motor.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) State the requirements of type-test and routine tests on synchronous machines.
   2) State the troubles with slip-ring induction motor and their causes.
   3) Explain the method of measurement of d.c. resistance of phase winding.
   4) State the various type tests performed on high voltage A. C. circuit breakers.
   5) Explain the starting test on a 3-phase induction motor.

5. Solve **any two** : **(10×2=20)**

   1) State the various types of tests performed on high voltage A.C. circuit-breakers. state the difference between the type tests, routine tests and commissioning tests.

   2) Explain the term “efficiency of an induction motor”. How can it be calculated from the data obtained from the ‘no load test’ and ‘locked-rotor’ test ?

   3) Explain the various test on a 3-phase induction motor.
      i) starting test
      ii) load test
      iii) temperature rise test.

SLR-VB – 402

Seat No.	

Set Q

B.E. (Electrical & Electronics Engineering) (Part – I) Examination, 2017
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 6-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) If the frequency of 3-phase supply to the stator of a 3-phase induction motor is increased, then synchronous speed
   a) is decreased b) is increased
   c) remains unchanged d) none of above

2) Under normal operating conditions, the contacts of the circuit breaker remain
   a) closed b) open c) semi-closed d) none of above

3) An arc is produced when the switch of a high-voltage and large-current circuit is
   a) opened b) closed c) opened or closed d) none of above

4) When the circuit breaker operates under fault conditions, the greatest noise is produced in
   a) oil circuit breaker b) air-blast circuit breaker
   c) vacuum circuit breaker d) SF_6 circuit breaker

5) A circuit breaker must perform the duty of
   a) opening the fault circuit and breaking the fault current
   b) being closed on to a fault
   c) carrying fault current for a short time
   d) all above

6) Two things which are same for primary and secondary of transformer are
   a) Ampere turns and voltage per turn b) Resistances and leakage reactances
   c) Current and induced voltages d) None of the above

7) A transformer operates poorly at very low frequencies because
   a) Permeability of core is increased
   b) Magnetizing current is abnormally high
   c) Primary reactance is too much increased
   d) None of the above

8) If a power transformer is operated at very high frequency then
   a) Primary reactance is too much increased
   b) Primary will draw large power
   c) Core losses will be excessive
   d) None of the above

9) The primary leakage flux links
   a) Primary winding only
   b) Secondary winding only
   c) Both a) and b)
   d) None of the above

10) The effect of leakage flux in a transformer is to
   a) Increase copper losses
   b) Decrease copper losses
   c) Cause voltage drop in the windings
   d) None of the above

11) The mutual flux in a transformer remains constant at all loads because
   a) Applied voltage and frequency are constant
   b) Leakage flux is small
   c) Iron core is used
   d) Losses are small

12) A transformer will work on
   a) AC only b) DC only c) Both a) and b) d) None of the above

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

14) A transformer is a efficient device because it
   a) Is a static device
   b) Uses inductive coupling
   c) Uses capacitive coupling
   d) Uses electric coupling

15) The winding of the transformer with greater number of turns will be
   a) high voltage winding
   b) low voltage winding
   c) either high or low voltage winding
   d) none of the above

16) The rotor of a synchronous motor is
   a) salient-pole type
   b) nonsalient-pole type
   c) identical to that of d.c. motor
   d) none of the above

17) Damper winding in a synchronous motor
   a) reduces winding losses
   b) serves to start the motor
   c) improves p.f. of the motor
   d) increases hunting of the motor

18) When the synchronous motor is on no load, the axes of the rotor poles _____ that of stator poles.
   a) nearly coincide with
   b) are far a head
   c) are far behind
   d) none of the above

19) A 3-phase induction motor is
   a) essentially a constant-speed motor
   b) a variable speed motor
   c) very costly
   d) not easily maintainable

20) The air-gap between and rotor of a 3-phase induction motor ranges from
   a) 2 cm to 4 cm
   b) 0.4 mm to 4 mm
   c) 1 cm to 2 cm
   d) 4 cm to 6 cm

_____

SLR-VB – 402

Seat No.	

B.E. (Electrical & Electronics Engineering) (Part – I) Examination, 2017
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 6-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve any **four** : **(5×4=20)**
   1) Basic principle of power transformer.
   2) Distinguish between major and minor repair work.
   3) Explain the method of winding resistance measurement.
   4) Explain the procedure of testing the BDV of oil.
   5) Explain the procedure of maintenance of transformer oil.

3. Solve **any two** : **(10×2=20)**
   1) What is the difference between the following test on power transformers_Type tests-Routine tests, Special tests, Commissioning tests ?
   2) Explain the significance of maintenance of a power transformer and explain repair work of medium power transformer.
   3) State the troubles, causes, remedies and protection device operating during respective abnormal condition in low voltage induction motor.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) State the requirements of type-test and routine tests on synchronous machines.
   2) State the troubles with slip-ring induction motor and their causes.
   3) Explain the method of measurement of d.c. resistance of phase winding.
   4) State the various type tests performed on high voltage A. C. circuit breakers.
   5) Explain the starting test on a 3-phase induction motor.

5. Solve **any two** : **(10×2=20)**

   1) State the various types of tests performed on high voltage A.C. circuit-breakers. state the difference between the type tests, routine tests and commissioning tests.

   2) Explain the term “efficiency of an induction motor”. How can it be calculated from the data obtained from the ‘no load test’ and ‘locked-rotor’ test ?

   3) Explain the various test on a 3-phase induction motor.
      i) starting test
      ii) load test
      iii) temperature rise test.

SLR-VB – 402

Seat No.	

Set R

B.E. (Electrical & Electronics Engineering) (Part – I) Examination, 2017
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 6-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) The rotor of a synchronous motor is
   a) salient-pole type b) nonsalient-pole type
   c) identical to that of d.c. motor d) none of the above

2) Damper winding in a synchronous motor
   a) reduces winding losses b) serves to start the motor
   c) improves p.f. of the motor d) increases hunting of the motor

3) When the synchronous motor is on no load, the axes of the rotor poles _____ that of stator poles.
   a) nearly coincide b) are far a head
   c) are far behind d) none of the above

4) A 3-phase induction motor is
   a) essentially a constant-speed motor b) a variable speed motor
   c) very costly d) not easily maintainable

5) The air-gap between and rotor of a 3-phase induction motor ranges from
   a) 2 cm to 4 cm b) 0.4 mm to 4 mm
   c) 1 cm to 2 cm d) 4 cm to 6 cm

6) If the frequency of 3-phase supply to the stator of a 3-phase induction motor is increased, then synchronous speed
   a) is decreased b) is increased
   c) remains unchanged d) none of above

7) Under normal operating conditions, the contacts of the circuit breaker remain
   a) closed b) open c) semi-closed d) none of above

8) An arc is produced when the switch of a high-voltage and large-current circuit is
   a) opened b) closed c) opened or closed d) none of above

9) When the circuit breaker operates under fault conditions, the greatest noise is produced in
   a) oil circuit breaker b) air-blast circuit breaker
   c) vacuum circuit breaker d) SF_6 circuit breaker

10) A circuit breaker must perform the duty of
   a) opening the fault circuit and breaking the fault current
   b) being closed on to a fault
   c) carrying fault current for a short time
   d) all above

11) Two things which are same for primary and secondary of transformer are
   a) Ampere turns and voltage per turn b) Resistances and leakage reactances
   c) Current and induced voltages d) None of the above

12) A transformer operates poorly at very low frequencies because
   a) Permeability of core is increased
   b) Magnetizing current is abnormally high
   c) Primary reactance is too much increased
   d) None of the above

13) If a power transformer is operated at very high frequency then
   a) Primary reactance is too much increased
   b) Primary will draw large power
   c) Core losses will be excessive
   d) None of the above

14) The primary leakage flux links
   a) Primary winding only b) Secondary winding only
   c) Both a) and b) d) None of the above

15) The effect of leakage flux in a transformer is to
   a) Increase copper losses b) Decrease copper losses
   c) Cause voltage drop in the windings d) None of the above

16) The mutual flux in a transformer remains constant at all loads because
   a) Applied voltage and frequency are constant
   b) Leakage flux is small
   c) Iron core is used
   d) Losses are small

17) A transformer will work on
   a) AC only b) DC only c) Both a) and b) d) None of the above

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

19) A transformer is a efficient device because it
   a) Is a static device b) Uses inductive coupling
   c) Uses capacitive coupling d) Uses electric coupling

20) The winding of the transformer with greater number of turns will be
   a) high voltage winding b) low voltage winding
   c) either high or low voltage winding d) none of the above

_____

SLR-VB – 402

Seat No.	

B.E. (Electrical & Electronics Engineering) (Part – I) Examination, 2017
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 6-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve any **four** : **(5×4=20)**
   1) Basic principle of power transformer.
   2) Distinguish between major and minor repair work.
   3) Explain the method of winding resistance measurement.
   4) Explain the procedure of testing the BDV of oil.
   5) Explain the procedure of maintenance of transformer oil.

3. Solve **any two** : **(10×2=20)**
   1) What is the difference between the following test on power transformers_Type tests-Routine tests, Special tests, Commissioning tests ?
   2) Explain the significance of maintenance of a power transformer and explain repair work of medium power transformer.
   3) State the troubles, causes, remedies and protection device operating during respective abnormal condition in low voltage induction motor.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) State the requirements of type-test and routine tests on synchronous machines.
   2) State the troubles with slip-ring induction motor and their causes.
   3) Explain the method of measurement of d.c. resistance of phase winding.
   4) State the various type tests performed on high voltage A. C. circuit breakers.
   5) Explain the starting test on a 3-phase induction motor.

5. Solve **any two** : **(10×2=20)**

   1) State the various types of tests performed on high voltage A.C. circuit-breakers. state the difference between the type tests, routine tests and commissioning tests.

   2) Explain the term “efficiency of an induction motor”. How can it be calculated from the data obtained from the ‘no load test’ and ‘locked-rotor’ test ?

   3) Explain the various test on a 3-phase induction motor.
      i) starting test
      ii) load test
      iii) temperature rise test.

SLR-VB – 402

Seat No.	

Set S

B.E. (Electrical & Electronics Engineering) (Part – I) Examination, 2017
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 6-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer :

1) The mutual flux in a transformer remains constant at all loads because
   a) Applied voltage and frequency are constant
   b) Leakage flux is small
   c) Iron core is used
   d) Losses are small

2) A transformer will work on
   a) AC only b) DC only c) Both a) and b) d) None of the above

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

4) A transformer is a efficient device because it
   a) Is a static device b) Uses inductive coupling
   c) Uses capacitive coupling d) Uses electric coupling

5) The winding of the transformer with greater number of turns will be
   a) high voltage winding b) low voltage winding
   c) either high or low voltage winding d) none of the above

6) The rotor of a synchronous motor is
   a) salient-pole type b) nonsalient-pole type
   c) identical to that of d.c. motor d) none of the above

7) Damper winding in a synchronous motor
   a) reduces winding losses b) serves to start the motor
   c) improves p.f. of the motor d) increases hunting of the motor

8) When the synchronous motor is on no load, the axes of the rotor poles _____ that of stator poles.
   a) nearly coincide with b) are far a head
   c) are far behind d) none of the above

P.T.O.

9) A 3-phase induction motor is
   a) essentially a constant-speed motor b) a variable speed motor
   c) very costly d) not easily maintainable

10) The air-gap between and rotor of a 3-phase induction motor ranges from
   a) 2 cm to 4 cm b) 0.4 mm to 4 mm
   c) 1 cm to 2 cm d) 4 cm to 6 cm

11) If the frequency of 3-phase supply to the stator of a 3-phase induction motor is increased, then synchronous speed
   a) is decreased b) is increased
   c) remains unchanged d) none of above

12) Under normal operating conditions, the contacts of the circuit breaker remain
   a) closed b) open c) semi-closed d) none of above

13) An arc is produced when the switch of a high-voltage and large-current circuit is
   a) opened b) closed c) opened or closed d) none of above

14) When the circuit breaker operates under fault conditions, the greatest noise is produced in
   a) oil circuit breaker b) air-blast circuit breaker
   c) vacuum circuit breaker d) SF_6 circuit breaker

15) A circuit breaker must perform the duty of
   a) opening the fault circuit and breaking the fault current
   b) being closed on to a fault
   c) carrying fault current for a short time
   d) all above

16) Two things which are same for primary and secondary of transformer are
   a) Ampere turns and voltage per turn b) Resistances and leakage reactances
   c) Current and induced voltages d) None of the above

17) A transformer operates poorly at very low frequencies because
   a) Permeability of core is increased
   b) Magnetizing current is abnormally high
   c) Primary reactance is too much increased
   d) None of the above

18) If a power transformer is operated at very high frequency then
   a) Primary reactance is too much increased
   b) Primary will draw large power
   c) Core losses will be excessive
   d) None of the above

19) The primary leakage flux links
   a) Primary winding only b) Secondary winding only
   c) Both a) and b) d) None of the above

20) The effect of leakage flux in a transformer is to
   a) Increase copper losses b) Decrease copper losses
   c) Cause voltage drop in the windings d) None of the above

———————

SLR-VB – 402

Seat No.	

B.E. (Electrical & Electronics Engineering) (Part – I) Examination, 2017
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 6-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve any **four** : **(5×4=20)**
   1) Basic principle of power transformer.
   2) Distinguish between major and minor repair work.
   3) Explain the method of winding resistance measurement.
   4) Explain the procedure of testing the BDV of oil.
   5) Explain the procedure of maintenance of transformer oil.

3. Solve **any two** : **(10×2=20)**
   1) What is the difference between the following test on power transformers_Type tests-Routine tests, Special tests, Commissioning tests ?
   2) Explain the significance of maintenance of a power transformer and explain repair work of medium power transformer.
   3) State the troubles, causes, remedies and protection device operating during respective abnormal condition in low voltage induction motor.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) State the requirements of type-test and routine tests on synchronous machines.
   2) State the troubles with slip-ring induction motor and their causes.
   3) Explain the method of measurement of d.c. resistance of phase winding.
   4) State the various type tests performed on high voltage A. C. circuit breakers.
   5) Explain the starting test on a 3-phase induction motor.

5. Solve **any two** : **(10×2=20)**

   1) State the various types of tests performed on high voltage A.C. circuit-breakers. state the difference between the type tests, routine tests and commissioning tests.

   2) Explain the term “efficiency of an induction motor”. How can it be calculated from the data obtained from the ‘no load test’ and ‘locked-rotor’ test ?

   3) Explain the various test on a 3-phase induction motor.
      i) starting test
      ii) load test
      iii) temperature rise test.

SLR-VB – 403

Seat No.	

Set **P**

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 8-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The normal current in a power line is 100 amps if short circuit fault occurs then it will be expected as
   a) 200 A b) 300 A
   c) more than 1000 A d) 100 A

2) Back up protection
   a) Is second line of defense
   b) Operates when primary protection fails
   c) Operation disconnects a large part of system
   d) All above

3) For the interruption of high voltage and low current, the circuit breaker preferred is
   a) Vacuum circuit breaker b) Air blast circuit breaker
   c) Oil circuit breaker d) All are correct

4) The rated making current of circuit breaker is _____ times rated short circuit breaking current.
   a) 1.8 b) 2.5 c) 1.5 d) $\sqrt{2}$

5) The differential relay likely to operate in accurately due to
   a) C. T. construction errors b) V.T. construction error
   c) Relay settings d) All above

6) The operating time of protection relay is usually
   a) one cycle b) two cycles c) four cycles d) three cycles

7) Static relays possess these advantages of
   a) low burden b) high burden c) medium burden d) no burden
8) The difference in the time setting of two adjacent relays is usually
   a) 0.2s b) 1s c) 0.5s d) 1.5s
9) Under normal operating conditions the contacts of circuit breaker remains
   a) closed b) open c) semi close d) none of above
10) Capacity current breaking results in
   a) Short circuit b) Open circuit c) Voltage surges d) None of above
11) The normal current in a power line in is 100A, suddenly their line current becomes 150A, one can expect
   a) open circuit fault b) short circuit fault
   c) overload condition d) none of above
12) Of all the faults occurring in a power system, the primary protection operates satisfactory in
   a) 10% cases b) 20% cases
   c) 30% cases d) about 90% cases
13) For a round wire of diameter d the fusing current I is given by
   a) $I \alpha d$ b) $I \alpha d^{3/2}$ c) $I \alpha d^2$ d) $I \alpha \sqrt{d}$
14) The most efficient torque producing actuating structure for induction type relays is
   a) Shaded polls structure b) Watt hour meter structure
   c) Induction cup d) None of above
15) Differential relays are used to protect the equipment against
   a) Over current b) Reverse current
   c) Internal fault d) None of above
16) The Merz-Price protection scheme is uneconomical for the protection of
   a) Overhead lines b) Alternators c) Transformers d) None of above
17) 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 above
18) Arc in a circuit breaker is interrupted at
   a) Zero current b) Maximum current
   c) Maximum voltage d) Minimum voltage
19) The time current graph of a fuse
   a) has linear characteristic b) is a circle
   c) has inverse characteristic d) none of above
20) A fuse is a
   a) protective device b) current limiting device
   c) current controlling device d) none of these above

_____

SLR-VB – 403

Seat No.	

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 8-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**
   1) Explain theories of arc extinction.
   2) Explain the role played by arc runners and arc splitters in an air-break circuit breaker.
   3) Compare isolators and earth blades.
   4) Describe the types of air blast circuit breaker.
   5) Explain the selection criteria of a fuse for induction motor protection.

3. Attempt **any two** questions: **(10×2=20)**
   1) Write technical notes on
      1) capacitive current breaking
      2) current chopping phenomena.
   2) Explain working principle of SF_6 circuit breaker with diagram.
   3) Compare oil circuit breaker and air blast circuit breaker with diagram.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**
   1) Explain what is meant by primary protection and backup protection.
   2) Explain a static IDMT over current relay, giving a neat block diagram.

3) Explain insulation coordination in power system.

4) Explain MHO and offset MHO relay.

5) Explain what is meant by the following terms as applied to over current relays
   i) Plug-setting ii) resetting time.

5. Attempt **any two** questions : **(10×2=20)**

1) Differentiate between surge diverter and surge absorber. What are the characteristics of an ideal surge diverter ?

2) Explain measurement of R and X in microprocessor based relay with program power flow chart.

3) Compare static relay and microprocessor based relay used for protection.

_____

SLR-VB – 403

Seat No.	

