SLR-EP – 319

Seat No.	

Set **P**

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 13-12-2016 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 ***right*** *indicate* ***full*** *marks.*
4) ***Use*** *of calculator is* ***allowed****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) $\frac{1}{D^2 + a^2}$ cosax is equal to

a) $\frac{x}{2a}$ cosax b) $\frac{x}{2a}$ sinax

c) $\frac{x}{2a^2}$ cosax d) $\frac{x}{2a^2}$ sinax

2) The complete solution of $(D^3 + 2D^2 + D)\, y = 0$ is

a) $y = c_1 + c_2\, e^{-x}$ b) $y = c_1 + (c_2 + c_3 x)\, e^{-x}$

c) $y = c_1 + c_2 x$ d) None of these

3) $\frac{1}{D + a} X$ is equal to

a) $\int X e^{ax}\, dx$ b) $\int X e^{-ax}\, dx$

c) $e^{ax} \int e^{-ax} X\, dx$ d) $e^{-ax} \int e^{ax} X\, dx$

4) The general solution of $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 0$ is y =

a) c_1 cosx + c_2 sinx b) c_1 cos logx + c_2 sin logx

c) $(c_1 + c_2 x)e^x$ d) None of these

5) The solution of the equation $p^2 + q = 1$ is

a) $z = ax + a^2y + c$ b) $z = a^2x + ay + c$

c) $z = ax + (1 - a^2)\, y + c$ d) $z = a^2x + a^2y + c$

6) $z = a\,(x + y) + c$ is the general solution of

a) $p.q = 1$ b) $p = 1 - q$ c) $p = q$ d) $p + q = 0$

7) The inverse z-transform of $\frac{z}{z-a}, |z| > a$ (with $k \geq 0$) is

a) a^k b) a^{-k} c) a^{k+1} d) a^{-k-1}

8) 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) $\frac{80}{243}$

9) $L^{-1}[\phi(s + a)] =$

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

10) The Unit Tangent vector to the curve $x = t^2 + 1$, $y = 4t - 3$, $z = 3t^2 - 6t$ at $t = 1$ is

a) $\frac{1}{\sqrt{3}}(\bar{i} + \bar{j} + \bar{k})$ b) $\frac{1}{\sqrt{6}}(\bar{i} + 2\bar{j} + \bar{k})$ c) $\frac{1}{\sqrt{5}}(\bar{i} + 2\bar{j})$ d) $\frac{1}{\sqrt{5}}(\bar{i} + 2\bar{k})$

11) If $\nabla^2 (r^n) = n(n + 1)\, r^{n-2}$ then $\nabla^2\left(\frac{1}{r}\right) =$

a) 1 b) 0 c) –1 d) $\frac{1}{n}$

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

a) only sine series b) only cosine series

c) both sine and cosine series d) none of these

13) The Fourier Cosine Transform of $f(x) = e^{-x}$, $x \geq 0$ is

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

14) If the complex Fourier Transform of f(x) is F(s), then the complex Fourier transform of f(3x) is

a) F(3s) b) $F\left(\frac{s}{3}\right)$ c) 3 F(3s) d) $\frac{1}{3} F\left(\frac{s}{3}\right)$

SLR-EP – 319

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 13-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. a) Solve $(D^2 - 7D + 12)\, y = e^{2x}$. **3**

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

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

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

   b) Solve $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = [\log(1+x)]^4 + \cos\log(1+x)$. **5**

4. a) Solve $p^2 - pq = 1 - z^2$. **4**

   b) Solve $(y - z)\, p + (z - x)\, q = x - y$. **5**

   OR

   Solve the following partial differential equation $3x\frac{\partial z}{\partial y} - 5y\frac{\partial z}{\partial y} = 0$ by the method of separation of variables. **5**

5. a) Find the z-transform and its ROC of the following sequence. **4**

   $f(k) = 3^k, \quad k < 0$
   $= 2^k, \quad k \geq 0$

   b) Find $z\left\{\sin\left(\alpha k + \frac{\pi}{2}\right)\right\}, k \geq 0$. **3**

   c) Find the inverse z-transform of $F(z) = \frac{z}{(z-1)(z-2)}$, $|z| > 2$. **3**