Set **Q**

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 8-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The Merz-Price protection scheme is uneconomical for the protection of
a) Overhead lines b) Alternators c) Transformers d) None of 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 above

3) Arc in a circuit breaker is interrupted at
a) Zero current b) Maximum current
c) Maximum voltage d) Minimum voltage

4) The time current graph of a fuse
a) has linear characteristic b) is a circle
c) has inverse characteristic d) none of above

5) A fuse is a
a) protective device b) current limiting device
c) current controlling device d) none of these above

6) The normal current in a power line is 100 amps if short circuit fault occurs then it will be expected as
a) 200 A b) 300 A
c) more than 1000 A d) 100 A

7) Back up protection
a) Is second line of defense
b) Operates when primary protection fails
c) Operation disconnects a large part of system
d) All above

8) For the interruption of high voltage and low current, the circuit breaker preferred is
   a) Vacuum circuit breaker b) Air blast circuit breaker
   c) Oil circuit breaker d) All are correct

9) The rated making current of circuit breaker is _____ times rated short circuit breaking current.
   a) 1.8 b) 2.5 c) 1.5 d) $\sqrt{2}$

10) The differential relay likely to operate in accurately due to
   a) C. T. construction errors b) V.T. construction error
   c) Relay settings d) All above

11) The operating time of protection relay is usually
   a) one cycle b) two cycles c) four cycles d) three cycles

12) Static relays possess these advantages of
   a) low burden b) high burden c) medium burden d) no burden

13) The difference in the time setting of two adjacent relays is usually
   a) 0.2s b) 1s c) 0.5s d) 1.5s

14) Under normal operating conditions the contacts of circuit breaker remains
   a) closed b) open c) semi close d) none of above

15) Capacity current breaking results in
   a) Short circuit b) Open circuit c) Voltage surges d) None of above

16) The normal current in a power line in is 100A, suddenly their line current becomes 150A, one can expect
   a) open circuit fault b) short circuit fault
   c) overload condition d) none of above

17) Of all the faults occurring in a power system, the primary protection operates satisfactory in
   a) 10% cases b) 20% cases
   c) 30% cases d) about 90% cases

18) For a round wire of diameter d the fusing current I is given by
   a) $I \alpha d$ b) $I \alpha d^{3/2}$ c) $I \alpha d^2$ d) $I \alpha \sqrt{d}$

19) The most efficient torque producing actuating structure for induction type relays is
   a) Shaded polls structure b) Watt hour meter structure
   c) Induction cup d) None of above

20) Differential relays are used to protect the equipment against
   a) Over current b) Reverse current
   c) Internal fault d) None of above

_____

SLR-VB – 403

Seat No.	

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 8-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**
   1) Explain theories of arc extinction.
   2) Explain the role played by arc runners and arc splitters in an air-break circuit breaker.
   3) Compare isolators and earth blades.
   4) Describe the types of air blast circuit breaker.
   5) Explain the selection criteria of a fuse for induction motor protection.

3. Attempt **any two** questions: **(10×2=20)**
   1) Write technical notes on
      1) capacitive current breaking
      2) current chopping phenomena.
   2) Explain working principle of SF_6 circuit breaker with diagram.
   3) Compare oil circuit breaker and air blast circuit breaker with diagram.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**
   1) Explain what is meant by primary protection and backup protection.
   2) Explain a static IDMT over current relay, giving a neat block diagram.

Set Q

3) Explain insulation coordination in power system.

4) Explain MHO and offset MHO relay.

5) Explain what is meant by the following terms as applied to over current relays
   i) Plug-setting ii) resetting time.

5. Attempt **any two** questions : **(10×2=20)**

1) Differentiate between surge diverter and surge absorber. What are the characteristics of an ideal surge diverter ?

2) Explain measurement of R and X in microprocessor based relay with program power flow chart.

3) Compare static relay and microprocessor based relay used for protection.

_____

SLR-VB – 403

Seat No.	

Set **R**

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 8-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The normal current in a power line in is 100A, suddenly their line current becomes 150A, one can expect
   a) open circuit fault b) short circuit fault
   c) overload condition d) none of above

2) Of all the faults occurring in a power system, the primary protection operates satisfactory in
   a) 10% cases b) 20% cases
   c) 30% cases d) about 90% cases

3) For a round wire of diameter d the fusing current I is given by
   a) $I \alpha d$ b) $I \alpha d^{3/2}$ c) $I \alpha d^2$ d) $I \alpha \sqrt{d}$

4) The most efficient torque producing actuating structure for induction type relays is
   a) Shaded polls structure b) Watt hour meter structure
   c) Induction cup d) None of above

5) Differential relays are used to protect the equipment against
   a) Over current b) Reverse current
   c) Internal fault d) None of above

6) The Merz-Price protection scheme is uneconomical for the protection of
   a) Overhead lines b) Alternators c) Transformers d) None of 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 above

8) Arc in a circuit breaker is interrupted at
   a) Zero current b) Maximum current
   c) Maximum voltage d) Minimum voltage

P.T.O.

9) The time current graph of a fuse
   a) has linear characteristic b) is a circle
   c) has inverse characteristic d) none of above

10) A fuse is a
   a) protective device b) current limiting device
   c) current controlling device d) none of these above

11) The normal current in a power line is 100 amps if short circuit fault occurs then it will be expected as
   a) 200 A b) 300 A
   c) more than 1000 A d) 100 A

12) Back up protection
   a) Is second line of defense
   b) Operates when primary protection fails
   c) Operation disconnects a large part of system
   d) All above

13) For the interruption of high voltage and low current, the circuit breaker preferred is
   a) Vacuum circuit breaker b) Air blast circuit breaker
   c) Oil circuit breaker d) All are correct

14) The rated making current of circuit breaker is _____ times rated short circuit breaking current.
   a) 1.8 b) 2.5 c) 1.5 d) $\sqrt{2}$

15) The differential relay likely to operate in accurately due to
   a) C. T. construction errors b) V.T. construction error
   c) Relay settings d) All above

16) The operating time of protection relay is usually
   a) one cycle b) two cycles c) four cycles d) three cycles

17) Static relays possess these advantages of
   a) low burden b) high burden c) medium burden d) no burden

18) The difference in the time setting of two adjacent relays is usually
   a) 0.2s b) 1s c) 0.5s d) 1.5s

19) Under normal operating conditions the contacts of circuit breaker remains
   a) closed b) open c) semi close d) none of above

20) Capacity current breaking results in
   a) Short circuit b) Open circuit c) Voltage surges d) None of above

_____

SLR-VB – 403

Seat No.	

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 8-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**
   1) Explain theories of arc extinction.
   2) Explain the role played by arc runners and arc splitters in an air-break circuit breaker.
   3) Compare isolators and earth blades.
   4) Describe the types of air blast circuit breaker.
   5) Explain the selection criteria of a fuse for induction motor protection.

3. Attempt **any two** questions: **(10×2=20)**
   1) Write technical notes on
      1) capacitive current breaking
      2) current chopping phenomena.
   2) Explain working principle of SF_6 circuit breaker with diagram.
   3) Compare oil circuit breaker and air blast circuit breaker with diagram.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**
   1) Explain what is meant by primary protection and backup protection.
   2) Explain a static IDMT over current relay, giving a neat block diagram.

3) Explain insulation coordination in power system.

4) Explain MHO and offset MHO relay.

5) Explain what is meant by the following terms as applied to over current relays
   i) Plug-setting ii) resetting time.

5. Attempt **any two** questions : **(10×2=20)**

1) Differentiate between surge diverter and surge absorber. What are the characteristics of an ideal surge diverter ?

2) Explain measurement of R and X in microprocessor based relay with program power flow chart.

3) Compare static relay and microprocessor based relay used for protection.

———————————

SLR-VB – 403

Seat No.	

Set **S**

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 8-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The operating time of protection relay is usually
a) one cycle b) two cycles c) four cycles d) three cycles

2) Static relays possess these advantages of
a) low burden b) high burden c) medium burden d) no burden

3) The difference in the time setting of two adjacent relays is usually
a) 0.2s b) 1s c) 0.5s d) 1.5s

4) Under normal operating conditions the contacts of circuit breaker remains
a) closed b) open c) semi close d) none of above

5) Capacity current breaking results in
a) Short circuit b) Open circuit c) Voltage surges d) None of above

6) The normal current in a power line in is 100A, suddenly their line current becomes 150A, one can expect
a) open circuit fault b) short circuit fault
c) overload condition d) none of above

7) Of all the faults occurring in a power system, the primary protection operates satisfactory in
a) 10% cases b) 20% cases
c) 30% cases d) about 90% cases

8) For a round wire of diameter d the fusing current I is given by
a) $I \alpha d$ b) $I \alpha d^{3/2}$ c) $I \alpha d^2$ d) $I \alpha \sqrt{d}$

9) The most efficient torque producing actuating structure for induction type relays is
a) Shaded polls structure b) Watt hour meter structure
c) Induction cup d) None of above

P.T.O.

10) Differential relays are used to protect the equipment against
a) Over current b) Reverse current
c) Internal fault d) None of above

11) The Merz-Price protection scheme is uneconomical for the protection of
a) Overhead lines b) Alternators c) Transformers d) None of 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 above

13) Arc in a circuit breaker is interrupted at
a) Zero current b) Maximum current
c) Maximum voltage d) Minimum voltage

14) The time current graph of a fuse
a) has linear characteristic b) is a circle
c) has inverse characteristic d) none of above

15) A fuse is a
a) protective device b) current limiting device
c) current controlling device d) none of these above

16) The normal current in a power line is 100 amps if short circuit fault occurs then it will be expected as
a) 200 A b) 300 A
c) more than 1000 A d) 100 A

17) Back up protection
a) Is second line of defense
b) Operates when primary protection fails
c) Operation disconnects a large part of system
d) All above

18) For the interruption of high voltage and low current, the circuit breaker preferred is
a) Vacuum circuit breaker b) Air blast circuit breaker
c) Oil circuit breaker d) All are correct

19) The rated making current of circuit breaker is _____ times rated short circuit breaking current.
a) 1.8 b) 2.5 c) 1.5 d) $\sqrt{2}$

20) The differential relay likely to operate in accurately due to
a) C. T. construction errors b) V.T. construction error
c) Relay settings d) All above

_____

SLR-VB – 403

Seat No.	

B.E. (Electrical and Electronics) (Part – I) Examination, 2017
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 8-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Assume suitable data **whenever** necessary.*

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**
   1) Explain theories of arc extinction.
   2) Explain the role played by arc runners and arc splitters in an air-break circuit breaker.
   3) Compare isolators and earth blades.
   4) Describe the types of air blast circuit breaker.
   5) Explain the selection criteria of a fuse for induction motor protection.

3. Attempt **any two** questions: **(10×2=20)**
   1) Write technical notes on
      1) capacitive current breaking
      2) current chopping phenomena.
   2) Explain working principle of SF_6 circuit breaker with diagram.
   3) Compare oil circuit breaker and air blast circuit breaker with diagram.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**
   1) Explain what is meant by primary protection and backup protection.
   2) Explain a static IDMT over current relay, giving a neat block diagram.

3) Explain insulation coordination in power system.

4) Explain MHO and offset MHO relay.

5) Explain what is meant by the following terms as applied to over current relays
   i) Plug-setting ii) resetting time.

5. Attempt **any two** questions : **(10×2=20)**

1) Differentiate between surge diverter and surge absorber. What are the characteristics of an ideal surge diverter ?

2) Explain measurement of R and X in microprocessor based relay with program power flow chart.

3) Compare static relay and microprocessor based relay used for protection.

———————————

SLR-VB – 405

Seat No.	

Set **P**

B.E. (E&E) (Part – I) Examination, 2017
(Elective – I) RENEWABLE ENERGY SOURCES

Day and Date : Tuesday, 9-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1 marks each)**

1) The maximum theoretical efficiencies of solar cells could be around
a) 99% b) 60% c) 48% d) 1%

2) The source of energy for satellite is
a) battery b) solar cell
c) cryogenic storage d) any of the above

3) Which of the following solar cookers is the most efficient and has the shortest cooking time ?
a) Box cooker b) Parabolic cooker
c) Panel cooker d) Cardboard type cooker

4) The electrical output of a solar cell depends on the
a) Intensity of solar radiation b) Heat component of solar radiation
c) Ultraviolet radiation d) Infrared radiation

5) What does SPV stand for with respect to solar energy ?
a) Solar photovoltaic b) Solid plate voltaic
c) Solar plate voids d) None of the above

6) Solar cells are made of
a) silicon b) germanium c) silver d) aluminium

7) Hydrogen is produced by
a) Electrolysis b) Incineration
c) Aerobic digestion d) Decomposting

8) Hydrogen can be stored as a
a) Compressed gas b) Liquid
c) Metal hydride d) All of the above

P.T.O.

9) 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

10) The major disadvantage, with solar cells for power generation is
   a) lack of availability b) large area requirement
   c) variable power d) high cost

11) Another name for a windmill is
   a) Wind farm b) Propeller c) Wind station d) Wind turbine

12) Lower speed wind turbines are mainly driven by
   a) Drag forces b) Lift forces
   c) Push forces d) None of the above

13) In petro thermal systems of geothermal energy there is hot dry rock but no underground water. In such systems energy is obtained by
   a) circulating compressed air b) pumping water
   c) creating water wells d) none of the above

14) When geothermal energy is available in the form of saline water, power is developed using
   a) flashed-steam system b) binary-cycle system
   c) total flow system d) any of the above

15) In hydrothermal source of geothermal energy
   a) hot water or steam is available b) hot gases are available
   c) molten lava is available d) none of the above

16) Biomass can be converted into
   a) Liquid fuel b) Hydrogen c) Producer Gas d) All of the above

17) Tidal energy mainly makes use of
   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

18) A rotameter is used to measure
   a) velocity of fluids b) viscosity of fluids
   c) density of fluids d) discharge of fluids

19) The voltage of a single solar cell is
   a) 0.5 V b) 1 V c) 1.1 V d) 5 V

20) 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-VB – 405

Seat No.	

B.E. (E&E) (Part – I) Examination, 2017
(Elective – I) RENEWABLE ENERGY SOURCES

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(5 marks each)**
   1) What is the Indian scenario in the field of non-conventional energy resources and economic growth ?
   2) With the help of neat sketch describe PV module and array.
   3) Draw and explain VI characteristics of PV cell.
   4) Define :
      1) pitch and yaw control
      2) cut in speed
      3) cut out speed
      4) tip speed ratio
      5) swept area.
   5) What are the non-conventional sources of energy and explain briefly ?

3. Attempt **any 2** questions : **(10 marks each)**
   1) Explain with neat sketch :
      i) pyranometer ii) pyrheliometer
   2) With the help of a neat sketch describe the principle of solar photovoltaic power generation. What are the main elements of a PV system ?
   3) Explain briefly with neat sketch about
      1) Horizontal wind mills.
      2) Vertical wind mills.

SECTION – II

4. Attempt **any 4** questions : **(5 marks each)**
   1) Explain and classify various geothermal resources.
   2) Write the advantages and disadvantages of hydrogen to use as a fuel.
   3) Explain with neat sketch steam reforming for production of hydrogen.
   4) State the various factors to be considered while designing the biogas plant.
   5) Explain with neat sketch working of OTEC system.

5. Attempt **any 2** questions : **(10 marks each)**
   1) Explain with neat sketch :
      1) floating drum digester
      2) fixed dome digester.
   2) How biomass conversion does takes place ? Name the various models of biogas plants and describe with neat sketch any one of them.
   3) Explain with neat sketch various part of geothermal energy system.

SLR-VB – 405

Seat No.	

Set **Q**

B.E. (E&E) (Part – I) Examination, 2017
(Elective – I) RENEWABLE ENERGY SOURCES

Day and Date : Tuesday, 9-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1 marks each)**

1) Biomass can be converted into
a) Liquid fuel b) Hydrogen c) Producer Gas d) All of the above

2) Tidal energy mainly makes use of
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 is used to measure
a) velocity of fluids b) viscosity of fluids
c) density of fluids d) discharge of fluids

4) The voltage of a single solar cell is
a) 0.5 V b) 1 V c) 1.1 V d) 5 V

5) 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

6) The maximum theoretical efficiencies of solar cells could be around
a) 99% b) 60% c) 48% d) 1%

7) The source of energy for satellite is
a) battery b) solar cell
c) cryogenic storage d) any of the above

8) Which of the following solar cookers is the most efficient and has the shortest cooking time ?
a) Box cooker b) Parabolic cooker
c) Panel cooker d) Cardboard type cooker

9) The electrical output of a solar cell depends on the
   a) Intensity of solar radiation b) Heat component of solar radiation
   c) Ultraviolet radiation d) Infrared radiation

10) What does SPV stand for with respect to solar energy ?
   a) Solar photovoltaic b) Solid plate voltaic
   c) Solar plate voids d) None of the above

11) Solar cells are made of
   a) silicon b) germanium c) silver d) aluminium

12) Hydrogen is produced by
   a) Electrolysis b) Incineration
   c) Aerobic digestion d) Decomposting

13) Hydrogen can be stored as a
   a) Compressed gas b) Liquid
   c) Metal hydride d) All of the above

14) 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

15) The major disadvantage, with solar cells for power generation is
   a) lack of availability b) large area requirement
   c) variable power d) high cost

16) Another name for a windmill is
   a) Wind farm b) Propeller c) Wind station d) Wind turbine

17) Lower speed wind turbines are mainly driven by
   a) Drag forces b) Lift forces
   c) Push forces d) None of the above

18) In petro thermal systems of geothermal energy there is hot dry rock but no underground water. In such systems energy is obtained by
   a) circulating compressed air b) pumping water
   c) creating water wells d) none of the above

19) When geothermal energy is available in the form of saline water, power is developed using
   a) flashed-steam system b) binary-cycle system
   c) total flow system d) any of the above

20) In hydrothermal source of geothermal energy
   a) hot water or steam is available b) hot gases are available
   c) molten lava is available d) none of the above

———————

SLR-VB – 405

Seat No.	

B.E. (E&E) (Part – I) Examination, 2017
(Elective – I) RENEWABLE ENERGY SOURCES

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(5 marks each)**
   1) What is the Indian scenario in the field of non-conventional energy resources and economic growth ?
   2) With the help of neat sketch describe PV module and array.
   3) Draw and explain VI characteristics of PV cell.
   4) Define :
      1) pitch and yaw control
      2) cut in speed
      3) cut out speed
      4) tip speed ratio
      5) swept area.
   5) What are the non-conventional sources of energy and explain briefly ?

3. Attempt **any 2** questions : **(10 marks each)**
   1) Explain with neat sketch :
      i) pyranometer ii) pyrheliometer
   2) With the help of a neat sketch describe the principle of solar photovoltaic power generation. What are the main elements of a PV system ?
   3) Explain briefly with neat sketch about
      1) Horizontal wind mills.
      2) Vertical wind mills.

Set Q

SECTION – II

4. Attempt **any 4** questions : **(5 marks each)**
   1) Explain and classify various geothermal resources.
   2) Write the advantages and disadvantages of hydrogen to use as a fuel.
   3) Explain with neat sketch steam reforming for production of hydrogen.
   4) State the various factors to be considered while designing the biogas plant.
   5) Explain with neat sketch working of OTEC system.

5. Attempt **any 2** questions : **(10 marks each)**
   1) Explain with neat sketch :
      1) floating drum digester
      2) fixed dome digester.
   2) How biomass conversion does takes place ? Name the various models of biogas plants and describe with neat sketch any one of them.
   3) Explain with neat sketch various part of geothermal energy system.

SLR-VB – 405

Seat No.	

Set **R**

B.E. (E&E) (Part – I) Examination, 2017
(Elective – I) RENEWABLE ENERGY SOURCES

Day and Date : Tuesday, 9-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1 marks each)**

1) Another name for a windmill is
a) Wind farm b) Propeller c) Wind station d) Wind turbine

2) Lower speed wind turbines are mainly driven by
a) Drag forces b) Lift forces
c) Push forces d) None of the above

3) In petro thermal systems of geothermal energy there is hot dry rock but no underground water. In such systems energy is obtained by
a) circulating compressed air b) pumping water
c) creating water wells d) none of the above

4) When geothermal energy is available in the form of saline water, power is developed using
a) flashed-steam system b) binary-cycle system
c) total flow system d) any of the above

5) In hydrothermal source of geothermal energy
a) hot water or steam is available b) hot gases are available
c) molten lava is available d) none of the above

6) Biomass can be converted into
a) Liquid fuel b) Hydrogen c) Producer Gas d) All of the above

7) Tidal energy mainly makes use of
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 is used to measure
   a) velocity of fluids b) viscosity of fluids
   c) density of fluids d) discharge of fluids

9) The voltage of a single solar cell is
   a) 0.5 V b) 1 V c) 1.1 V d) 5 V

10) 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

11) The maximum theoretical efficiencies of solar cells could be around
   a) 99% b) 60% c) 48% d) 1%

12) The source of energy for satellite is
   a) battery b) solar cell
   c) cryogenic storage d) any of the above

13) Which of the following solar cookers is the most efficient and has the shortest cooking time ?
   a) Box cooker b) Parabolic cooker
   c) Panel cooker d) Cardboard type cooker

14) The electrical output of a solar cell depends on the
   a) Intensity of solar radiation b) Heat component of solar radiation
   c) Ultraviolet radiation d) Infrared radiation

15) What does SPV stand for with respect to solar energy ?
   a) Solar photovoltaic b) Solid plate voltaic
   c) Solar plate voids d) None of the above

16) Solar cells are made of
   a) silicon b) germanium c) silver d) aluminium

17) Hydrogen is produced by
   a) Electrolysis b) Incineration
   c) Aerobic digestion d) Decomposting

18) Hydrogen can be stored as a
   a) Compressed gas b) Liquid
   c) Metal hydride d) All of the above

19) 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

20) The major disadvantage, with solar cells for power generation is
   a) lack of availability b) large area requirement
   c) variable power d) high cost

———————

SLR-VB – 405

Seat No.	

B.E. (E&E) (Part – I) Examination, 2017
(Elective – I) RENEWABLE ENERGY SOURCES

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(5 marks each)**
   1) What is the Indian scenario in the field of non-conventional energy resources and economic growth ?
   2) With the help of neat sketch describe PV module and array.
   3) Draw and explain VI characteristics of PV cell.
   4) Define :
      1) pitch and yaw control
      2) cut in speed
      3) cut out speed
      4) tip speed ratio
      5) swept area.
   5) What are the non-conventional sources of energy and explain briefly ?

3. Attempt **any 2** questions : **(10 marks each)**
   1) Explain with neat sketch :
      i) pyranometer ii) pyrheliometer
   2) With the help of a neat sketch describe the principle of solar photovoltaic power generation. What are the main elements of a PV system ?
   3) Explain briefly with neat sketch about
      1) Horizontal wind mills.
      2) Vertical wind mills.

SECTION – II

4. Attempt **any 4** questions : **(5 marks each)**
   1) Explain and classify various geothermal resources.
   2) Write the advantages and disadvantages of hydrogen to use as a fuel.
   3) Explain with neat sketch steam reforming for production of hydrogen.
   4) State the various factors to be considered while designing the biogas plant.
   5) Explain with neat sketch working of OTEC system.

5. Attempt **any 2** questions : **(10 marks each)**
   1) Explain with neat sketch :
      1) floating drum digester
      2) fixed dome digester.
   2) How biomass conversion does takes place ? Name the various models of biogas plants and describe with neat sketch any one of them.
   3) Explain with neat sketch various part of geothermal energy system.

SLR-VB – 405

Seat No.	

Set **S**

B.E. (E&E) (Part – I) Examination, 2017
(Elective – I) RENEWABLE ENERGY SOURCES

Day and Date : Tuesday, 9-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **(1 marks each)**

1) Solar cells are made of
a) silicon b) germanium c) silver d) aluminium

2) Hydrogen is produced by
a) Electrolysis b) Incineration
c) Aerobic digestion d) Decomposting

3) Hydrogen can be stored as a
a) Compressed gas b) Liquid
c) Metal hydride d) All of the above

4) 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

5) The major disadvantage, with solar cells for power generation is
a) lack of availability b) large area requirement
c) variable power d) high cost

6) Another name for a windmill is
a) Wind farm b) Propeller c) Wind station d) Wind turbine

7) Lower speed wind turbines are mainly driven by
a) Drag forces b) Lift forces
c) Push forces d) None of the above

8) In petro thermal systems of geothermal energy there is hot dry rock but no underground water. In such systems energy is obtained by
   a) circulating compressed air b) pumping water
   c) creating water wells d) none of the above

9) When geothermal energy is available in the form of saline water, power is developed using
   a) flashed-steam system b) binary-cycle system
   c) total flow system d) any of the above

10) In hydrothermal source of geothermal energy
   a) hot water or steam is available b) hot gases are available
   c) molten lava is available d) none of the above

11) Biomass can be converted into
   a) Liquid fuel b) Hydrogen c) Producer Gas d) All of the above

12) Tidal energy mainly makes use of
   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

13) A rotameter is used to measure
   a) velocity of fluids b) viscosity of fluids
   c) density of fluids d) discharge of fluids

14) The voltage of a single solar cell is
   a) 0.5 V b) 1 V c) 1.1 V d) 5 V

15) 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

16) The maximum theoretical efficiencies of solar cells could be around
   a) 99% b) 60% c) 48% d) 1%

17) The source of energy for satellite is
   a) battery b) solar cell
   c) cryogenic storage d) any of the above

18) Which of the following solar cookers is the most efficient and has the shortest cooking time ?
   a) Box cooker b) Parabolic cooker
   c) Panel cooker d) Cardboard type cooker

19) The electrical output of a solar cell depends on the
   a) Intensity of solar radiation b) Heat component of solar radiation
   c) Ultraviolet radiation d) Infrared radiation

20) What does SPV stand for with respect to solar energy ?
   a) Solar photovoltaic b) Solid plate voltaic
   c) Solar plate voids d) None of the above

———————

SLR-VB – 405

Seat No.	

B.E. (E&E) (Part – I) Examination, 2017
(Elective – I) RENEWABLE ENERGY SOURCES

Day and Date : Tuesday, 9-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(5 marks each)**
   1) What is the Indian scenario in the field of non-conventional energy resources and economic growth ?
   2) With the help of neat sketch describe PV module and array.
   3) Draw and explain VI characteristics of PV cell.
   4) Define :
      1) pitch and yaw control
      2) cut in speed
      3) cut out speed
      4) tip speed ratio
      5) swept area.
   5) What are the non-conventional sources of energy and explain briefly ?

3. Attempt **any 2** questions : **(10 marks each)**
   1) Explain with neat sketch :
      i) pyranometer ii) pyrheliometer
   2) With the help of a neat sketch describe the principle of solar photovoltaic power generation. What are the main elements of a PV system ?
   3) Explain briefly with neat sketch about
      1) Horizontal wind mills.
      2) Vertical wind mills.

SECTION – II

4. Attempt **any 4** questions : **(5 marks each)**
   1) Explain and classify various geothermal resources.
   2) Write the advantages and disadvantages of hydrogen to use as a fuel.
   3) Explain with neat sketch steam reforming for production of hydrogen.
   4) State the various factors to be considered while designing the biogas plant.
   5) Explain with neat sketch working of OTEC system.

5. Attempt **any 2** questions : **(10 marks each)**
   1) Explain with neat sketch :
      1) floating drum digester
      2) fixed dome digester.
   2) How biomass conversion does takes place ? Name the various models of biogas plants and describe with neat sketch any one of them.
   3) Explain with neat sketch various part of geothermal energy system.

SLR-VB – 410

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 16-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***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 : 20

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

1) A transducer converts
   a) Mechanical energy into electrical energy
   b) Mechanical displacement into electrical signal
   c) One form of energy into another form of energy
   d) Electrical energy into mechanical form

2) One of the following is an active transducer
   a) Strain range b) Selsyn c) Photovoltaic cell d) Photo emissive cell

3) A strip chart recorder is
   a) An active transducer b) An inverse transducer
   c) An output transducer d) b) and c)

4) While selecting a transducer for particular application
   a) Only the input characteristics should be considered
   b) Only the output characteristics should be considered
   c) Only the transfer characteristics should be considered
   d) Input, output and transducer characteristics should be considered

5) A Reynold's number of 1000 indicates
   a) Turbulence flow b) Laminar flow
   c) A flow which can either be turbulent or laminar d) None of these

6) Thermocouples are
   a) Passive transducers b) Active transducers
   c) Both active and passive transducers d) Output transducers

7) In an LVDT the two secondary windings are connected in differential to obtain
   a) Higher output voltage
   b) An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core took place from right to left or from left to right
   c) In order to establish the null or the reference point for the displacement of the core
   d) Both b) and c)

8) The dynamic characteristics of capacitive transducers are similar to those of
   a) Low pass filter b) High pass filter c) Notch filter d) Band stop filters

9) 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

10) Piezo-electric transducers are
   a) Passive transducers b) Active transducers c) Inverse transducers d) b) and c)

11) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

12) 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

13) Modem is an acronym of
   a) Modulation b) Demodulation c) Modulation and demodulation d) All of these

14) 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

15) 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

16) 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

17) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A/D converter is
   a) Successive approximation converter b) Digital ramp converter
   c) Digital slope converter d) All of these

18) 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

19) 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

20) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when,
   a) Static strains are being measured b) Dynamic strains are being measured
   c) Both static and dynamic strains are being measured d) None of these

SLR-VB – 410

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 16-5-2017 Marks : 80

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

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

2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

a) Define :

1) Accuracy

2) Precision

3) Resolution

4) Repeatability

5) Hysteresis.

b) Draw and explain Chopper Stabilized amplifier.

c) Draw and explain sine wave generation circuit.

d) Explain sample and hold circuit.

e) Explain Frequency to Voltage converter.

f) Explain R-2R ADC circuit.

3. Solve **any two** : **(10×2=20)**

a) Draw and explain block diagram of instrumentation system and function of each block. Give one industrial example.

b) What is meant by Active filters and derive the frequency response of 1^{st} and 2^{nd} order filter ?

c) Explain the concept of DAS. State all the types and multichannel DAS.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Explain voltage and current telemetry system.

   b) List the strip chart recorder. Explain any one.

   c) List the digital I/O devices. Explain any two.

   d) Write a short note on :

      i) LCD Display

      ii) LED Display.

   e) What is the role of PLC in automation and list the programming devices of PLC ?

   f) Explain concept of modulation. Explain one of the type.

5. Solve **any two** : **(10×2=20)**

   a) Draw and explain block diagram of general telemetering system and state types.

   b) Draw and explain architecture of PLC. State the types of PLC.

   c) Explain function generator and pulse generator.

SLR-VB – 410

Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 16-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***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 : 20

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

1) Period measurement is done in frequency meters for achieving high accuracy in the case of
   a) High frequencies b) Medium frequencies c) DC d) Low frequencies

2) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A/D converter is
   a) Successive approximation converter b) Digital ramp converter
   c) Digital slope converter d) All of these

3) X-Y recorders
   a) Record one quantity with respect to another quantity
   b) Record one quantity on X axis with respect to time on Y axis
   c) Record one quantity on Y axis with respect to time on X axis
   d) None of these

4) The advantages of FM magnetic tape recording are
   a) It can record from dc to several KHz
   b) It is free from dropout effects
   c) It is independent of amplitude variations and accurately reproduces the waveform of input signal
   d) All of these

5) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when,
   a) Static strains are being measured b) Dynamic strains are being measured
   c) Both static and dynamic strains are being measured d) None of these

6) A transducer converts
   a) Mechanical energy into electrical energy
   b) Mechanical displacement into electrical signal
   c) One form of energy into another form of energy
   d) Electrical energy into mechanical form

7) One of the following is an active transducer
   a) Strain range b) Selsyn c) Photovoltaic cell d) Photo emissive cell

8) A strip chart recorder is
   a) An active transducer b) An inverse transducer
   c) An output transducer d) b) and c)

9) While selecting a transducer for particular application
   a) Only the input characteristics should be considered
   b) Only the output characteristics should be considered
   c) Only the transfer characteristics should be considered
   d) Input, output and transducer characteristics should be considered

10) A Reynold's number of 1000 indicates
   a) Turbulence flow b) Laminar flow
   c) A flow which can either be turbulent or laminar d) None of these

11) Thermocouples are
   a) Passive transducers b) Active transducers
   c) Both active and passive transducers d) Output transducers

12) 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 took 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)

13) 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

14) 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

15) Piezo-electric transducers are
   a) Passive transducers b) Active transducers c) Inverse transducers d) b) and c)

16) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

17) 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

18) Modem is an acronym of
   a) Modulation b) Demodulation c) Modulation and demodulation d) All of these

19) 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

20) 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-VB – 410

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 16-5-2017 Marks : 80

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

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

2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

a) Define :

1) Accuracy

2) Precision

3) Resolution

4) Repeatability

5) Hysteresis.

b) Draw and explain Chopper Stabilized amplifier.

c) Draw and explain sine wave generation circuit.

d) Explain sample and hold circuit.

e) Explain Frequency to Voltage converter.

f) Explain R-2R ADC circuit.

3. Solve **any two** : **(10×2=20)**

a) Draw and explain block diagram of instrumentation system and function of each block. Give one industrial example.

b) What is meant by Active filters and derive the frequency response of 1^{st} and 2^{nd} order filter ?

c) Explain the concept of DAS. State all the types and multichannel DAS.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Explain voltage and current telemetry system.

   b) List the strip chart recorder. Explain any one.

   c) List the digital I/O devices. Explain any two.

   d) Write a short note on :

      i) LCD Display

      ii) LED Display.

   e) What is the role of PLC in automation and list the programming devices of PLC ?

   f) Explain concept of modulation. Explain one of the type.

5. Solve **any two** : **(10×2=20)**

   a) Draw and explain block diagram of general telemetering system and state types.

   b) Draw and explain architecture of PLC. State the types of PLC.

   c) Explain function generator and pulse generator.

SLR-VB – 410

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 16-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***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 : 20

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

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

7) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A/D converter is
a) Successive approximation converter b) Digital ramp converter
c) Digital slope converter d) All of these

8) X-Y recorders
a) Record one quantity with respect to another quantity
b) Record one quantity on X axis with respect to time on Y axis
c) Record one quantity on Y axis with respect to time on X axis
d) None of these

9) The advantages of FM magnetic tape recording are
   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 dynamic strains are being measured d) None of these

11) A transducer converts
   a) Mechanical energy into electrical energy
   b) Mechanical displacement into electrical signal
   c) One form of energy into another form of energy
   d) Electrical energy into mechanical form

12) One of the following is an active transducer
   a) Strain range b) Selsyn c) Photovoltaic cell d) Photo emissive cell

13) A strip chart recorder is
   a) An active transducer b) An inverse transducer
   c) An output transducer d) b) and c)

14) While selecting a transducer for particular application
   a) Only the input characteristics should be considered
   b) Only the output characteristics should be considered
   c) Only the transfer characteristics should be considered
   d) Input, output and transducer characteristics should be considered

15) A Reynold's number of 1000 indicates
   a) Turbulence flow b) Laminar flow
   c) A flow which can either be turbulent or laminar d) None of these

16) Thermocouples are
   a) Passive transducers b) Active transducers
   c) Both active and passive transducers d) Output transducers

17) 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 took 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)

18) 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

19) 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

20) Piezo-electric transducers are
   a) Passive transducers b) Active transducers c) Inverse transducers d) b) and c)

SLR-VB – 410

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 16-5-2017 Marks : 80

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

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

2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

a) Define :

1) Accuracy

2) Precision

3) Resolution

4) Repeatability

5) Hysteresis.

b) Draw and explain Chopper Stabilized amplifier.

c) Draw and explain sine wave generation circuit.

d) Explain sample and hold circuit.

e) Explain Frequency to Voltage converter.

f) Explain R-2R ADC circuit.

3. Solve **any two** : **(10×2=20)**

a) Draw and explain block diagram of instrumentation system and function of each block. Give one industrial example.

b) What is meant by Active filters and derive the frequency response of 1^{st} and 2^{nd} order filter ?

c) Explain the concept of DAS. State all the types and multichannel DAS.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Explain voltage and current telemetry system.

   b) List the strip chart recorder. Explain any one.

   c) List the digital I/O devices. Explain any two.

   d) Write a short note on :

      i) LCD Display

      ii) LED Display.

   e) What is the role of PLC in automation and list the programming devices of PLC ?

   f) Explain concept of modulation. Explain one of the type.

5. Solve **any two** : **(10×2=20)**

   a) Draw and explain block diagram of general telemetering system and state types.

   b) Draw and explain architecture of PLC. State the types of PLC.

   c) Explain function generator and pulse generator.

SLR-VB – 410

Seat No.	

Set **S**

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 16-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***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 : 20

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

1) Thermocouples are
   a) Passive transducers b) Active transducers
   c) Both active and passive transducers d) Output transducers

2) In an LVDT the two secondary windings are connected in differential to obtain
   a) Higher output voltage
   b) An output voltage which is phase sensitive i.e. the output voltage has a phase which can lead us to conclusion whether the displacement of the core took place from right to left or from left to right
   c) In order to establish the null or the reference point for the displacement of the core
   d) Both b) and c)

3) The dynamic characteristics of capacitive transducers are similar to those of
   a) Low pass filter b) High pass filter c) Notch filter d) Band stop filters

4) Quartz and Rochelle salt belong to
   a) Nature group of piezo-electric material
   b) Synthetic group of piezo-electric material
   c) Can belong to nature or synthetic group of piezo-electric material provided properly polarized
   d) All of these

5) Piezo-electric transducers are
   a) Passive transducers b) Active transducers c) Inverse transducers d) b) and c)

6) In FM systems operate at
   a) VHF and UHF b) Only VHF c) Only MF d) MF and HF

7) 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

8) Modem is an acronym of
   a) Modulation b) Demodulation c) Modulation and demodulation d) All of these

9) 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

10) 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

11) Period measurement is done in frequency meters for achieving high accuracy in the case of
   a) High frequencies b) Medium frequencies c) DC d) Low frequencies

12) A digital voltmeter uses an A/D converter which needs a start pulse, uses an analog comparator and has a relatively fixed conversion time independent of the applied voltage. The A/D converter is
   a) Successive approximation converter b) Digital ramp converter
   c) Digital slope converter d) All of these

13) X-Y recorders
   a) Record one quantity with respect to another quantity
   b) Record one quantity on X axis with respect to time on Y axis
   c) Record one quantity on Y axis with respect to time on X axis
   d) None of these

14) The advantages of FM magnetic tape recording are
   a) It can record from dc to several KHz
   b) It is free from dropout effects
   c) It is independent of amplitude variations and accurately reproduces the waveform of input signal
   d) All of these

15) When measuring strain, ballast circuits use a capacitor to act as high pass filter. This is done when,
   a) Static strains are being measured b) Dynamic strains are being measured
   c) Both static and dynamic strains are being measured d) None of these

16) A transducer converts
   a) Mechanical energy into electrical energy
   b) Mechanical displacement into electrical signal
   c) One form of energy into another form of energy
   d) Electrical energy into mechanical form

17) One of the following is an active transducer
   a) Strain range b) Selsyn c) Photovoltaic cell d) Photo emissive cell

18) A strip chart recorder is
   a) An active transducer b) An inverse transducer
   c) An output transducer d) b) and c)

19) While selecting a transducer for particular application
   a) Only the input characteristics should be considered
   b) Only the output characteristics should be considered
   c) Only the transfer characteristics should be considered
   d) Input, output and transducer characteristics should be considered

20) A Reynold's number of 1000 indicates
   a) Turbulence flow b) Laminar flow
   c) A flow which can either be turbulent or laminar d) None of these

SLR-VB – 410

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 16-5-2017 Marks : 80

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

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

2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

a) Define :

1) Accuracy

2) Precision

3) Resolution

4) Repeatability

5) Hysteresis.

b) Draw and explain Chopper Stabilized amplifier.

c) Draw and explain sine wave generation circuit.

d) Explain sample and hold circuit.

e) Explain Frequency to Voltage converter.

f) Explain R-2R ADC circuit.