Set P

SECTION – II

6. a) Evaluate $L^{-1}\left\{\frac{2s-5}{9s^2-2s}\right\}$. **3**

b) Find $L^{-1}\left\{\log\left(\sqrt{\frac{s^2+4}{s(s+1)}}\right)\right\}$. **3**

c) Solve the differential equation $y'' - 3y' + 2y = 12e^{-2t}$ using Laplace Transform given that $y(0) = 2$ and $y'(0) = 6$. **4**

OR

c) Find $L\left\{\frac{1}{t} e^{2t} \sin^3 t\right\}$. **4**

7. a) Prove that $\nabla^4(e^r) = \left(1+\frac{4}{r}\right)e^r$. **3**

b) Find the rate of change of $\phi = xy + yz + zx$ at (1, –1, 2) in the direction of the normal to the surface $x^2 + y^2 = z + 4$. **3**

c) Show that the vector $\bar{F} = (y+z)\,\bar{i} + (z+x)\,\bar{j} + (x+y)\,\bar{k}$ is solenoidal and irrotational. **3**

8. a) Find the Fourier cosine transform of $e^{-2x} + 4e^{-3x}$. **4**

b) Using Fourier cosine integral, prove that $e^{-x}\cos x = \frac{2}{\pi}\int_0^\infty \frac{(\omega^2+2)}{(\omega^2+4)} \cos \omega x \, d\omega$. **5**

9. a) Find the Fourier expansion of $f(x) = \sqrt{1-\cos x}$ in the range $(0, 2\pi)$. **5**

b) Obtain the Fourier expansion of x^2 from x = – 2 to x = 2 and hence deduce that

$$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \quad \textbf{4}$$

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SLR-EP – 319

Seat No.	

Set **Q**

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) 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) $\frac{80}{243}$

2) $L^{-1}[\phi(s+a)] =$

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

3) The Unit Tangent vector to the curve $x = t^2 + 1$, $y = 4t - 3$, $z = 3t^2 - 6t$ at $t = 1$ is

a) $\frac{1}{\sqrt{3}}(\bar{i} + \bar{j} + \bar{k})$ b) $\frac{1}{\sqrt{6}}(\bar{i} + 2\bar{j} + \bar{k})$ c) $\frac{1}{\sqrt{5}}(\bar{i} + 2\bar{j})$ d) $\frac{1}{\sqrt{5}}(\bar{i} + 2\bar{k})$

4) If $\nabla^2 (r^n) = n(n+1)\, r^{n-2}$ then $\nabla^2\left(\frac{1}{r}\right) =$

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P.T.O.

7) If the complex Fourier Transform of f(x) is F(s), then the complex Fourier transform of f(3x) is

a) F(3s) b) $F\left(\frac{s}{3}\right)$ c) 3 F(3s) d) $\frac{1}{3}F\left(\frac{s}{3}\right)$

8) $\frac{1}{D^2+a^2}$ cosax is equal to

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10) $\frac{1}{D+a}X$ is equal to

a) $\int X e^{ax}\, dx$ b) $\int X e^{-ax}\, dx$

c) $e^{ax}\int e^{-ax} X\, dx$ d) $e^{-ax}\int e^{ax} X\, dx$

11) The general solution of $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 0$ is y =

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12) The solution of the equation $p^2 + q = 1$ is

a) $z = ax + a^2y + c$ b) $z = a^2x + ay + c$

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13) z = a (x + y) + c is the general solution of

a) p.q = 1 b) p = 1 – q c) p = q d) p + q = 0

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SLR-EP – 319

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 13-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. a) Solve $(D^2 - 7D + 12)\, y = e^{2x}$. **3**

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

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

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

   b) Solve $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = [\log(1+x)]^4 + \cos\log(1+x)$. **5**

4. a) Solve $p^2 - pq = 1 - z^2$. **4**

   b) Solve $(y - z)\, p + (z - x)\, q = x - y$. **5**

   OR

   Solve the following partial differential equation $3x\frac{\partial z}{\partial y} - 5y\frac{\partial z}{\partial y} = 0$ by the method of separation of variables. **5**

5. a) Find the z-transform and its ROC of the following sequence. **4**

   $f(k) = 3^k, \quad k < 0$
   $= 2^k, \quad k \geq 0$

   b) Find $z\left\{\sin\left(\alpha k + \frac{\pi}{2}\right)\right\}, k \geq 0$. **3**

   c) Find the inverse z-transform of $F(z) = \frac{z}{(z-1)(z-2)}$, $|z| > 2$. **3**