3. Solve **any two** : **(10×2=20)**

a) Draw and explain block diagram of instrumentation system and function of each block. Give one industrial example.

b) What is meant by Active filters and derive the frequency response of 1^{st} and 2^{nd} order filter ?

c) Explain the concept of DAS. State all the types and multichannel DAS.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Explain voltage and current telemetry system.

   b) List the strip chart recorder. Explain any one.

   c) List the digital I/O devices. Explain any two.

   d) Write a short note on :

      i) LCD Display

      ii) LED Display.

   e) What is the role of PLC in automation and list the programming devices of PLC ?

   f) Explain concept of modulation. Explain one of the type.

5. Solve **any two** : **(10×2=20)**

   a) Draw and explain block diagram of general telemetering system and state types.

   b) Draw and explain architecture of PLC. State the types of PLC.

   c) Explain function generator and pulse generator.

SLR-VB – 411

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Thursday, 18-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In a power system, during disturbance, governor is used to
   a) Adjust the terminal voltage b) Adjust the speed
   c) Reduced the speed d) None of the above

2) Short circuit currents are due to
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phase to earth fault d) None of the above

3) Which is the following result in symmetrical fault ?
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phase to earth fault d) Two phase to earth

4) The maximum short circuit current occurs in the case of
   a) Three phase to bolted fault b) Double line to ground fault
   c) Phase to phase fault d) Single line to ground fault

5) The magnitude of fault current depend upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both a and b

6) A balanced three phase system consist of
   a) Zero sequence current only b) Positive sequence current only
   c) Negative sequence current only d) None of the above

7) Fault level means
   a) Voltage at the point of fault b) Fault current
   c) Fault power factor d) Fault MVA

P.T.O.

8) Which type of connection are used in two conductor open fault ?
   a) Series b) Parallel
   c) Both a and b d) None of the above

9) Which type of connection are used in one conductor open fault ?
   a) Series b) Parallel
   c) Both a and b d) None of the above

10) Which of the following network gets affected by the method of neutral grounding ?
   a) Zero sequence network b) Positive sequence network
   c) Negative sequence network d) All of the above

11) The positive sequence component of voltage at the point of fault becomes zero when it is a
   a) Three phase fault b) Line to line fault
   c) LLG fault d) Line to ground fault

12) Load frequency control uses
   a) Proportional control uses b) Integral controller alone
   c) Both a and b d) Either a or b

13) Load frequency control are carried out with
   a) P controller only b) I controller only
   c) D controller only d) PID controller

14) Load frequency control is achieved by properly matching the individual machines
   a) Reactive power b) Generated power
   c) Turbine inputs d) Turbine and Generator rating

15) In automatic generation control system, the time constant of field winding is
   a) Smaller than that of the governor b) Larger than that of the governor
   c) Small as that of the governor d) None of the above

16) In a _____ fault the zero sequence networks is not connected.
   a) Line to ground b) Line to line
   c) Double line to ground d) None of the above

17) Only the _____ sequence network is contains a voltage source.
   a) Positive b) Negative c) Both a and b d) Zero

18) Which of the following fault occurs most frequently ?
   a) Single Line to ground b) Line to line
   c) Double line to ground d) None of the above

19) For a Fully transposed transmission line
   a) Equal positive and negative sequence impedance
   b) Zero sequence impedance much larger than the positive sequence impedance
   c) Both a and b
   d) None of the above

20) Zero sequence current can flow through a star connected winding only if star point is
   a) Grounded b) Ungrounded
   c) Both a and b d) None of the above

_____

SLR-VB – 411

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Explain fault in power system.
   2) Derive an equation of one conductor open fault.
   3) Draw the zero sequence network for delta/delta and transformer star/star connected transformer with star point connected to ground.
   4) What is symmetrical component ?
   5) What is per unit system ? State advantages of per unit system.

3. Solve **any two** : **(2×10=20)**
   1) Explain transient on transmission line.
   2) Derive an equation of single line to ground fault.
   3) With a schematic diagram explain automatic voltage control.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   1) Describe various methods of improving stability.
   2) Explain contingency analysis.
   3) Explain transient state stability.
   4) Derive an equation of dynamics of synchronous machine.
   5) What are factors affecting the transient stability.

Set P

5. Solve **any two** : **(2×10=20)**

   1) Explain by using equal area criterion what happens when mechanical power input to the Turbine is suddenly changed.

   2) Explain types of stability and concept of equal area criterion.

   3) Derive swing equation and explain ‘M’ and ‘H’ constants.

———————

SLR-VB – 411

Seat No.	

Set Q

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
POWER SYSTEM - II

Day and Date : Thursday, 18-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In a _____ fault the zero sequence networks is not connected.
a) Line to ground b) Line to line
c) Double line to ground d) None of the above

2) Only the _____ sequence network is contains a voltage source.
a) Positive b) Negative c) Both a and b d) Zero

3) Which of the following fault occurs most frequently ?
a) Single Line to ground b) Line to line
c) Double line to ground d) None of the above

4) For a Fully transposed transmission line
a) Equal positive and negative sequence impedance
b) Zero sequence impedance much larger than the positive sequence impedance
c) Both a and b
d) None of the above

5) Zero sequence current can flow through a star connected winding only if star point is
a) Grounded b) Ungrounded
c) Both a and b d) None of the above

6) In a power system, during disturbance, governor is used to
a) Adjust the terminal voltage b) Adjust the speed
c) Reduced the speed d) None of the above

7) Short circuit currents are due to
a) Single line to ground fault b) Phase to phase fault
c) All the three phase to earth fault d) None of the above

P.T.O.

8) Which is the following result in symmetrical fault ?
   a) Single line to ground fault
   b) Phase to phase fault
   c) All the three phase to earth fault
   d) Two phase to earth

9) The maximum short circuit current occurs in the case of
   a) Three phase to bolted fault
   b) Double line to ground fault
   c) Phase to phase fault
   d) Single line to ground fault

10) The magnitude of fault current depend upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both a and b

11) A balanced three phase system consist of
   a) Zero sequence current only
   b) Positive sequence current only
   c) Negative sequence current only
   d) None of the above

12) Fault level means
   a) Voltage at the point of fault
   b) Fault current
   c) Fault power factor
   d) Fault MVA

13) Which type of connection are used in two conductor open fault ?
   a) Series
   b) Parallel
   c) Both a and b
   d) None of the above

14) Which type of connection are used in one conductor open fault ?
   a) Series
   b) Parallel
   c) Both a and b
   d) None of the above

15) Which of the following network gets affected by the method of neutral grounding ?
   a) Zero sequence network
   b) Positive sequence network
   c) Negative sequence network
   d) All of the above

16) The positive sequence component of voltage at the point of fault becomes zero when it is a
   a) Three phase fault
   b) Line to line fault
   c) LLG fault
   d) Line to ground fault

17) Load frequency control uses
   a) Proportional control uses
   b) Integral controller alone
   c) Both a and b
   d) Either a or b

18) Load frequency control are carried out with
   a) P controller only
   b) I controller only
   c) D controller only
   d) PID controller

19) Load frequency control is achieved by properly matching the individual machines
   a) Reactive power
   b) Generated power
   c) Turbine inputs
   d) Turbine and Generator rating

20) In automatic generation control system, the time constant of field winding is
   a) Smaller than that of the governor
   b) Larger than that of the governor
   c) Small as that of the governor
   d) None of the above

———————

SLR-VB – 411

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Explain fault in power system.
   2) Derive an equation of one conductor open fault.
   3) Draw the zero sequence network for delta/delta and transformer star/star connected transformer with star point connected to ground.
   4) What is symmetrical component ?
   5) What is per unit system ? State advantages of per unit system.

3. Solve **any two** : **(2×10=20)**
   1) Explain transient on transmission line.
   2) Derive an equation of single line to ground fault.
   3) With a schematic diagram explain automatic voltage control.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   1) Describe various methods of improving stability.
   2) Explain contingency analysis.
   3) Explain transient state stability.
   4) Derive an equation of dynamics of synchronous machine.
   5) What are factors affecting the transient stability.

Set Q

5. Solve **any two** : **(2×10=20)**

   1) Explain by using equal area criterion what happens when mechanical power input to the Turbine is suddenly changed.

   2) Explain types of stability and concept of equal area criterion.

   3) Derive swing equation and explain ‘M’ and ‘H’ constants.

———————

SLR-VB – 411

Seat No.	

Set R

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Thursday, 18-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The positive sequence component of voltage at the point of fault becomes zero when it is a
   a) Three phase fault b) Line to line fault
   c) LLG fault d) Line to ground fault

2) Load frequency control uses
   a) Proportional control uses b) Integral controller alone
   c) Both a and b d) Either a or b

3) Load frequency control are carried out with
   a) P controller only b) I controller only
   c) D controller only d) PID controller

4) Load frequency control is achieved by properly matching the individual machines
   a) Reactive power b) Generated power
   c) Turbine inputs d) Turbine and Generator rating

5) In automatic generation control system, the time constant of field winding is
   a) Smaller than that of the governor b) Larger than that of the governor
   c) Small as that of the governor d) None of the above

6) In a _____ fault the zero sequence networks is not connected.
   a) Line to ground b) Line to line
   c) Double line to ground d) None of the above

7) Only the _____ sequence network is contains a voltage source.
   a) Positive b) Negative c) Both a and b d) Zero

8) Which of the following fault occurs most frequently ?
   a) Single Line to ground b) Line to line
   c) Double line to ground d) None of the above

P.T.O.

9) For a Fully transposed transmission line
   a) Equal positive and negative sequence impedance
   b) Zero sequence impedance much larger than the positive sequence impedance
   c) Both a and b
   d) None of the above

10) Zero sequence current can flow through a star connected winding only if star point is
   a) Grounded
   b) Ungrounded
   c) Both a and b
   d) None of the above

11) In a power system, during disturbance, governor is used to
   a) Adjust the terminal voltage
   b) Adjust the speed
   c) Reduced the speed
   d) None of the above

12) Short circuit currents are due to
   a) Single line to ground fault
   b) Phase to phase fault
   c) All the three phase to earth fault
   d) None of the above

13) Which is the following result in symmetrical fault ?
   a) Single line to ground fault
   b) Phase to phase fault
   c) All the three phase to earth fault
   d) Two phase to earth

14) The maximum short circuit current occurs in the case of
   a) Three phase to bolted fault
   b) Double line to ground fault
   c) Phase to phase fault
   d) Single line to ground fault

15) The magnitude of fault current depend upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both a and b

16) A balanced three phase system consist of
   a) Zero sequence current only
   b) Positive sequence current only
   c) Negative sequence current only
   d) None of the above

17) Fault level means
   a) Voltage at the point of fault
   b) Fault current
   c) Fault power factor
   d) Fault MVA

18) Which type of connection are used in two conductor open fault ?
   a) Series
   b) Parallel
   c) Both a and b
   d) None of the above

19) Which type of connection are used in one conductor open fault ?
   a) Series
   b) Parallel
   c) Both a and b
   d) None of the above

20) Which of the following network gets affected by the method of neutral grounding ?
   a) Zero sequence network
   b) Positive sequence network
   c) Negative sequence network
   d) All of the above

———————

SLR-VB – 411

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (Old)
Examination, 2017
POWER SYSTEM – II

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Explain fault in power system.
   2) Derive an equation of one conductor open fault.
   3) Draw the zero sequence network for delta/delta and transformer star/star connected transformer with star point connected to ground.
   4) What is symmetrical component ?
   5) What is per unit system ? State advantages of per unit system.

3. Solve **any two** : **(2×10=20)**
   1) Explain transient on transmission line.
   2) Derive an equation of single line to ground fault.
   3) With a schematic diagram explain automatic voltage control.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   1) Describe various methods of improving stability.
   2) Explain contingency analysis.
   3) Explain transient state stability.
   4) Derive an equation of dynamics of synchronous machine.
   5) What are factors affecting the transient stability.

Set R

5. Solve **any two** : **(2×10=20)**

   1) Explain by using equal area criterion what happens when mechanical power input to the Turbine is suddenly changed.

   2) Explain types of stability and concept of equal area criterion.

   3) Derive swing equation and explain ‘M’ and ‘H’ constants.

———————

SLR-VB – 411

Seat No.	

Set S

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Thursday, 18-5-2017 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) A balanced three phase system consist of
   a) Zero sequence current only b) Positive sequence current only
   c) Negative sequence current only d) None of the above

2) Fault level means
   a) Voltage at the point of fault b) Fault current
   c) Fault power factor d) Fault MVA

3) Which type of connection are used in two conductor open fault ?
   a) Series b) Parallel
   c) Both a and b d) None of the above

4) Which type of connection are used in one conductor open fault ?
   a) Series b) Parallel
   c) Both a and b d) None of the above

5) Which of the following network gets affected by the method of neutral grounding ?
   a) Zero sequence network b) Positive sequence network
   c) Negative sequence network d) All of the above

6) The positive sequence component of voltage at the point of fault becomes zero when it is a
   a) Three phase fault b) Line to line fault
   c) LLG fault d) Line to ground fault

7) Load frequency control uses
   a) Proportional control uses b) Integral controller alone
   c) Both a and b d) Either a or b

8) Load frequency control are carried out with
   a) P controller only b) I controller only
   c) D controller only d) PID controller

P.T.O.

9) Load frequency control is achieved by properly matching the individual machines
   a) Reactive power b) Generated power
   c) Turbine inputs d) Turbine and Generator rating

10) In automatic generation control system, the time constant of field winding is
   a) Smaller than that of the governor b) Larger than that of the governor
   c) Small as that of the governor d) None of the above

11) In a _____ fault the zero sequence networks is not connected.
   a) Line to ground b) Line to line
   c) Double line to ground d) None of the above

12) Only the _____ sequence network is contains a voltage source.
   a) Positive b) Negative c) Both a and b d) Zero

13) Which of the following fault occurs most frequently ?
   a) Single Line to ground b) Line to line
   c) Double line to ground d) None of the above

14) For a Fully transposed transmission line
   a) Equal positive and negative sequence impedance
   b) Zero sequence impedance much larger than the positive sequence impedance
   c) Both a and b
   d) None of the above

15) Zero sequence current can flow through a star connected winding only if star point is
   a) Grounded b) Ungrounded
   c) Both a and b d) None of the above

16) In a power system, during disturbance, governor is used to
   a) Adjust the terminal voltage b) Adjust the speed
   c) Reduced the speed d) None of the above

17) Short circuit currents are due to
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phase to earth fault d) None of the above

18) Which is the following result in symmetrical fault ?
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phase to earth fault d) Two phase to earth

19) The maximum short circuit current occurs in the case of
   a) Three phase to bolted fault b) Double line to ground fault
   c) Phase to phase fault d) Single line to ground fault

20) The magnitude of fault current depend upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both a and b

_____

SLR-VB – 411

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – I) (Old) Examination, 2017
POWER SYSTEM – II

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Make suitable assumptions ***if necessary****.*

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Explain fault in power system.
   2) Derive an equation of one conductor open fault.
   3) Draw the zero sequence network for delta/delta and transformer star/star connected transformer with star point connected to ground.
   4) What is symmetrical component ?
   5) What is per unit system ? State advantages of per unit system.

3. Solve **any two** : **(2×10=20)**
   1) Explain transient on transmission line.
   2) Derive an equation of single line to ground fault.
   3) With a schematic diagram explain automatic voltage control.

SECTION – II

4. Solve **any four** : **(4×5=20)**
   1) Describe various methods of improving stability.
   2) Explain contingency analysis.
   3) Explain transient state stability.
   4) Derive an equation of dynamics of synchronous machine.
   5) What are factors affecting the transient stability.

Set S

5. Solve **any two** : **(2×10=20)**

   1) Explain by using equal area criterion what happens when mechanical power input to the Turbine is suddenly changed.

   2) Explain types of stability and concept of equal area criterion.

   3) Derive swing equation and explain ‘M’ and ‘H’ constants.

———————

SLR-VB – 412

Seat No.	

Set P

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2017
HVDC & FACTS

Day and Date : Tuesday, 16-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) A back to back HVDC link can be advantageous compared to AC primarily because
   a) It is cheaper
   b) Of stability considerations
   c) Of controlled power glow
   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) Both b and c

3) The HVDC converter
   a) Does not consume reactive power
   b) Consumes as much reactive power as real power
   c) Consumes 50% of the real power
   d) None of the above

4) Problems of AC interconnection
   a) presence of large power oscillations which can lead to frequent tripping
   b) increase in fault level
   c) transmission of disturbances from one system to the another
   d) all of the above

5) In Homopolar link conductors having
   a) One conductor is negative and other is ground
   b) One conductor is positive and other is negative
   c) all having same polarity usually negative
   d) all of the above

6) Series compensation is primarily resorted to
   a) improve voltage profile
   b) improve stability
   c) reduce fault currents
   d) all of the above

7) Series capacitor is used in a transmission line to
   a) Compensate the voltage drop
   b) Reduce line losses
   c) Improve load power factor
   d) None of the above

P.T.O.

8) Which equipment do not supply reactive power in HVDC converter stations ?
   a) Static VAR compensators
   b) Series capacitors
   c) Synchronous condensers
   d) AC filters

9) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 180°

10) High Voltage DC transmission (HVDC) is mainly used for
   a) Bulk power transmission over very long distances
   b) Interconnecting two systems with the same nominal frequency
   c) Eliminating reactive power requirement in the operation
   d) Minimizing harmonics at the converter stations

11) The SVC was initially used for _____ where the objective is to dynamically control the reactive power demand of large loads.
   a) load compensation
   b) load up gradation
   c) load current control
   d) none of the above

12) The harmonics which are not present due to imbalance of bridges operation, firing angle errors are called
   a) even harmonics
   b) odd harmonics
   c) non characteristic harmonic
   d) characteristic harmonic

13) All the filter branches appear at fundamental frequency as
   a) resistive b) capacitive c) d.c. source d) inductive

14) If the d.c. Smoothing reactor is of infinite value
   a) d.c. Harmonics will be more
   b) d.c. Side voltage will be zero
   c) current will be oscillatory
   d) d.c. Side harmonics will be zero

15) The Line commutated converters uses which of the following devices for switching ?
   a) MOSFET b) S.C.R. c) Diode d) GTO

16) Which one of the following is not true regarding HVDC transmission ?
   a) Corona loss is much more in HVDC transmission
   b) The power transmission capability of bipolar line is almost the same as that of signal circuit ac line
   c) HVDC link can operate between two ac systems whose frequencies need not be equal
   d) There is no distance limitation for HVDC transmission by underground cable

17) In turbo alternator rotor diameter is limited to about
   a) 0.6 m b) 1.2 m c) 1.8 m d) 3 m

18) Which of the following is connected before the d.c. Filter bank and after the converters in HVDC ?
   a) Converter transformer
   b) Smoothing reactor
   c) Valve hall
   d) A.c. filter

19) Shunt compensation in an EHV line is used to
   a) Improve stability
   b) Reduce fault level
   c) Improve voltage profile
   d) Substitute for synchronous phase modifier

20) The converter transformer feeding a Graetz bridge serves the objectives of providing
   a) galvanic separation between AC and DC sides
   b) voltage transformation between AC and DC networks
   c) adjustment of the applied AC voltage by On Load Tap Changer (OLTC)
   d) all of the above

_____

SLR-VB – 412

Seat No.	

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2017
HVDC & FACTS

Day and Date : Tuesday, 16-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four**. **(5×4=20)**
   1) Give the comparison between SVC and STATCOM.
   2) Explain stability limits and voltage control aspects of HVDC transmission system.
   3) State types of DC link and explain any one in detail.
   4) State basic types of FACTS controller and explain its importance in transmission network.
   5) Briefly classify the FACTS controllers.

3. Solve the following. **(10×2=20)**
   1) Compare HVDC technology with FACTS technology.
   2) Explain power flow controlled in HVDC transmission line and power flow control using FACTS controller, distinguish both the methods with their merits and demerits.

   OR

   2) Explain the merits and demerits of SSSC.

SECTION – II

4. Solve **any four**. **(5×4=20)**
   a) Give classification of HVDC links and explain each in detail.
   b) State basic principle of control and control implementation in HVDC system.
   c) Explain pulse frequency control and pulse phase control.
   d) Explain in detail modern trends in HVDC transmission system.
   e) Explain planning for HVDC transmission system.

5. Solve the following. **(10×2=20)**
   a) Give the comparison of AC and DC transmission with respect to technical performance and reliability.
   b) Why HVDC control is necessary and explains various portions of HVDC control characteristics.

   OR

   b) Draw the Graetz circuit and analysis this circuit without overlap angle condition.

———————

Set P

Set P

SLR-VB – 412

Seat No.	

Set Q

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2017
HVDC & FACTS

Day and Date : Tuesday, 16-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) Which one of the following is not true regarding HVDC transmission ?
   a) Corona loss is much more in HVDC transmission
   b) The power transmission capability of bipolar line is almost the same as that of signal circuit ac line
   c) HVDC link can operate between two ac systems whose frequencies need not be equal
   d) There is no distance limitation for HVDC transmission by underground cable

2) In turbo alternator rotor diameter is limited to about
   a) 0.6 m b) 1.2 m c) 1.8 m d) 3 m

3) Which of the following is connected before the d.c. Filter bank and after the converters in HVDC ?
   a) Converter transformer b) Smoothing reactor
   c) Valve hall d) A.c. filter

4) Shunt compensation in an EHV line is used to
   a) Improve stability b) Reduce fault level
   c) Improve voltage profile d) Substitute for synchronous phase modifier

5) The converter transformer feeding a Graetz bridge serves the objectives of providing
   a) galvanic separation between AC and DC sides
   b) voltage transformation between AC and DC networks
   c) adjustment of the applied AC voltage by On Load Tap Changer (OLTC)
   d) all of the above

6) A back to back HVDC link can be advantageous compared to AC primarily because
   a) It is cheaper b) Of stability considerations
   c) Of controlled power glow 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) Both b and c

P.T.O.

8) The HVDC converter
   a) Does not consume reactive power
   b) Consumes as much reactive power as real power
   c) Consumes 50% of the real power
   d) None of the above

9) Problems of AC interconnection
   a) presence of large power oscillations which can lead to frequent tripping
   b) increase in fault level
   c) transmission of disturbances from one system to the another
   d) all of the above

10) In Homopolar link conductors having
   a) One conductor is negative and other is ground
   b) One conductor is positive and other is negative
   c) all having same polarity usually negative
   d) all of the above

11) Series compensation is primarily resorted to
   a) improve voltage profile
   b) improve stability
   c) reduce fault currents
   d) all of the above

12) Series capacitor is used in a transmission line to
   a) Compensate the voltage drop
   b) Reduce line losses
   c) Improve load power factor
   d) None of the above

13) Which equipment do not supply reactive power in HVDC converter stations ?
   a) Static VAR compensators
   b) Series capacitors
   c) Synchronous condensers
   d) AC filters

14) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 180°

15) High Voltage DC transmission (HVDC) is mainly used for
   a) Bulk power transmission over very long distances
   b) Interconnecting two systems with the same nominal frequency
   c) Eliminating reactive power requirement in the operation
   d) Minimizing harmonics at the converter stations

16) The SVC was initially used for _____ where the objective is to dynamically control the reactive power demand of large loads.
   a) load compensation
   b) load up gradation
   c) load current control
   d) none of the above

17) The harmonics which are not present due to imbalance of bridges operation, firing angle errors are called
   a) even harmonics
   b) odd harmonics
   c) non characteristic harmonic
   d) characteristic harmonic

18) All the filter branches appear at fundamental frequency as
   a) resistive b) capacitive c) d.c. source d) inductive

19) If the d.c. Smoothing reactor is of infinite value
   a) d.c. Harmonics will be more
   b) d.c. Side voltage will be zero
   c) current will be oscillatory
   d) d.c. Side harmonics will be zero

20) The Line commutated converters uses which of the following devices for switching ?
   a) MOSFET b) S.C.R. c) Diode d) GTO

_____

SLR-VB – 412

Seat No.	

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2017
HVDC & FACTS

Day and Date : Tuesday, 16-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four**. **(5×4=20)**
   1) Give the comparison between SVC and STATCOM.
   2) Explain stability limits and voltage control aspects of HVDC transmission system.
   3) State types of DC link and explain any one in detail.
   4) State basic types of FACTS controller and explain its importance in transmission network.
   5) Briefly classify the FACTS controllers.

3. Solve the following. **(10×2=20)**
   1) Compare HVDC technology with FACTS technology.
   2) Explain power flow controlled in HVDC transmission line and power flow control using FACTS controller, distinguish both the methods with their merits and demerits.

   OR

   2) Explain the merits and demerits of SSSC.

SECTION – II

4. Solve **any four**. **(5×4=20)**
   a) Give classification of HVDC links and explain each in detail.
   b) State basic principle of control and control implementation in HVDC system.
   c) Explain pulse frequency control and pulse phase control.
   d) Explain in detail modern trends in HVDC transmission system.
   e) Explain planning for HVDC transmission system.

5. Solve the following. **(10×2=20)**
   a) Give the comparison of AC and DC transmission with respect to technical performance and reliability.
   b) Why HVDC control is necessary and explains various portions of HVDC control characteristics.

   OR

   b) Draw the Graetz circuit and analysis this circuit without overlap angle condition.

———————

Set Q

Set Q

SLR-VB – 412

Seat No.	

Set R

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2017
HVDC & FACTS

Day and Date : Tuesday, 16-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The SVC was initially used for _____ where the objective is to dynamically control the reactive power demand of large loads.
   a) load compensation b) load up gradation
   c) load current control d) none of the above

2) The harmonics which are not present due to imbalance of bridges operation, firing angle errors are called
   a) even harmonics b) odd harmonics
   c) non characteristic harmonic d) characteristic harmonic

3) All the filter branches appear at fundamental frequency as
   a) resistive b) capacitive c) d.c. source d) inductive

4) If the d.c. Smoothing reactor is of infinite value
   a) d.c. Harmonics will be more b) d.c. Side voltage will be zero
   c) current will be oscillatory d) d.c. Side harmonics will be zero

5) The Line commutated converters uses which of the following devices for switching ?
   a) MOSFET b) S.C.R. c) Diode d) GTO

6) Which one of the following is not true regarding HVDC transmission ?
   a) Corona loss is much more in HVDC transmission
   b) The power transmission capability of bipolar line is almost the same as that of signal circuit ac line
   c) HVDC link can operate between two ac systems whose frequencies need not be equal
   d) There is no distance limitation for HVDC transmission by underground cable

7) In turbo alternator rotor diameter is limited to about
   a) 0.6 m b) 1.2 m c) 1.8 m d) 3 m

8) Which of the following is connected before the d.c. Filter bank and after the converters in HVDC ?
   a) Converter transformer b) Smoothing reactor
   c) Valve hall d) A.c. filter

P.T.O.

9) Shunt compensation in an EHV line is used to
   a) Improve stability
   b) Reduce fault level
   c) Improve voltage profile
   d) Substitute for synchronous phase modifier

10) The converter transformer feeding a Graetz bridge serves the objectives of providing
   a) galvanic separation between AC and DC sides
   b) voltage transformation between AC and DC networks
   c) adjustment of the applied AC voltage by On Load Tap Changer (OLTC)
   d) all of the above

11) A back to back HVDC link can be advantageous compared to AC primarily because
   a) It is cheaper
   b) Of stability considerations
   c) Of controlled power glow
   d) All of the above

12) 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) Both b and c

13) The HVDC converter
   a) Does not consume reactive power
   b) Consumes as much reactive power as real power
   c) Consumes 50% of the real power
   d) None of the above

14) Problems of AC interconnection
   a) presence of large power oscillations which can lead to frequent tripping
   b) increase in fault level
   c) transmission of disturbances from one system to the another
   d) all of the above

15) In Homopolar link conductors having
   a) One conductor is negative and other is ground
   b) One conductor is positive and other is negative
   c) all having same polarity usually negative
   d) all of the above

16) Series compensation is primarily resorted to
   a) improve voltage profile
   b) improve stability
   c) reduce fault currents
   d) all of the above

17) Series capacitor is used in a transmission line to
   a) Compensate the voltage drop
   b) Reduce line losses
   c) Improve load power factor
   d) None of the above

18) Which equipment do not supply reactive power in HVDC converter stations ?
   a) Static VAR compensators
   b) Series capacitors
   c) Synchronous condensers
   d) AC filters

19) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 180°

20) High Voltage DC transmission (HVDC) is mainly used for
   a) Bulk power transmission over very long distances
   b) Interconnecting two systems with the same nominal frequency
   c) Eliminating reactive power requirement in the operation
   d) Minimizing harmonics at the converter stations

SLR-VB – 412

Seat No.	

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2017
HVDC & FACTS

Day and Date : Tuesday, 16-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four**. **(5×4=20)**
   1) Give the comparison between SVC and STATCOM.
   2) Explain stability limits and voltage control aspects of HVDC transmission system.
   3) State types of DC link and explain any one in detail.
   4) State basic types of FACTS controller and explain its importance in transmission network.
   5) Briefly classify the FACTS controllers.

3. Solve the following. **(10×2=20)**
   1) Compare HVDC technology with FACTS technology.
   2) Explain power flow controlled in HVDC transmission line and power flow control using FACTS controller, distinguish both the methods with their merits and demerits.

   OR

   2) Explain the merits and demerits of SSSC.

SECTION – II

4. Solve **any four**. **(5×4=20)**
   a) Give classification of HVDC links and explain each in detail.
   b) State basic principle of control and control implementation in HVDC system.
   c) Explain pulse frequency control and pulse phase control.
   d) Explain in detail modern trends in HVDC transmission system.
   e) Explain planning for HVDC transmission system.

5. Solve the following. **(10×2=20)**
   a) Give the comparison of AC and DC transmission with respect to technical performance and reliability.
   b) Why HVDC control is necessary and explains various portions of HVDC control characteristics.

   OR

   b) Draw the Graetz circuit and analysis this circuit without overlap angle condition.

———————

Set R

Set R

SLR-VB – 412

Seat No.	

Set S

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2017
HVDC & FACTS

Day and Date : Tuesday, 16-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) Series compensation is primarily resorted to
   a) improve voltage profile b) improve stability
   c) reduce fault currents d) all of the above

2) Series capacitor is used in a transmission line to
   a) Compensate the voltage drop b) Reduce line losses
   c) Improve load power factor d) None of the above

3) Which equipment do not supply reactive power in HVDC converter stations ?
   a) Static VAR compensators b) Series capacitors
   c) Synchronous condensers d) AC filters

4) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 180°

5) High Voltage DC transmission (HVDC) is mainly used for
   a) Bulk power transmission over very long distances
   b) Interconnecting two systems with the same nominal frequency
   c) Eliminating reactive power requirement in the operation
   d) Minimizing harmonics at the converter stations

6) The SVC was initially used for _____ where the objective is to dynamically control the reactive power demand of large loads.
   a) load compensation b) load up gradation
   c) load current control d) none of the above

7) The harmonics which are not present due to imbalance of bridges operation, firing angle errors are called
   a) even harmonics b) odd harmonics
   c) non characteristic harmonic d) characteristic harmonic

8) All the filter branches appear at fundamental frequency as
   a) resistive b) capacitive c) d.c. source d) inductive

P.T.O.

9) If the d.c. Smoothing reactor is of infinite value
   a) d.c. Harmonics will be more
   b) d.c. Side voltage will be zero
   c) current will be oscillatory
   d) d.c. Side harmonics will be zero

10) The Line commutated converters uses which of the following devices for switching ?
   a) MOSFET b) S.C.R. c) Diode d) GTO

11) Which one of the following is not true regarding HVDC transmission ?
   a) Corona loss is much more in HVDC transmission
   b) The power transmission capability of bipolar line is almost the same as that of signal circuit ac line
   c) HVDC link can operate between two ac systems whose frequencies need not be equal
   d) There is no distance limitation for HVDC transmission by underground cable

12) In turbo alternator rotor diameter is limited to about
   a) 0.6 m b) 1.2 m c) 1.8 m d) 3 m

13) Which of the following is connected before the d.c. Filter bank and after the converters in HVDC ?
   a) Converter transformer
   b) Smoothing reactor
   c) Valve hall
   d) A.c. filter

14) Shunt compensation in an EHV line is used to
   a) Improve stability
   b) Reduce fault level
   c) Improve voltage profile
   d) Substitute for synchronous phase modifier

15) The converter transformer feeding a Graetz bridge serves the objectives of providing
   a) galvanic separation between AC and DC sides
   b) voltage transformation between AC and DC networks
   c) adjustment of the applied AC voltage by On Load Tap Changer (OLTC)
   d) all of the above

16) A back to back HVDC link can be advantageous compared to AC primarily because
   a) It is cheaper
   b) Of stability considerations
   c) Of controlled power glow
   d) All of the above

17) 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) Both b and c

18) The HVDC converter
   a) Does not consume reactive power
   b) Consumes as much reactive power as real power
   c) Consumes 50% of the real power
   d) None of the above

19) Problems of AC interconnection
   a) presence of large power oscillations which can lead to frequent tripping
   b) increase in fault level
   c) transmission of disturbances from one system to the another
   d) all of the above

20) In Homopolar link conductors having
   a) One conductor is negative and other is ground
   b) One conductor is positive and other is negative
   c) all having same polarity usually negative
   d) all of the above

SLR-VB – 412

Seat No.	

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2017
HVDC & FACTS

Day and Date : Tuesday, 16-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four**. **(5×4=20)**
   1) Give the comparison between SVC and STATCOM.
   2) Explain stability limits and voltage control aspects of HVDC transmission system.
   3) State types of DC link and explain any one in detail.
   4) State basic types of FACTS controller and explain its importance in transmission network.
   5) Briefly classify the FACTS controllers.

3. Solve the following. **(10×2=20)**
   1) Compare HVDC technology with FACTS technology.
   2) Explain power flow controlled in HVDC transmission line and power flow control using FACTS controller, distinguish both the methods with their merits and demerits.

   OR

   2) Explain the merits and demerits of SSSC.

SECTION – II

4. Solve **any four**. **(5×4=20)**
   a) Give classification of HVDC links and explain each in detail.
   b) State basic principle of control and control implementation in HVDC system.
   c) Explain pulse frequency control and pulse phase control.
   d) Explain in detail modern trends in HVDC transmission system.
   e) Explain planning for HVDC transmission system.

5. Solve the following. **(10×2=20)**
   a) Give the comparison of AC and DC transmission with respect to technical performance and reliability.
   b) Why HVDC control is necessary and explains various portions of HVDC control characteristics.

   OR

   b) Draw the Graetz circuit and analysis this circuit without overlap angle condition.

———————

Set S

Set S

SLR-VB – 413

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 18-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 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 : 20

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

1) Eddy current loss varies with maximum flux density (B) as
A) B B) B^2 C) $B^{1.6}$ D) $B^{2.6}$

2) If the permeability of a material is much more than 1. It can be classified as
A) Diamagnetic material B) Paramagnetic material
C) Ferro-magnetic material D) Ferrite

3) The material used for core of rotating machines is
A) Cast iron B) Soft steel C) Silicon steel D) Hard steel

4) Which of the following can be worked with higher flux densities ?
A) Mild steel B) Silicon iron
C) Cold rolled silicon steel D) Hot rolled silicon steel

5) The stacking factor will be least for
A) Square core B) Cruciform core
C) Three stepped core D) Four stepped core

6) If the air gap of a 3 phase induction motor is kept large
A) Magnetizing current decreases B) Magnetizing current increases
C) Noise increases D) Obtain high starting torque

7) Low speed alternators are of _____pole.
A) Salient B) Non-salient
C) Circular D) None of the above

8) In an induction motor air gap is increased.
A) Speed will reduce B) Efficiency will improve
C) Power factor will be lowered D) Breakdown torque will reduce

9) Cording factor is the ratio of the EMFs of
   A) Short pitch coil to full pitch coil
   B) Full pitch winding to concentrated winding
   C) Full pitch winding to short pitch winding
   D) Distributed winding to full pitch winding

10) Magnetostriction
   A) Grain oriented magnetic properties
   B) Represents the upper limit to which magnetic properties can be induced
   C) Change in dimensions resulting from magnetisation of ferromagnetic materials
   D) None of the above

11) An ideal insulating material should high
   A) Insulation resistance B) Dielectric strength
   C) Both A) and B) D) None of the above

12) Specific magnetic loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

13) In case of induction motor the current density in bar usually taken is
   A) 0.1 – 0.2 A/mm^2 B) 1 –2A/mm^2
   C) 3 – 5 A/mm^2 D) None of the above

14) In an induction motor L / T = 1 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

15) An under excited synchronous motor is act as
   A) Resistor B) Inductor
   C) Capacitor D) None of the above

16) Specific electric loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

17) Line joining tangent and output line in a circle diagram gives
   A) Copper loss B) Stator loss
   C) Maximum output D) Maximum torque

18) 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

19) Open circuit test on a transformer is conducted to obtain
   A) Leakage impedances B) Ohmic loss
   C) Hysteresis loss only D) Core loss only

20) The harmonics in rotating machines are generated due to
   A) Non-sinusoidal field form B) Slotting of the stator core
   C) Both (A) and (B) above D) None of the above

SLR-VB – 413

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory.***
2) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×5=20)**

a) For a transformer show that, Et = $K\sqrt{KVA}$
Where Et = Emf per turn, KVA = rating of transformer.

b) Explain the different modes of heat transfer.

c) Explain different types of winding used for transformer.

d) Explain the different insulating materials used for electrical machines.

e) Determine the overall dimensions of 100KVA, 11000/415V, three phase and 50Hz core type transformer. Use following data :
Emf per turn = 5V, Maximum flux density = 1.4 wb/sq.m., current density = 2.6 A/Sq.mm., Kw = 0.3, stacking factor = 0.9. Use three stepped core for which width of largest stamping is 0.9d. Ai = 0.6 d^2.

3. Solve **any two** : **(2×10=20)**

a) Explain various auxiliary equipment used in transformer.

b) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 5 KVA, 11KV/400V, 50Hz, single phase distribution transformer. The net copper area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for core, a flux density of 1 web/Sq.m., current density of 1.4 A/Sq.mm., window space factor of 0.2 and ratio of window height to width is 3.

c) Why stepped cores are used in transformer ? Explain different yoke section used for transformer.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Write short note on damper winding used in synchronous machine.

   b) Find the main dimensions of a 2500 KVA, 3 KV, 50 Hz, 187.5 rpm, 3-phase water wheel generator. The average gap density is 0.6 web/m^2 and ampere conductor per meter are 34000. Use circular poles with ratio of core length to pole pitch = 0.65 runway speed is limited about twice of normal speed.

   c) What are different pole constructions are used for salient pole alternator ?

   d) 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.

   e) Derive an output equation of 3ϕ induction motor.