Set Q

SECTION – II

6. a) Evaluate $L^{-1}\left\{\frac{2s-5}{9s^2-2s}\right\}$. **3**

b) Find $L^{-1}\left\{\log\left(\sqrt{\frac{s^2+4}{s(s+1)}}\right)\right\}$. **3**

c) Solve the differential equation $y'' - 3y' + 2y = 12e^{-2t}$ using Laplace Transform given that $y(0) = 2$ and $y'(0) = 6$. **4**

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c) Find $L\left\{\frac{1}{t} e^{2t} \sin^3 t\right\}$. **4**

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b) Find the rate of change of $\phi = xy + yz + zx$ at (1, –1, 2) in the direction of the normal to the surface $x^2 + y^2 = z + 4$. **3**

c) Show that the vector $\bar{F} = (y+z)\,\bar{i} + (z+x)\,\bar{j} + (x+y)\,\bar{k}$ is solenoidal and irrotational. **3**

8. a) Find the Fourier cosine transform of $e^{-2x} + 4e^{-3x}$. **4**

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b) Obtain the Fourier expansion of x^2 from x = – 2 to x = 2 and hence deduce that

$$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \quad \textbf{4}$$

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SLR-EP – 319

Seat No.	

Set **R**

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
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Instructions : *1) Q. No. **1** is **compulsory**. It should be solved in **first 30 minutes** in Answer Book Page No. **3**. **Each** question carries **one** mark.*
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*4) **Use** of calculator is **allowed**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) The solution of the equation $p^2 + q = 1$ is

a) $z = ax + a^2y + c$ b) $z = a^2x + ay + c$
c) $z = ax + (1 - a^2)\, y + c$ d) $z = a^2x + a^2y + c$

2) $z = a\,(x + y) + c$ is the general solution of

a) $p.q = 1$ b) $p = 1 - q$ c) $p = q$ d) $p + q = 0$

3) The inverse z-transform of $\frac{z}{z-a}, |z| > a$ (with $k \geq 0$) is

a) a^k b) a^{-k} c) a^{k+1} d) a^{-k-1}

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) $t\, L^{-1}[\phi(s)]$

6) The Unit Tangent vector to the curve $x = t^2 + 1$, $y = 4t - 3$, $z = 3t^2 - 6t$ at $t = 1$ is

a) $\frac{1}{\sqrt{3}}(\bar{i} + \bar{j} + \bar{k})$ b) $\frac{1}{\sqrt{6}}(\bar{i} + 2\bar{j} + \bar{k})$ c) $\frac{1}{\sqrt{5}}(\bar{i} + 2\bar{j})$ d) $\frac{1}{\sqrt{5}}(\bar{i} + 2\bar{k})$

7) If $\nabla^2 (r^n) = n(n+1)\, r^{n-2}$ then $\nabla^2\left(\frac{1}{r}\right) =$

a) 1 b) 0 c) –1 d) $\frac{1}{n}$

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

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a) $\frac{x}{2a}$ cosax b) $\frac{x}{2a}$ sinax

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12) The complete solution of $(D^3 + 2D^2 + D)\, y = 0$ is

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13) $\frac{1}{D+a} X$ is equal to

a) $\int X e^{ax}\, dx$ b) $\int X e^{-ax}\, dx$

c) $e^{ax} \int e^{-ax} X\, dx$ d) $e^{-ax} \int e^{ax} X\, dx$

14) The general solution of $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 0$ is y =

a) $c_1 \cos x + c_2 \sin x$ b) $c_1 \cos \log x + c_2 \sin \log x$

c) $(c_1 + c_2 x)e^x$ d) None of these

Set R

SLR-EP – 319

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
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Day and Date : Tuesday, 13-12-2016 Marks : 56
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Instructions *: 1) Attempt* ***any three*** *questions from* ***each*** *Section.*
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SECTION – I

2. a) Solve $(D^2 - 7D + 12)\, y = e^{2x}$. **3**

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

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

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

   b) Solve $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = [\log(1+x)]^4 + \cos\log(1+x)$. **5**

4. a) Solve $p^2 - pq = 1 - z^2$. **4**

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   OR

   Solve the following partial differential equation $3x\frac{\partial z}{\partial y} - 5y\frac{\partial z}{\partial y} = 0$ by the method of separation of variables. **5**

5. a) Find the z-transform and its ROC of the following sequence. **4**

   $f(k) = 3^k, \quad k < 0$
   $= 2^k, \quad k \geq 0$

   b) Find $z\left\{\sin\left(\alpha k + \frac{\pi}{2}\right)\right\}, k \geq 0$. **3**

   c) Find the inverse z-transform of $F(z) = \frac{z}{(z-1)(z-2)}$, $|z| > 2$. **3**

Set R

SECTION – II

6. a) Evaluate $L^{-1}\left\{\frac{2s-5}{9s^2-2s}\right\}$. **3**

   b) Find $L^{-1}\left\{\log\left(\sqrt{\frac{s^2+4}{s(s+1)}}\right)\right\}$. **3**

   c) Solve the differential equation $y'' - 3y' + 2y = 12e^{-2t}$ using Laplace Transform given that $y(0) = 2$ and $y'(0) = 6$. **4**

   OR

   c) Find $L\left\{\frac{1}{t} e^{2t} \sin^3 t\right\}$. **4**

7. a) Prove that $\nabla^4(e^r) = \left(1+\frac{4}{r}\right)e^r$. **3**

   b) Find the rate of change of $\phi = xy + yz + zx$ at (1, –1, 2) in the direction of the normal to the surface $x^2 + y^2 = z + 4$. **3**

   c) Show that the vector $\bar{F} = (y+z)\,\bar{i} + (z+x)\,\bar{j} + (x+y)\,\bar{k}$ is solenoidal and irrotational. **3**

8. a) Find the Fourier cosine transform of $e^{-2x} + 4e^{-3x}$. **4**

   b) Using Fourier cosine integral, prove that $e^{-x}\cos x = \frac{2}{\pi}\int_0^\infty \frac{(\omega^2+2)}{(\omega^2+4)} \cos \omega x \, d\omega$. **5**

9. a) Find the Fourier expansion of $f(x) = \sqrt{1-\cos x}$ in the range $(0, 2\pi)$. **5**

   b) Obtain the Fourier expansion of x^2 from x = – 2 to x = 2 and hence deduce that

   $$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \quad$$ **4**

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SLR-EP – 319

Seat No.	

Set **S**

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 13-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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3) Figures to ***right*** *indicate* ***full*** *marks.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) The Unit Tangent vector to the curve $x = t^2 + 1$, $y = 4t - 3$, $z = 3t^2 - 6t$ at $t = 1$ is

a) $\frac{1}{\sqrt{3}}(\bar{i} + \bar{j} + \bar{k})$ b) $\frac{1}{\sqrt{6}}(\bar{i} + 2\bar{j} + \bar{k})$ c) $\frac{1}{\sqrt{5}}(\bar{i} + 2\bar{j})$ d) $\frac{1}{\sqrt{5}}(\bar{i} + 2\bar{k})$

2) If $\nabla^2 (r^n) = n(n + 1)\, r^{n-2}$ then $\nabla^2 \left(\frac{1}{r}\right) =$

a) 1 b) 0 c) –1 d) $\frac{1}{n}$

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

a) only sine series b) only cosine series
c) both sine and cosine series d) none of these

4) The Fourier Cosine Transform of $f(x) = e^{-x}$, $x \geq 0$ is

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

5) If the complex Fourier Transform of f(x) is F(s), then the complex Fourier transform of f(3x) is

a) F(3s) b) $F\left(\frac{s}{3}\right)$ c) 3 F(3s) d) $\frac{1}{3} F\left(\frac{s}{3}\right)$

6) $\frac{1}{D^2 + a^2}$ cosax is equal to

a) $\frac{x}{2a}$ cosax b) $\frac{x}{2a}$ sinax c) $\frac{x}{2a^2}$ cosax d) $\frac{x}{2a^2}$ sinax