5. Solve **any two** : **(2×10=20)**

   a) Explain the design procedure of field winding used for alternator.

   b) Explain procedure to draw circle diagram of 3ϕ induction motor.

   c) Derive an expression for armature resistance and leakage reactance of an alternator.

SLR-VB – 413

Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 18-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 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 : 20

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

1) Specific electric loading is not governed by
A) Heating B) Speed of machine
C) Machine size D) Magnetizing current

2) Line joining tangent and output line in a circle diagram gives
A) Copper loss B) Stator loss
C) Maximum output D) Maximum torque

3) 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

4) Open circuit test on a transformer is conducted to obtain
A) Leakage impedances B) Ohmic loss
C) Hysteresis loss only D) Core loss only

5) The harmonics in rotating machines are generated due to
A) Non-sinusoidal field form B) Slotting of the stator core
C) Both (A) and (B) above D) None of the above

6) Eddy current loss varies with maximum flux density (B) as
A) B B) B^2 C) $B^{1.6}$ D) $B^{2.6}$

7) If the permeability of a material is much more than 1. It can be classified as
A) Diamagnetic material B) Paramagnetic material
C) Ferro-magnetic material D) Ferrite

8) The material used for core of rotating machines is
A) Cast iron B) Soft steel C) Silicon steel D) Hard steel

P.T.O.

9) Which of the following can be worked with higher flux densities ?
   A) Mild steel B) Silicon iron
   C) Cold rolled silicon steel D) Hot rolled silicon steel

10) The stacking factor will be least for
   A) Square core B) Cruciform core
   C) Three stepped core D) Four stepped core

11) If the air gap of a 3 phase induction motor is kept large
   A) Magnetizing current decreases B) Magnetizing current increases
   C) Noise increases D) Obtain high starting torque

12) Low speed alternators are of _____pole.
   A) Salient B) Non-salient
   C) Circular D) None of the above

13) In an induction motor air gap is increased.
   A) Speed will reduce B) Efficiency will improve
   C) Power factor will be lowered D) Breakdown torque will reduce

14) Cording factor is the ratio of the EMFs of
   A) Short pitch coil to full pitch coil
   B) Full pitch winding to concentrated winding
   C) Full pitch winding to short pitch winding
   D) Distributed winding to full pitch winding

15) Magnetostriction
   A) Grain oriented magnetic properties
   B) Represents the upper limit to which magnetic properties can be induced
   C) Change in dimensions resulting from magnetisation of ferromagnetic materials
   D) None of the above

16) An ideal insulating material should high
   A) Insulation resistance B) Dielectric strength
   C) Both A) and B) D) None of the above

17) Specific magnetic loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

18) In case of induction motor the current density in bar usually taken is
   A) 0.1 – 0.2 A/mm^2 B) 1 –2A/mm^2
   C) 3 – 5 A/mm^2 D) None of the above

19) In an induction motor L / T = 1 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

20) An under excited synchronous motor is act as
   A) Resistor B) Inductor
   C) Capacitor D) None of the above

_____

SLR-VB – 413

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory.***
2) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×5=20)**

a) For a transformer show that, Et = $K\sqrt{KVA}$
Where Et = Emf per turn, KVA = rating of transformer.

b) Explain the different modes of heat transfer.

c) Explain different types of winding used for transformer.

d) Explain the different insulating materials used for electrical machines.

e) Determine the overall dimensions of 100KVA, 11000/415V, three phase and 50Hz core type transformer. Use following data :
Emf per turn = 5V, Maximum flux density = 1.4 wb/sq.m., current density = 2.6 A/Sq.mm., Kw = 0.3, stacking factor = 0.9. Use three stepped core for which width of largest stamping is 0.9d. Ai = 0.6 d^2.

3. Solve **any two** : **(2×10=20)**

a) Explain various auxiliary equipment used in transformer.

b) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 5 KVA, 11KV/400V, 50Hz, single phase distribution transformer. The net copper area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for core, a flux density of 1 web/Sq.m., current density of 1.4 A/Sq.mm., window space factor of 0.2 and ratio of window height to width is 3.

c) Why stepped cores are used in transformer ? Explain different yoke section used for transformer.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Write short note on damper winding used in synchronous machine.

   b) Find the main dimensions of a 2500 KVA, 3 KV, 50 Hz, 187.5 rpm, 3-phase water wheel generator. The average gap density is 0.6 web/m^2 and ampere conductor per meter are 34000. Use circular poles with ratio of core length to pole pitch = 0.65 runway speed is limited about twice of normal speed.

   c) What are different pole constructions are used for salient pole alternator ?

   d) 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.

   e) Derive an output equation of 3ϕ induction motor.

5. Solve **any two** : **(2×10=20)**

   a) Explain the design procedure of field winding used for alternator.

   b) Explain procedure to draw circle diagram of 3ϕ induction motor.

   c) Derive an expression for armature resistance and leakage reactance of an alternator.

SLR-VB – 413

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 18-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 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 : 20

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

1) An ideal insulating material should high
   A) Insulation resistance B) Dielectric strength
   C) Both A) and B) D) None of the above

2) Specific magnetic loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

3) In case of induction motor the current density in bar usually taken is
   A) 0.1 – 0.2 A/mm^2 B) 1 –2A/mm^2
   C) 3 – 5 A/mm^2 D) None of the above

4) In an induction motor L / T = 1 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

5) An under excited synchronous motor is act as
   A) Resistor B) Inductor
   C) Capacitor D) None of the above

6) Specific electric loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

7) Line joining tangent and output line in a circle diagram gives
   A) Copper loss B) Stator loss
   C) Maximum output D) Maximum torque

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) Open circuit test on a transformer is conducted to obtain
   A) Leakage impedances B) Ohmic loss
   C) Hysteresis loss only D) Core loss only

10) The harmonics in rotating machines are generated due to
   A) Non-sinusoidal field form B) Slotting of the stator core
   C) Both (A) and (B) above D) None of the above

11) Eddy current loss varies with maximum flux density (B) as
   A) B B) B^2 C) $B^{1.6}$ D) $B^{2.6}$

12) If the permeability of a material is much more than 1. It can be classified as
   A) Diamagnetic material B) Paramagnetic material
   C) Ferro-magnetic material D) Ferrite

13) The material used for core of rotating machines is
   A) Cast iron B) Soft steel C) Silicon steel D) Hard steel

14) Which of the following can be worked with higher flux densities ?
   A) Mild steel B) Silicon iron
   C) Cold rolled silicon steel D) Hot rolled silicon steel

15) The stacking factor will be least for
   A) Square core B) Cruciform core
   C) Three stepped core D) Four stepped core

16) If the air gap of a 3 phase induction motor is kept large
   A) Magnetizing current decreases B) Magnetizing current increases
   C) Noise increases D) Obtain high starting torque

17) Low speed alternators are of _____pole.
   A) Salient B) Non-salient
   C) Circular D) None of the above

18) In an induction motor air gap is increased.
   A) Speed will reduce B) Efficiency will improve
   C) Power factor will be lowered D) Breakdown torque will reduce

19) Cording factor is the ratio of the EMFs of
   A) Short pitch coil to full pitch coil
   B) Full pitch winding to concentrated winding
   C) Full pitch winding to short pitch winding
   D) Distributed winding to full pitch winding

20) Magnetostriction
   A) Grain oriented magnetic properties
   B) Represents the upper limit to which magnetic properties can be induced
   C) Change in dimensions resulting from magnetisation of ferromagnetic materials
   D) None of the above

_____

SLR-VB – 413

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory.***
2) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×5=20)**

a) For a transformer show that, Et = $K\sqrt{KVA}$
Where Et = Emf per turn, KVA = rating of transformer.

b) Explain the different modes of heat transfer.

c) Explain different types of winding used for transformer.

d) Explain the different insulating materials used for electrical machines.

e) Determine the overall dimensions of 100KVA, 11000/415V, three phase and 50Hz core type transformer. Use following data :
Emf per turn = 5V, Maximum flux density = 1.4 wb/sq.m., current density = 2.6 A/Sq.mm., Kw = 0.3, stacking factor = 0.9. Use three stepped core for which width of largest stamping is 0.9d. Ai = 0.6 d^2.

3. Solve **any two** : **(2×10=20)**

a) Explain various auxiliary equipment used in transformer.

b) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 5 KVA, 11KV/400V, 50Hz, single phase distribution transformer. The net copper area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for core, a flux density of 1 web/Sq.m., current density of 1.4 A/Sq.mm., window space factor of 0.2 and ratio of window height to width is 3.

c) Why stepped cores are used in transformer ? Explain different yoke section used for transformer.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Write short note on damper winding used in synchronous machine.

   b) Find the main dimensions of a 2500 KVA, 3 KV, 50 Hz, 187.5 rpm, 3-phase water wheel generator. The average gap density is 0.6 web/m^2 and ampere conductor per meter are 34000. Use circular poles with ratio of core length to pole pitch = 0.65 runway speed is limited about twice of normal speed.

   c) What are different pole constructions are used for salient pole alternator ?

   d) 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.

   e) Derive an output equation of 3ϕ induction motor.

5. Solve **any two** : **(2×10=20)**

   a) Explain the design procedure of field winding used for alternator.

   b) Explain procedure to draw circle diagram of 3ϕ induction motor.

   c) Derive an expression for armature resistance and leakage reactance of an alternator.

SLR-VB – 413

Seat No.	

Set **S**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 18-5-2017 Total Marks : 100
Time : 3.00 p.m. to 6.00 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 : 20

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

1) If the air gap of a 3 phase induction motor is kept large
   A) Magnetizing current decreases B) Magnetizing current increases
   C) Noise increases D) Obtain high starting torque

2) Low speed alternators are of _____pole.
   A) Salient B) Non-salient
   C) Circular D) None of the above

3) In an induction motor air gap is increased.
   A) Speed will reduce B) Efficiency will improve
   C) Power factor will be lowered D) Breakdown torque will reduce

4) Cording factor is the ratio of the EMFs of
   A) Short pitch coil to full pitch coil
   B) Full pitch winding to concentrated winding
   C) Full pitch winding to short pitch winding
   D) Distributed winding to full pitch winding

5) Magnetostriction
   A) Grain oriented magnetic properties
   B) Represents the upper limit to which magnetic properties can be induced
   C) Change in dimensions resulting from magnetisation of ferromagnetic materials
   D) None of the above

6) An ideal insulating material should high
   A) Insulation resistance B) Dielectric strength
   C) Both A) and B) D) None of the above

7) Specific magnetic loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

P.T.O.

8) In case of induction motor the current density in bar usually taken is
   A) 0.1 – 0.2 A/mm^2 B) 1 –2A/mm^2
   C) 3 – 5 A/mm^2 D) None of the above

9) In an induction motor L / T = 1 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

10) An under excited synchronous motor is act as
   A) Resistor B) Inductor
   C) Capacitor D) None of the above

11) Specific electric loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

12) Line joining tangent and output line in a circle diagram gives
   A) Copper loss B) Stator loss
   C) Maximum output D) Maximum torque

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) Open circuit test on a transformer is conducted to obtain
   A) Leakage impedances B) Ohmic loss
   C) Hysteresis loss only D) Core loss only

15) The harmonics in rotating machines are generated due to
   A) Non-sinusoidal field form B) Slotting of the stator core
   C) Both (A) and (B) above D) None of the above

16) Eddy current loss varies with maximum flux density (B) as
   A) B B) B^2 C) $B^{1.6}$ D) $B^{2.6}$

17) If the permeability of a material is much more than 1. It can be classified as
   A) Diamagnetic material B) Paramagnetic material
   C) Ferro-magnetic material D) Ferrite

18) The material used for core of rotating machines is
   A) Cast iron B) Soft steel C) Silicon steel D) Hard steel

19) Which of the following can be worked with higher flux densities ?
   A) Mild steel B) Silicon iron
   C) Cold rolled silicon steel D) Hot rolled silicon steel

20) The stacking factor will be least for
   A) Square core B) Cruciform core
   C) Three stepped core D) Four stepped core

SLR-VB – 413

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ELECTRICAL MACHINE DESIGN

Day and Date : Thursday, 18-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions : *1)* ***All*** *questions are* ***compulsory.***
2) ***Assume*** *the suitable data* ***whenever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×5=20)**

a) For a transformer show that, Et = $K\sqrt{KVA}$
Where Et = Emf per turn, KVA = rating of transformer.

b) Explain the different modes of heat transfer.

c) Explain different types of winding used for transformer.

d) Explain the different insulating materials used for electrical machines.

e) Determine the overall dimensions of 100KVA, 11000/415V, three phase and 50Hz core type transformer. Use following data :
Emf per turn = 5V, Maximum flux density = 1.4 wb/sq.m., current density = 2.6 A/Sq.mm., Kw = 0.3, stacking factor = 0.9. Use three stepped core for which width of largest stamping is 0.9d. Ai = 0.6 d^2.

3. Solve **any two** : **(2×10=20)**

a) Explain various auxiliary equipment used in transformer.

b) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 5 KVA, 11KV/400V, 50Hz, single phase distribution transformer. The net copper area in the window is 0.6 times the net cross-section of iron in the core. Assume a square cross-section for core, a flux density of 1 web/Sq.m., current density of 1.4 A/Sq.mm., window space factor of 0.2 and ratio of window height to width is 3.

c) Why stepped cores are used in transformer ? Explain different yoke section used for transformer.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Write short note on damper winding used in synchronous machine.

   b) Find the main dimensions of a 2500 KVA, 3 KV, 50 Hz, 187.5 rpm, 3-phase water wheel generator. The average gap density is 0.6 web/m^2 and ampere conductor per meter are 34000. Use circular poles with ratio of core length to pole pitch = 0.65 runway speed is limited about twice of normal speed.

   c) What are different pole constructions are used for salient pole alternator ?

   d) 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.

   e) Derive an output equation of 3ϕ induction motor.

5. Solve **any two** : **(2×10=20)**

   a) Explain the design procedure of field winding used for alternator.

   b) Explain procedure to draw circle diagram of 3ϕ induction motor.

   c) Derive an expression for armature resistance and leakage reactance of an alternator.

SLR-VB – 414

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 20-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct option : **20**

1) _____ is the process by which goods and services are created.
a) Marketing b) Production c) Advertising d) Selling

2) Planning is _____
a) Measurement and correction of the performance of sub-ordinates
b) Selection from among alternatives of future course of action
c) What is to be done within a time frame
d) Getting things done through others

3) _____ are constructed to discover interests, existing skills and potential for acquiring skills.
a) Proficiency and aptitude test b) Intelligence test
c) Vocational test d) Personality test

4) Improved technology shall bring out _____
a) Increase in cost of production b) Increase in demand
c) Increase in scale of production d) None of above

5) In _____ function of management the actual performance of sub-ordinates is guided towards common goal.
a) Staffing b) Controlling c) Leadership d) Directing

6) Maintenance problems are more prone to decision under _____
a) Certainty b) Risk c) Uncertainty d) Ambiguity

7) A test of sound objective is _____
a) It is too low b) It is complex
c) It is set for long term period d) It is specific

8) Which of the following statement is false ?
a) Objective should be specific
b) Objective must be set interms of performance and results
c) Objectives must always be set by top management
d) Objective from network

P.T.O.

9) A joint stock company consist of more than _____ persons.
   a) 10 b) 20 c) 30 d) No limitations

10) The industries in which investments in plant and machinery does not exceeded Rs. 25 lakhs is called as _____
   a) Cottage industry b) Tiny industry
   c) Small scale industry d) Ancillary unit

11) Objectives should be set by _____
   a) The board of directors
   b) Middle management
   c) Level authorised to initiate and approve of program
   d) Lower management

12) The three dimensions of learning organization are _____
   a) Inputs transformation
   b) Staff, style and skills
   c) Creative tensions, systems thinking and culture facilitations
   d) Open systems, boundaries and closed systems

13) To earn more profit the capital should be _____
   a) Maximised b) Minimised c) Same d) Can't say

14) In _____ concept product enjoy the supreme importance.
   a) Selling b) Marketing c) Advertising d) Distribution

15) Private company can raise capital
   a) By selling share b) By public borrowing
   c) By both above d) By none of above

16) Line organization is _____
   a) Organization run by top management
   b) Organization run by only workers
   c) Both a) and b)
   d) None of above

17) Break even point in units is represented by the equation _____
   a) (Sales revenue - fixed cost)/contribution per unit
   b) Fixed cost/selling price per unit
   c) Fixed cost/variable cost
   d) Fixed cost/contribution per unit

18) Managing is best defined as _____
   a) Decision making
   b) Getting things done through sub-ordinates
   c) Planning
   d) Creating a climate conductive to goal accomplishment

19) Pooled decision making is _____
   a) Taking decision by pooling several problems
   b) Taking decisions by pooling long term impacts
   c) Taking decisions by pooling authority of managers
   d) Taking decisions by pooling up programmed decisions

20) Factors of production are _____
   a) Input and outputs
   b) Output only
   c) Input only
   d) The minimum set of inputs that can produce a certain fixed quantity output

SLR-VB – 414

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 20-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. a) Explain make and buy decisions. **5**
   b) Explain the problems of power sector. **5**

3. Explain in details different types of business organizations. **10**

   OR

   Explain in detail the role of science and technology in the economic development of developing country.

4. Write short notes on **any four** : **(5×4=20)**
   a) Advantages and disadvantages of public company
   b) Value engineering
   c) Five year plan in Indian economy
   d) Break even analysis
   e) Organization structure.

SECTION – II

5. Explain in detail functions of management. **10**

6. Explain definition, types, functions and qualities of entrepreneur. **10**

   OR

   Define company and explain detail procedure of formation of public limited company. **10**

7. Write short notes on **any four** : **(5×4=20)**
   a) Industrial policies for ISI
   b) Industrial safety
   c) Controls of electrical thefts
   d) Project planning tools
   e) Management information system.

Set P

Set P

SLR-VB – 414

Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 20-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct option : **20**

1) Line organization is _____
   a) Organization run by top management
   b) Organization run by only workers
   c) Both a) and b)
   d) None of above

2) Break even point in units is represented by the equation _____
   a) (Sales revenue - fixed cost)/contribution per unit
   b) Fixed cost/selling price per unit
   c) Fixed cost/variable cost
   d) Fixed cost/contribution per unit

3) Managing is best defined as _____
   a) Decision making
   b) Getting things done through sub-ordinates
   c) Planning
   d) Creating a climate conductive to goal accomplishment

4) Pooled decision making is _____
   a) Taking decision by pooling several problems
   b) Taking decisions by pooling long term impacts
   c) Taking decisions by pooling authority of managers
   d) Taking decisions by pooling up programmed decisions

5) Factors of production are _____
   a) Input and outputs
   b) Output only
   c) Input only
   d) The minimum set of inputs that can produce a certain fixed quantity output

6) _____ is the process by which goods and services are created.
   a) Marketing b) Production c) Advertising d) Selling

7) Planning is _____
   a) Measurement and correction of the performance of sub-ordinates
   b) Selection from among alternatives of future course of action
   c) What is to be done within a time frame
   d) Getting things done through others

8) _____ are constructed to discover interests, existing skills and potential for acquiring skills.
   a) Proficiency and aptitude test b) Intelligence test
   c) Vocational test d) Personality test

9) Improved technology shall bring out _____
   a) Increase in cost of production b) Increase in demand
   c) Increase in scale of production d) None of above

10) In _____ function of management the actual performance of sub-ordinates is guided towards common goal.
   a) Staffing b) Controlling c) Leadership d) Directing

11) Maintenance problems are more prone to decision under _____
   a) Certainty b) Risk c) Uncertainty d) Ambiguity

12) A test of sound objective is _____
   a) It is too low b) It is complex
   c) It is set for long term period d) It is specific

13) Which of the following statement is false ?
   a) Objective should be specific
   b) Objective must be set interms of performance and results
   c) Objectives must always be set by top management
   d) Objective from network

14) A joint stock company consist of more than _____ persons.
   a) 10 b) 20 c) 30 d) No limitations

15) The industries in which investments in plant and machinery does not exceeded Rs. 25 lakhs is called as _____
   a) Cottage industry b) Tiny industry
   c) Small scale industry d) Ancillary unit

16) Objectives should be set by _____
   a) The board of directors
   b) Middle management
   c) Level authorised to initiate and approve of program
   d) Lower management

17) The three dimensions of learning organization are _____
   a) Inputs transformation
   b) Staff, style and skills
   c) Creative tensions, systems thinking and culture facilitations
   d) Open systems, boundaries and closed systems

18) To earn more profit the capital should be _____
   a) Maximised b) Minimised c) Same d) Can't say

19) In _____ concept product enjoy the supreme importance.
   a) Selling b) Marketing c) Advertising d) Distribution

20) Private company can raise capital
   a) By selling share b) By public borrowing
   c) By both above d) By none of above

_____

SLR-VB – 414

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 20-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. a) Explain make and buy decisions. **5**
   b) Explain the problems of power sector. **5**

3. Explain in details different types of business organizations. **10**

   OR

   Explain in detail the role of science and technology in the economic development of developing country.

4. Write short notes on **any four** : **(5×4=20)**
   a) Advantages and disadvantages of public company
   b) Value engineering
   c) Five year plan in Indian economy
   d) Break even analysis
   e) Organization structure.

SECTION – II

5. Explain in detail functions of management. **10**

6. Explain definition, types, functions and qualities of entrepreneur. **10**

   OR

   Define company and explain detail procedure of formation of public limited company. **10**

7. Write short notes on **any four** : **(5×4=20)**
   a) Industrial policies for ISI
   b) Industrial safety
   c) Controls of electrical thefts
   d) Project planning tools
   e) Management information system.

Set Q

Set Q

SLR-VB – 414

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 20-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct option : **20**

1) Objectives should be set by _____
   a) The board of directors
   b) Middle management
   c) Level authorised to initiate and approve of program
   d) Lower management

2) The three dimensions of learning organization are _____
   a) Inputs transformation
   b) Staff, style and skills
   c) Creative tensions, systems thinking and culture facilitations
   d) Open systems, boundaries and closed systems

3) To earn more profit the capital should be _____
   a) Maximised b) Minimised c) Same d) Can't say

4) In _____ concept product enjoy the supreme importance.
   a) Selling b) Marketing c) Advertising d) Distribution

5) Private company can raise capital
   a) By selling share b) By public borrowing
   c) By both above d) By none of above

6) Line organization is _____
   a) Organization run by top management
   b) Organization run by only workers
   c) Both a) and b)
   d) None of above

7) Break even point in units is represented by the equation _____
   a) (Sales revenue - fixed cost)/contribution per unit
   b) Fixed cost/selling price per unit
   c) Fixed cost/variable cost
   d) Fixed cost/contribution per unit

P.T.O.

8) Managing is best defined as _____
   a) Decision making
   b) Getting things done through sub-ordinates
   c) Planning
   d) Creating a climate conductive to goal accomplishment

9) Pooled decision making is _____
   a) Taking decision by pooling several problems
   b) Taking decisions by pooling long term impacts
   c) Taking decisions by pooling authority of managers
   d) Taking decisions by pooling up programmed decisions

10) Factors of production are _____
   a) Input and outputs
   b) Output only
   c) Input only
   d) The minimum set of inputs that can produce a certain fixed quantity output

11) _____ is the process by which goods and services are created.
   a) Marketing b) Production c) Advertising d) Selling

12) Planning is _____
   a) Measurement and correction of the performance of sub-ordinates
   b) Selection from among alternatives of future course of action
   c) What is to be done within a time frame
   d) Getting things done through others

13) _____ are constructed to discover interests, existing skills and potential for acquiring skills.
   a) Proficiency and aptitude test b) Intelligence test
   c) Vocational test d) Personality test

14) Improved technology shall bring out _____
   a) Increase in cost of production b) Increase in demand
   c) Increase in scale of production d) None of above

15) In _____ function of management the actual performance of sub-ordinates is guided towards common goal.
   a) Staffing b) Controlling c) Leadership d) Directing

16) Maintenance problems are more prone to decision under _____
   a) Certainty b) Risk c) Uncertainty d) Ambiguity

17) A test of sound objective is _____
   a) It is too low b) It is complex
   c) It is set for long term period d) It is specific

18) Which of the following statement is false ?
   a) Objective should be specific
   b) Objective must be set interms of performance and results
   c) Objectives must always be set by top management
   d) Objective from network

19) A joint stock company consist of more than _____ persons.
   a) 10 b) 20 c) 30 d) No limitations

20) The industries in which investments in plant and machinery does not exceeded Rs. 25 lakhs is called as _____
   a) Cottage industry b) Tiny industry
   c) Small scale industry d) Ancillary unit

_____

SLR-VB – 414

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 20-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. a) Explain make and buy decisions. **5**
   b) Explain the problems of power sector. **5**

3. Explain in details different types of business organizations. **10**

   OR

   Explain in detail the role of science and technology in the economic development of developing country.

4. Write short notes on **any four** : **(5×4=20)**
   a) Advantages and disadvantages of public company
   b) Value engineering
   c) Five year plan in Indian economy
   d) Break even analysis
   e) Organization structure.

SECTION – II

5. Explain in detail functions of management. **10**

6. Explain definition, types, functions and qualities of entrepreneur. **10**

   OR

   Define company and explain detail procedure of formation of public limited company. **10**

7. Write short notes on **any four** : **(5×4=20)**
   a) Industrial policies for ISI
   b) Industrial safety
   c) Controls of electrical thefts
   d) Project planning tools
   e) Management information system.

Set R

Set R

SLR-VB – 414

Seat No.	

Set **S**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 20-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct option : **20**

1) Maintenance problems are more prone to decision under _____
a) Certainty b) Risk c) Uncertainty d) Ambiguity

2) A test of sound objective is _____
a) It is too low b) It is complex
c) It is set for long term period d) It is specific

3) Which of the following statement is false ?
a) Objective should be specific
b) Objective must be set interms of performance and results
c) Objectives must always be set by top management
d) Objective from network

4) A joint stock company consist of more than _____ persons.
a) 10 b) 20 c) 30 d) No limitations

5) The industries in which investments in plant and machinery does not exceeded Rs. 25 lakhs is called as _____
a) Cottage industry b) Tiny industry
c) Small scale industry d) Ancillary unit

6) Objectives should be set by _____
a) The board of directors
b) Middle management
c) Level authorised to initiate and approve of program
d) Lower management

7) The three dimensions of learning organization are _____
a) Inputs transformation
b) Staff, style and skills
c) Creative tensions, systems thinking and culture facilitations
d) Open systems, boundaries and closed systems

8) To earn more profit the capital should be _____
a) Maximised b) Minimised c) Same d) Can't say

P.T.O.

9) In _____ concept product enjoy the supreme importance.
   a) Selling b) Marketing c) Advertising d) Distribution

10) Private company can raise capital
   a) By selling share b) By public borrowing
   c) By both above d) By none of above

11) Line organization is _____
   a) Organization run by top management
   b) Organization run by only workers
   c) Both a) and b)
   d) None of above

12) Break even point in units is represented by the equation _____
   a) (Sales revenue - fixed cost)/contribution per unit
   b) Fixed cost/selling price per unit
   c) Fixed cost/variable cost
   d) Fixed cost/contribution per unit

13) Managing is best defined as _____
   a) Decision making
   b) Getting things done through sub-ordinates
   c) Planning
   d) Creating a climate conductive to goal accomplishment

14) Pooled decision making is _____
   a) Taking decision by pooling several problems
   b) Taking decisions by pooling long term impacts
   c) Taking decisions by pooling authority of managers
   d) Taking decisions by pooling up programmed decisions

15) Factors of production are _____
   a) Input and outputs
   b) Output only
   c) Input only
   d) The minimum set of inputs that can produce a certain fixed quantity output

16) _____ is the process by which goods and services are created.
   a) Marketing b) Production c) Advertising d) Selling

17) Planning is _____
   a) Measurement and correction of the performance of sub-ordinates
   b) Selection from among alternatives of future course of action
   c) What is to be done within a time frame
   d) Getting things done through others

18) _____ are constructed to discover interests, existing skills and potential for acquiring skills.
   a) Proficiency and aptitude test b) Intelligence test
   c) Vocational test d) Personality test

19) Improved technology shall bring out _____
   a) Increase in cost of production b) Increase in demand
   c) Increase in scale of production d) None of above

20) In _____ function of management the actual performance of sub-ordinates is guided towards common goal.
   a) Staffing b) Controlling c) Leadership d) Directing

_____

SLR-VB – 414

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 20-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. a) Explain make and buy decisions. **5**
   b) Explain the problems of power sector. **5**

3. Explain in details different types of business organizations. **10**

   OR

   Explain in detail the role of science and technology in the economic development of developing country.

4. Write short notes on **any four** : **(5×4=20)**
   a) Advantages and disadvantages of public company
   b) Value engineering
   c) Five year plan in Indian economy
   d) Break even analysis
   e) Organization structure.

SECTION – II

5. Explain in detail functions of management. **10**

6. Explain definition, types, functions and qualities of entrepreneur. **10**

   OR

   Define company and explain detail procedure of formation of public limited company. **10**

7. Write short notes on **any four** : **(5×4=20)**
   a) Industrial policies for ISI
   b) Industrial safety
   c) Controls of electrical thefts
   d) Project planning tools
   e) Management information system.

Set S

Set S

SLR-VB – 416

Seat No.	

Set **P**

B.E. (Part – II) (Electrical & Electronics) Examination, 2017
ENERGY CONSERVATION AND AUDITING (Elective – II)

Day and Date : Tuesday, 23-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) 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

2) 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

3) 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

4) The major source of electrical power generation in India is
   a) Thermal b) Hydel c) Nuclear d) Wind

5) 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

6) The proposed international standard for energy management is
   a) ISO 9001 b) ISO 14000 c) ISO 14001 d) ISO 5001

7) Energy intensity is the ratio of
   a) Fuel consumption / GDP b) GDP/Fuel consumption
   c) GDP/Energy consumption d) Energy consumption/GDP

8) 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

9) One unit of electricity is equivalent to _____ Kcal heat units.
   a) 800 b) 860 c) 400 d) 680

P.T.O.

10) 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

11) The country that accounts for nearly 25% of world energy consumption
   a) USA b) Russia c) India d) China

12) In a CUSUM chart, if the graph is horizontal for two consecutive periods then
   a) Actual calculated energy consumption are the same
   b) Actual calculated energy consumption is reduced
   c) Specific energy consumption is the same
   d) Each one of the above may be true

13) The objective of energy management includes
   a) Minimizing energy costs b) Minimizing waste
   c) Minimizing environmental degradation d) All of above

14) The contribution of nuclear energy to the overall installed electrical capacity in India is
   a) 24.2% b) 65.7% c) 17.4% d) 2.9%

15) The Net Present Value (NPV) is
   a) Equal to the sum of the present values of all cash flows
   b) Equal to the sum of returns
   c) Equal to sum of all cash flows
   d) None of these

16) Star rating is part of
   a) DSM b) BLY c) S&L d) None of the above

17) In a PERT network the critical path is the
   a) Longest path b) Shortest path
   c) Paths of critical importance d) Paths from start to finish

18) Energy monitoring and targeting is built on the principle of
   a) "Production can be reduced to achieve reduced energy consumption"
   b) "Consumption of energy is proportional to production rate"
   c) "You cannot manage what you do not measure"
   d) None of the above

19) One tone of oil equivalent is
   a) 10,000 Kcal b) 1,000 Kcal c) 1,000 kg of oil d) 10,000 Mkcal

20) The simplest technique for scheduling of tasks and tracking the progress is
   a) Gantt chart b) CPM c) PERT d) WBS

_____

SLR-VB – 416

Seat No.	

B.E. (Part – II) (Electrical & Electronics) Examination, 2017
ENERGY CONSERVATION AND AUDITING (Elective – II)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

1) What is the difference between primary and secondary energy ? Give examples.

2) Explain the difference between standards and labeling.

3) List the five forms of energy with examples.

4) Explain the major difference between preliminary energy audit and detailed energy audit.

5) Define energy management, list its objectives.

3. Solve **any two** : **(2×10=20)**

1) Explain the difference between energy conservation and energy efficiency with suitable examples.

2) Explain the following :

a) Production factor.

b) Reference year equivalent.

c) Plant energy performance.

3) List ten strategic measures for meeting the future energy requirements in India.

SECTION – II

4. Solve **any four** : **(4×5=20)**

1) List the duties and responsibilities of an energy manager.

2) What are the limitations of payback period ? Explain briefly.

3) What is the importance of slack time in project network ?

4) What do you understand by energy monitoring and targeting ?

5) Explain the steps involved in project development cycle.

5. Solve **any two** : **(2×10=20)**

1) Explain ways by which employees can be motivated on energy management.

2) Explain the following :

a) Fixed fee contract.

b) Guaranteed saving performance contract.

c) Shared saving performance contract.

3) What is CUSUM chart ? List the steps involved in CUSUM analysis.

SLR-VB – 416

Seat No.	

Set **Q**

B.E. (Part – II) (Electrical & Electronics) Examination, 2017
ENERGY CONSERVATION AND AUDITING (Elective – II)

Day and Date : Tuesday, 23-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) Star rating is part of
a) DSM b) BLY c) S&L d) None of the above

2) In a PERT network the critical path is the
a) Longest path b) Shortest path
c) Paths of critical importance d) Paths from start to finish

3) Energy monitoring and targeting is built on the principle of
a) "Production can be reduced to achieve reduced energy consumption"
b) "Consumption of energy is proportional to production rate"
c) "You cannot manage what you do not measure"
d) None of the above

4) One tone of oil equivalent is
a) 10,000 Kcal b) 1,000 Kcal c) 1,000 kg of oil d) 10,000 Mkcal

5) The simplest technique for scheduling of tasks and tracking the progress is
a) Gantt chart b) CPM c) PERT d) WBS

6) 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

7) 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

8) 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

9) The major source of electrical power generation in India is
a) Thermal b) Hydel c) Nuclear d) Wind

P.T.O.

10) 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

11) The proposed international standard for energy management is
   a) ISO 9001 b) ISO 14000 c) ISO 14001 d) ISO 5001

12) Energy intensity is the ratio of
   a) Fuel consumption / GDP b) GDP/Fuel consumption
   c) GDP/Energy consumption d) Energy consumption/GDP

13) 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

14) One unit of electricity is equivalent to _____ Kcal heat units.
   a) 800 b) 860 c) 400 d) 680

15) 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

16) The country that accounts for nearly 25% of world energy consumption
   a) USA b) Russia c) India d) China

17) In a CUSUM chart, if the graph is horizontal for two consecutive periods then
   a) Actual calculated energy consumption are the same
   b) Actual calculated energy consumption is reduced
   c) Specific energy consumption is the same
   d) Each one of the above may be true

18) The objective of energy management includes
   a) Minimizing energy costs b) Minimizing waste
   c) Minimizing environmental degradation d) All of above

19) The contribution of nuclear energy to the overall installed electrical capacity in India is
   a) 24.2% b) 65.7% c) 17.4% d) 2.9%

20) The Net Present Value (NPV) is
   a) Equal to the sum of the present values of all cash flows
   b) Equal to the sum of returns
   c) Equal to sum of all cash flows
   d) None of these

_____

SLR-VB – 416

Seat No.	

B.E. (Part – II) (Electrical & Electronics) Examination, 2017
ENERGY CONSERVATION AND AUDITING (Elective – II)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

1) What is the difference between primary and secondary energy ? Give examples.

2) Explain the difference between standards and labeling.

3) List the five forms of energy with examples.

4) Explain the major difference between preliminary energy audit and detailed energy audit.

5) Define energy management, list its objectives.

3. Solve **any two** : **(2×10=20)**

1) Explain the difference between energy conservation and energy efficiency with suitable examples.

2) Explain the following :

a) Production factor.

b) Reference year equivalent.

c) Plant energy performance.

3) List ten strategic measures for meeting the future energy requirements in India.

SECTION – II

4. Solve **any four** : **(4×5=20)**

1) List the duties and responsibilities of an energy manager.

2) What are the limitations of payback period ? Explain briefly.

3) What is the importance of slack time in project network ?

4) What do you understand by energy monitoring and targeting ?

5) Explain the steps involved in project development cycle.

5. Solve **any two** : **(2×10=20)**

1) Explain ways by which employees can be motivated on energy management.

2) Explain the following :

a) Fixed fee contract.

b) Guaranteed saving performance contract.

c) Shared saving performance contract.

3) What is CUSUM chart ? List the steps involved in CUSUM analysis.

SLR-VB – 416

Seat No.	

Set R

B.E. (Part – II) (Electrical & Electronics) Examination, 2017
ENERGY CONSERVATION AND AUDITING (Elective – II)

Day and Date : Tuesday, 23-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The country that accounts for nearly 25% of world energy consumption
   a) USA b) Russia c) India d) China

2) In a CUSUM chart, if the graph is horizontal for two consecutive periods then
   a) Actual calculated energy consumption are the same
   b) Actual calculated energy consumption is reduced
   c) Specific energy consumption is the same
   d) Each one of the above may be true

3) The objective of energy management includes
   a) Minimizing energy costs b) Minimizing waste
   c) Minimizing environmental degradation d) All of above

4) The contribution of nuclear energy to the overall installed electrical capacity in India is
   a) 24.2% b) 65.7% c) 17.4% d) 2.9%

5) The Net Present Value (NPV) is
   a) Equal to the sum of the present values of all cash flows
   b) Equal to the sum of returns
   c) Equal to sum of all cash flows
   d) None of these

6) Star rating is part of
   a) DSM b) BLY c) S&L d) None of the above

7) In a PERT network the critical path is the
   a) Longest path b) Shortest path
   c) Paths of critical importance d) Paths from start to finish

P.T.O.

8) Energy monitoring and targeting is built on the principle of
   a) "Production can be reduced to achieve reduced energy consumption"
   b) "Consumption of energy is proportional to production rate"
   c) "You cannot manage what you do not measure"
   d) None of the above

9) One tone of oil equivalent is
   a) 10,000 Kcal b) 1,000 Kcal c) 1,000 kg of oil d) 10,000 Mkcal

10) The simplest technique for scheduling of tasks and tracking the progress is
   a) Gantt chart b) CPM c) PERT d) WBS

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

15) 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

16) The proposed international standard for energy management is
   a) ISO 9001 b) ISO 14000 c) ISO 14001 d) ISO 5001

17) Energy intensity is the ratio of
   a) Fuel consumption / GDP b) GDP/Fuel consumption
   c) GDP/Energy consumption d) Energy consumption/GDP

18) 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

19) One unit of electricity is equivalent to _____ Kcal heat units.
   a) 800 b) 860 c) 400 d) 680

20) 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-VB – 416

Seat No.	

B.E. (Part – II) (Electrical & Electronics) Examination, 2017
ENERGY CONSERVATION AND AUDITING (Elective – II)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

   1) What is the difference between primary and secondary energy ? Give examples.

   2) Explain the difference between standards and labeling.

   3) List the five forms of energy with examples.