7) The complete solution of $(D^3 + 2D^2 + D)\, y = 0$ is

a) $y = c_1 + c_2\, e^{-x}$ b) $y = c_1 + (c_2 + c_3 x)\, e^{-x}$

c) $y = c_1 + c_2 x$ d) None of these

8) $\frac{1}{D + a} X$ is equal to

a) $\int X e^{ax}\, dx$ b) $\int X e^{-ax}\, dx$

c) $e^{ax} \int e^{-ax} X\, dx$ d) $e^{-ax} \int e^{ax} X\, dx$

9) The general solution of $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = 0$ is y =

a) $c_1 \cos x + c_2 \sin x$ b) $c_1 \cos \log x + c_2 \sin \log x$

c) $(c_1 + c_2 x)e^x$ d) None of these

10) The solution of the equation $p^2 + q = 1$ is

a) $z = ax + a^2y + c$ b) $z = a^2x + ay + c$

c) $z = ax + (1 - a^2)\, y + c$ d) $z = a^2x + a^2y + c$

11) $z = a\,(x + y) + c$ is the general solution of

a) $p.q = 1$ b) $p = 1 - q$ c) $p = q$ d) $p + q = 0$

12) The inverse z-transform of $\frac{z}{z - a}, |z| > a$ (with $k \geq 0$) is

a) a^k b) a^{-k} c) a^{k+1} d) a^{-k-1}

13) 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) $\frac{80}{243}$

14) $L^{-1}[\phi(s + a)] =$

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

SLR-EP – 319

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ENGINEERING MATHEMATICS – III

Day and Date : Tuesday, 13-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. a) Solve $(D^2 - 7D + 12)\, y = e^{2x}$. **3**

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

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

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

   b) Solve $(1+x)^2 \frac{d^2y}{dx^2} + (1+x)\frac{dy}{dx} + y = [\log(1+x)]^4 + \cos\log(1+x)$. **5**

4. a) Solve $p^2 - pq = 1 - z^2$. **4**

   b) Solve $(y - z)\, p + (z - x)\, q = x - y$. **5**

   OR

   Solve the following partial differential equation $3x\frac{\partial z}{\partial y} - 5y\frac{\partial z}{\partial y} = 0$ by the method of separation of variables. **5**

5. a) Find the z-transform and its ROC of the following sequence. **4**

   $f(k) = 3^k, \quad k < 0$
   $= 2^k, \quad k \geq 0$

   b) Find $z\left\{\sin\left(\alpha k + \frac{\pi}{2}\right)\right\}, k \geq 0$. **3**

   c) Find the inverse z-transform of $F(z) = \frac{z}{(z-1)(z-2)}$, $|z| > 2$. **3**

Set S

SECTION – II

6. a) Evaluate $L^{-1}\left\{\frac{2s-5}{9s^2-2s}\right\}$. **3**

   b) Find $L^{-1}\left\{\log\left(\sqrt{\frac{s^2+4}{s(s+1)}}\right)\right\}$. **3**

   c) Solve the differential equation $y'' - 3y' + 2y = 12e^{-2t}$ using Laplace Transform given that $y(0) = 2$ and $y'(0) = 6$. **4**

   OR

   c) Find $L\left\{\frac{1}{t} e^{2t} \sin^3 t\right\}$. **4**

7. a) Prove that $\nabla^4(e^r) = \left(1+\frac{4}{r}\right)e^r$. **3**

   b) Find the rate of change of $\phi = xy + yz + zx$ at (1, –1, 2) in the direction of the normal to the surface $x^2 + y^2 = z + 4$. **3**

   c) Show that the vector $\bar{F} = (y+z)\,\bar{i} + (z+x)\,\bar{j} + (x+y)\,\bar{k}$ is solenoidal and irrotational. **3**

8. a) Find the Fourier cosine transform of $e^{-2x} + 4e^{-3x}$. **4**

   b) Using Fourier cosine integral, prove that $e^{-x}\cos x = \frac{2}{\pi}\int_0^\infty \frac{(\omega^2+2)}{(\omega^2+4)} \cos \omega x \, d\omega$. **5**

9. a) Find the Fourier expansion of $f(x) = \sqrt{1-\cos x}$ in the range $(0, 2\pi)$. **5**

   b) Obtain the Fourier expansion of x^2 from x = – 2 to x = 2 and hence deduce that

   $$\frac{\pi^2}{12} = \frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \quad$$ **4**

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SLR-EP – 320

Seat No.	