   4) Explain the major difference between preliminary energy audit and detailed energy audit.

   5) Define energy management, list its objectives.

3. Solve **any two** : **(2×10=20)**

   1) Explain the difference between energy conservation and energy efficiency with suitable examples.

   2) Explain the following :

      a) Production factor.

      b) Reference year equivalent.

      c) Plant energy performance.

   3) List ten strategic measures for meeting the future energy requirements in India.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   1) List the duties and responsibilities of an energy manager.

   2) What are the limitations of payback period ? Explain briefly.

3) What is the importance of slack time in project network ?

4) What do you understand by energy monitoring and targeting ?

5) Explain the steps involved in project development cycle.

5. Solve **any two** : **(2×10=20)**

1) Explain ways by which employees can be motivated on energy management.

2) Explain the following :

a) Fixed fee contract.

b) Guaranteed saving performance contract.

c) Shared saving performance contract.

3) What is CUSUM chart ? List the steps involved in CUSUM analysis.

SLR-VB – 416

Seat No.	

Set S

B.E. (Part – II) (Electrical & Electronics) Examination, 2017
ENERGY CONSERVATION AND AUDITING (Elective – II)

Day and Date : Tuesday, 23-5-2017 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The proposed international standard for energy management is
a) ISO 9001 b) ISO 14000 c) ISO 14001 d) ISO 5001

2) Energy intensity is the ratio of
a) Fuel consumption / GDP b) GDP/Fuel consumption
c) GDP/Energy consumption d) Energy consumption/GDP

3) 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

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) The country that accounts for nearly 25% of world energy consumption
a) USA b) Russia c) India d) China

7) In a CUSUM chart, if the graph is horizontal for two consecutive periods then
a) Actual calculated energy consumption are the same
b) Actual calculated energy consumption is reduced
c) Specific energy consumption is the same
d) Each one of the above may be true

8) The objective of energy management includes
a) Minimizing energy costs b) Minimizing waste
c) Minimizing environmental degradation d) All of above

P.T.O.

9) The contribution of nuclear energy to the overall installed electrical capacity in India is
   a) 24.2% b) 65.7% c) 17.4% d) 2.9%

10) The Net Present Value (NPV) is
   a) Equal to the sum of the present values of all cash flows
   b) Equal to the sum of returns
   c) Equal to sum of all cash flows
   d) None of these

11) Star rating is part of
   a) DSM b) BLY c) S&L d) None of the above

12) In a PERT network the critical path is the
   a) Longest path b) Shortest path
   c) Paths of critical importance d) Paths from start to finish

13) Energy monitoring and targeting is built on the principle of
   a) "Production can be reduced to achieve reduced energy consumption"
   b) "Consumption of energy is proportional to production rate"
   c) "You cannot manage what you do not measure"
   d) None of the above

14) One tone of oil equivalent is
   a) 10,000 Kcal b) 1,000 Kcal c) 1,000 kg of oil d) 10,000 Mkcal

15) The simplest technique for scheduling of tasks and tracking the progress is
   a) Gantt chart b) CPM c) PERT d) WBS

16) 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

17) 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

18) 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

19) The major source of electrical power generation in India is
   a) Thermal b) Hydel c) Nuclear d) Wind

20) 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

SLR-VB – 416

Seat No.	

B.E. (Part – II) (Electrical & Electronics) Examination, 2017
ENERGY CONSERVATION AND AUDITING (Elective – II)

Day and Date : Tuesday, 23-5-2017 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

1) What is the difference between primary and secondary energy ? Give examples.

2) Explain the difference between standards and labeling.

3) List the five forms of energy with examples.

4) Explain the major difference between preliminary energy audit and detailed energy audit.

5) Define energy management, list its objectives.

3. Solve **any two** : **(2×10=20)**

1) Explain the difference between energy conservation and energy efficiency with suitable examples.

2) Explain the following :

a) Production factor.

b) Reference year equivalent.

c) Plant energy performance.

3) List ten strategic measures for meeting the future energy requirements in India.

SECTION – II

4. Solve **any four** : **(4×5=20)**

1) List the duties and responsibilities of an energy manager.

2) What are the limitations of payback period ? Explain briefly.

3) What is the importance of slack time in project network ?

4) What do you understand by energy monitoring and targeting ?

5) Explain the steps involved in project development cycle.

5. Solve **any two** : **(2×10=20)**

1) Explain ways by which employees can be motivated on energy management.

2) Explain the following :

a) Fixed fee contract.

b) Guaranteed saving performance contract.

c) Shared saving performance contract.

3) What is CUSUM chart ? List the steps involved in CUSUM analysis.

SLR-VB – 421

Seat No.	

Set P

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
HVDC (Old)

Day and Date : Monday, 29-5-2017 Total Marks : 100
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 : 20

1. Choose the correct options : **(20×1=20)**
   1) 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 the above
   2) CCC stands for
      a) Capacitor Compressed Converter b) Capacitor Commutator Converter
      c) Capacitor Commutated Converter d) None of the above
   3) Harmonic instability problem particularly with low short circuit ratios, is the drawback of
      a) IPC scheme b) EPC scheme
      c) Current controller d) Current extinguish angle controller
   4) Under unbalanced voltage conditions, EPC results in
      a) More DC voltage b) Less DC voltage
      c) Moderate DC voltage d) None of the 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) Arc-back is a _____ fault and results in severe stress on transformer winding.
      a) Self clearing b) Non-self clearing
      c) Commutation failure d) Both (a) and (b)

P.T.O.

7) Misfire occurs
   a) The presence of an unwanted signals
   b) Because of duplicated converter controls
   c) The required gate pulse is missing
   d) Both (a) and (b)
8) HVDC transmission lines are more economical for
   a) Short distance transmission b) Interconnected system
   c) Long distance transmission d) Both (a) and (b)
9) The first commercially used HVDC link was built in
   a) 2006 b) 1954 c) 1986 d) yet to be built
10) A back to back HVDC link can be advantageous compared to AC primarily because
   a) It is cheaper b) Of stability considerations
   c) Of controlled power glow d) None of these
11) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 90°
12) 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 the above
13) The HVDC converter
   a) Does not consume reactive power
   b) Consumes as much reactive power as real power
   c) Consumes 50% of the real power
   d) All of the above
14) Normal value of break even distance in dc transmission is around
   a) 70 km b) 700 km c) 7000 km d) any distance
15) 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
16) Tuned filters are used to filter out
   a) Characteristic harmonics b) Non-characteristic harmonics
   c) Both (a) and (b) d) Transients only
17) Passive filters acts as source of
   a) Active power b) Reactive power
   c) Apparent power d) Only (a) and (c)
18) Protection of MTDC system can be done by
   a) High speed disconnecting switches b) Fast current control
   c) Differential type protection d) All of the above
19) The bypassing of the bridge can be done with the help of
   a) Replacing a single valve in the arm
   b) Replacing both valve in same arm
   c) Activating a bypass pair in the bridge
   d) Deactivating same arm from converter set
20) _____ is a non-self clearing fault.
   a) Commutation failure b) Arc-through
   c) Arc-back d) Misfire

SLR-VB – 421

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
HVDC (Old)

Day and Date : Monday, 29-5-2017 Marks : 80
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** : **(5×4=20)**

1) Explain limitations of HVDC transmission over EHVAC.

2) Explain the EPC scheme of firing angle generation.

3) Explain starting and stopping of valves in converter stations.

4) Write a short note on arc-through and misfire.

5) Explain with neat diagram the different types of DC links.

6) Define pulse number and explain valve utilization factor.

3. Solve **any two** : **(10×2=20)**

1) Find the expression of DC output for 6 pulse converter in HVDC system considering overlap angle more than 60°.

2) Explain causes of over-current and protection against them.

3) Give detailed comparison between HVDC and AC transmission.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain the reactive power balance in HVDC substations.
   2) Explain the TCR with VI characteristics.
   3) Explain the potential applications of MTDC systems.
   4) Explain static VAR systems.
   5) Explain DC filters with neat diagram.
   6) Explain different causes of harmonics.

5. Solve **any two** : **(10×2=20)**
   1) Define the non-characteristics harmonics and derive the expression for it.
   2) State and explain the design of active and passive filters.
   3) Explain the following current control methods of MTDC system :
      i) Current margin method.
      ii) Two ACR method.

SLR-VB – 421

Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
HVDC (Old)

Day and Date : Monday, 29-5-2017 Total Marks : 100
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 : 20

1. Choose the correct options : **(20×1=20)**
   1) Tuned filters are used to filter out
      a) Characteristic harmonics b) Non-characteristic harmonics
      c) Both (a) and (b) d) Transients only
   2) Passive filters acts as source of
      a) Active power b) Reactive power
      c) Apparent power d) Only (a) and (c)
   3) Protection of MTDC system can be done by
      a) High speed disconnecting switches b) Fast current control
      c) Differential type protection d) All of the above
   4) The bypassing of the bridge can be done with the help of
      a) Replacing a single valve in the arm
      b) Replacing both valve in same arm
      c) Activating a bypass pair in the bridge
      d) Deactivating same arm from converter set
   5) _____ is a non-self clearing fault.
      a) Commutation failure b) Arc-through
      c) Arc-back d) Misfire
   6) 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 the above

7) CCC stands for
   a) Capacitor Compressed Converter b) Capacitor Commutator Converter
   c) Capacitor Commutated Converter d) None of the above
8) Harmonic instability problem particularly with low short circuit ratios, is the drawback of
   a) IPC scheme b) EPC scheme
   c) Current controller d) Current extinguish angle controller
9) Under unbalanced voltage conditions, EPC results in
   a) More DC voltage b) Less DC voltage
   c) Moderate DC voltage d) None of the 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) Arc-back is a _____ fault and results in severe stress on transformer winding.
   a) Self clearing b) Non-self clearing
   c) Commutation failure d) Both (a) and (b)
12) Misfire occurs
   a) The presence of an unwanted signals
   b) Because of duplicated converter controls
   c) The required gate pulse is missing
   d) Both (a) and (b)
13) HVDC transmission lines are more economical for
   a) Short distance transmission b) Interconnected system
   c) Long distance transmission d) Both (a) and (b)
14) The first commercially used HVDC link was built in
   a) 2006 b) 1954 c) 1986 d) yet to be built
15) A back to back HVDC link can be advantageous compared to AC primarily because
   a) It is cheaper b) Of stability considerations
   c) Of controlled power glow d) None of these
16) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 90°
17) 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 the above
18) The HVDC converter
   a) Does not consume reactive power
   b) Consumes as much reactive power as real power
   c) Consumes 50% of the real power
   d) All of the above
19) Normal value of break even distance in dc transmission is around
   a) 70 km b) 700 km c) 7000 km d) any distance
20) 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

_____

SLR-VB – 421

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
HVDC (Old)

Day and Date : Monday, 29-5-2017 Marks : 80
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** : **(5×4=20)**

1) Explain limitations of HVDC transmission over EHVAC.

2) Explain the EPC scheme of firing angle generation.

3) Explain starting and stopping of valves in converter stations.

4) Write a short note on arc-through and misfire.

5) Explain with neat diagram the different types of DC links.

6) Define pulse number and explain valve utilization factor.

3. Solve **any two** : **(10×2=20)**

1) Find the expression of DC output for 6 pulse converter in HVDC system considering overlap angle more than 60°.

2) Explain causes of over-current and protection against them.

3) Give detailed comparison between HVDC and AC transmission.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain the reactive power balance in HVDC substations.
   2) Explain the TCR with VI characteristics.
   3) Explain the potential applications of MTDC systems.
   4) Explain static VAR systems.
   5) Explain DC filters with neat diagram.
   6) Explain different causes of harmonics.

5. Solve **any two** : **(10×2=20)**
   1) Define the non-characteristics harmonics and derive the expression for it.
   2) State and explain the design of active and passive filters.
   3) Explain the following current control methods of MTDC system :
      i) Current margin method.
      ii) Two ACR method.

SLR-VB – 421

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
HVDC (Old)

Day and Date : Monday, 29-5-2017 Total Marks : 100
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 : 20

1. Choose the correct options : **(20×1=20)**
   1) In HVDC transmission system, rectifier firing angle a is kept near
      a) 0° b) 15° c) 30° d) 90°
   2) 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 the above
   3) The HVDC converter
      a) Does not consume reactive power
      b) Consumes as much reactive power as real power
      c) Consumes 50% of the real power
      d) All of the above
   4) Normal value of break even distance in dc transmission is around
      a) 70 km b) 700 km c) 7000 km d) any distance
   5) As compared to HVAC line, the corona and radio interference on a HVDC line are
      a) Lower b) More c) The same d) All of the above
   6) Tuned filters are used to filter out
      a) Characteristic harmonics b) Non-characteristic harmonics
      c) Both (a) and (b) d) Transients only
   7) Passive filters acts as source of
      a) Active power b) Reactive power
      c) Apparent power d) Only (a) and (c)
   8) Protection of MTDC system can be done by
      a) High speed disconnecting switches b) Fast current control
      c) Differential type protection d) All of the above

P.T.O.

9) The bypassing of the bridge can be done with the help of
   a) Replacing a single valve in the arm
   b) Replacing both valve in same arm
   c) Activating a bypass pair in the bridge
   d) Deactivating same arm from converter set

10) _____ is a non-self clearing fault.
   a) Commutation failure b) Arc-through
   c) Arc-back d) Misfire

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 the above

12) CCC stands for
   a) Capacitor Compressed Converter b) Capacitor Commutator Converter
   c) Capacitor Commutated Converter d) None of the above

13) Harmonic instability problem particularly with low short circuit ratios, is the drawback of
   a) IPC scheme b) EPC scheme
   c) Current controller d) Current extinguish angle controller

14) Under unbalanced voltage conditions, EPC results in
   a) More DC voltage b) Less DC voltage
   c) Moderate DC voltage d) None of the above

15) A commutation group is defined as, group of valves in which only _____ valves conducts.
   a) One b) Two c) Three d) Four

16) Arc-back is a _____ fault and results in severe stress on transformer winding.
   a) Self clearing b) Non-self clearing
   c) Commutation failure d) Both (a) and (b)

17) Misfire occurs
   a) The presence of an unwanted signals
   b) Because of duplicated converter controls
   c) The required gate pulse is missing
   d) Both (a) and (b)

18) HVDC transmission lines are more economical for
   a) Short distance transmission b) Interconnected system
   c) Long distance transmission d) Both (a) and (b)

19) The first commercially used HVDC link was built in
   a) 2006 b) 1954 c) 1986 d) yet to be built

20) A back to back HVDC link can be advantageous compared to AC primarily because
   a) It is cheaper b) Of stability considerations
   c) Of controlled power glow d) None of these

_____

SLR-VB – 421

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
HVDC (Old)

Day and Date : Monday, 29-5-2017 Marks : 80
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** : **(5×4=20)**

1) Explain limitations of HVDC transmission over EHVAC.

2) Explain the EPC scheme of firing angle generation.

3) Explain starting and stopping of valves in converter stations.

4) Write a short note on arc-through and misfire.

5) Explain with neat diagram the different types of DC links.

6) Define pulse number and explain valve utilization factor.

3. Solve **any two** : **(10×2=20)**

1) Find the expression of DC output for 6 pulse converter in HVDC system considering overlap angle more than 60°.

2) Explain causes of over-current and protection against them.

3) Give detailed comparison between HVDC and AC transmission.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   1) Explain the reactive power balance in HVDC substations.
   2) Explain the TCR with VI characteristics.
   3) Explain the potential applications of MTDC systems.
   4) Explain static VAR systems.
   5) Explain DC filters with neat diagram.
   6) Explain different causes of harmonics.

5. Solve **any two** : **(10×2=20)**

   1) Define the non-characteristics harmonics and derive the expression for it.
   2) State and explain the design of active and passive filters.
   3) Explain the following current control methods of MTDC system :
      i) Current margin method.
      ii) Two ACR method.

SLR-VB – 421

Seat No.	

Set S

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
HVDC (Old)

Day and Date : Monday, 29-5-2017 Total Marks : 100
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 : 20

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

1) Arc-back is a _____ fault and results in severe stress on transformer winding.
   a) Self clearing b) Non-self clearing
   c) Commutation failure d) Both (a) and (b)

2) Misfire occurs
   a) The presence of an unwanted signals
   b) Because of duplicated converter controls
   c) The required gate pulse is missing
   d) Both (a) and (b)

3) HVDC transmission lines are more economical for
   a) Short distance transmission b) Interconnected system
   c) Long distance transmission d) Both (a) and (b)

4) The first commercially used HVDC link was built in
   a) 2006 b) 1954 c) 1986 d) yet to be built

5) A back to back HVDC link can be advantageous compared to AC primarily because
   a) It is cheaper b) Of stability considerations
   c) Of controlled power glow d) None of these

6) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 90°

7) 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 the above

P.T.O.

8) The HVDC converter
   a) Does not consume reactive power
   b) Consumes as much reactive power as real power
   c) Consumes 50% of the real power
   d) All of the above
9) Normal value of break even distance in dc transmission is around
   a) 70 km b) 700 km c) 7000 km d) any distance
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) Tuned filters are used to filter out
   a) Characteristic harmonics b) Non-characteristic harmonics
   c) Both (a) and (b) d) Transients only
12) Passive filters acts as source of
   a) Active power b) Reactive power
   c) Apparent power d) Only (a) and (c)
13) Protection of MTDC system can be done by
   a) High speed disconnecting switches b) Fast current control
   c) Differential type protection d) All of the above
14) The bypassing of the bridge can be done with the help of
   a) Replacing a single valve in the arm
   b) Replacing both valve in same arm
   c) Activating a bypass pair in the bridge
   d) Deactivating same arm from converter set
15) _____ is a non-self clearing fault.
   a) Commutation failure b) Arc-through
   c) Arc-back d) Misfire
16) 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 the above
17) CCC stands for
   a) Capacitor Compressed Converter b) Capacitor Commutator Converter
   c) Capacitor Commutated Converter d) None of the above
18) Harmonic instability problem particularly with low short circuit ratios, is the drawback of
   a) IPC scheme b) EPC scheme
   c) Current controller d) Current extinguish angle controller
19) Under unbalanced voltage conditions, EPC results in
   a) More DC voltage b) Less DC voltage
   c) Moderate DC voltage d) None of the above
20) A commutation group is defined as, group of valves in which only _____ valves conducts.
   a) One b) Two c) Three d) Four

_____

SLR-VB – 421

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2017
HVDC (Old)

Day and Date : Monday, 29-5-2017 Marks : 80
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** : **(5×4=20)**

1) Explain limitations of HVDC transmission over EHVAC.

2) Explain the EPC scheme of firing angle generation.

3) Explain starting and stopping of valves in converter stations.

4) Write a short note on arc-through and misfire.

5) Explain with neat diagram the different types of DC links.

6) Define pulse number and explain valve utilization factor.

3. Solve **any two** : **(10×2=20)**

1) Find the expression of DC output for 6 pulse converter in HVDC system considering overlap angle more than 60°.

2) Explain causes of over-current and protection against them.

3) Give detailed comparison between HVDC and AC transmission.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   1) Explain the reactive power balance in HVDC substations.
   2) Explain the TCR with VI characteristics.
   3) Explain the potential applications of MTDC systems.
   4) Explain static VAR systems.
   5) Explain DC filters with neat diagram.
   6) Explain different causes of harmonics.

5. Solve **any two** : **(10×2=20)**

   1) Define the non-characteristics harmonics and derive the expression for it.
   2) State and explain the design of active and passive filters.
   3) Explain the following current control methods of MTDC system :
      i) Current margin method.
      ii) Two ACR method.