Set P

S.E. (Electrical & Electronics Engineering) (CGPA) (Part – I) Examination, 2016
DC MACHINES AND TRANSFORMERS

Day and Date : Thursday, 15-12-2016 Max. Marks : 70

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

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

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

3) ***Assume*** *suitably the missing data.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The dc armature winding in which coil sides are a pole pitch apart is called _____ winding.

a) Multiplex b) Fractional pitch

c) Full pitch d) Pole pitch

2) In a 4 pole 35 slot d.c. armature, 180 electrical degree coil span will be obtained when coil occupy _____ slots.

a) 1 and 10 b) 1 and 9 c) 2 and 11 d) 3 and 12

3) The main function of inter poles is to minimize _____ between the brushes and the commutator when the d.c. machine is loaded.

a) Friction b) Sparking c) Current d) Wear and tear

4) The most likely causes of sparking at the brushes in d.c. machines is

a) open coil in the armature b) defective inter poles

c) incorrect brush spring pressure d) all of the above

5) Which of the following d.c. generator cannot build up on open circuit

a) shunt b) series c) short shunt d) long shunt

P.T.O.

6) In a d.c. motor, unidirectional torque is produced with the help of
   a) Brushes b) Commutator c) End plates d) Both a and b

7) The E_b/v ratio of d.c. motor is an indication of its
   a) Efficiency b) Speed regulation
   c) Starting torque d) Running torque

8) The most usual test for determining the efficiency of a traction motor is the _____ test.
   a) Field's b) Retardation c) Hopkinson's d) Swinburne's

9) Which of the following is not basic element of a transformer ?
   a) Core b) Primary winding
   c) Secondary winding d) Mutual flux

10) A 200 KVA transformer has an iron loss of 1 KW and full load cu. loss of 2 KW its load KVA corresponding to maximum efficiency is _____ KVA.
   a) 100 b) 141.4 c) 50 d) 200

11) No load test on a transformer is carried out to determine
   a) Copper loss
   b) Magnetizing current
   c) Magnetizing current and No load loss
   d) Efficiency of the transformer

12) When V-V system is converts in to a $\Delta - \Delta$ system increase in capacity of the system is _____ percent.
   a) 86.6 b) 0.75 c) 0.51 d) 0.65

13) If the load p.f. is 0.866 then the average p.f. of the V-V bank is
   a) 0.866 b) 0.75 c) 0.51 d) 0.65

14) Out of the following given choices for poly phase transformer connections which one will you select for three to two phase conversion.
   a) Scott b) Star/Star
   c) Double scott d) Star/double delta

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SLR-EP – 320

Seat No.	

S.E. (Electrical & Electronics Engineering) (CGPA) (Part – I) Examination, 2016
DC MACHINES AND TRANSFORMERS

Day and Date : Thursday, 15-12-2016 Marks : 56

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

SECTION – I

2. Answer **any four** questions. **(3×4=12)**

   1) With a neat sketch explain the armature reaction and its effects.

   2) With a neat sketch explain the speed control of dc motor armature and flux control.

   3) With a neat sketch explain the Swinburne's test for dc motor.

   4) A 22.38 KW 440 V, 4 pole wave wound dc shunt motor has 840 armature conductors and 140 commutator segments its full load efficiency is 88 % and the shunt field current is 1.8 A. If brushes are shifted backward through 1.5 segments from the geometrical neutral axis the demagnetizing and distorting amp. Turns/pole.

   5) A dc series motor having a resistance of 1 Ω drives a fan for which the torque varies as the square of the speed at 220 V the set runs at 350 r.p.m. and takes 25 A. The speed is to be raised to 500 r.p.m. by increasing the voltage determine the necessary voltage and the corresponding current assuming the field to be unsaturated.

3. Answer **any two** questions. **(2×8=16)**

   1) With a neat sketch explain the commutation process in DC generator.

   2) With a neat diagram explain the retardation test for finding the efficiency of DC machine.

   3) The Hopkinson's test on two similar shunt machines gave the following full load data.

      Line voltage = 110 V, field currents are 3 A and 3.5 A, line current = 48 A arm resistance of each is 0.035 Ω motor arm current = 230 A. Calculate the efficiency of each machine assuming a brush contact drop of 1 V per brush.

SECTION – II

4. Answer **any four** questions. **(3×4=12)**

   1) Derive an expression for E.M.F. equation of a transformer.

   2) With neat sketch explain how the mutual flux remains constant at any desired load in transformer.

   3) With a neat sketch explain $\Delta - \Delta$ connection of a 3 ϕ transformer.

   4) Two transformers connected in open delta supply a 400 KVA balanced load operating at 0.866 p.f. lag the load voltage is 440V. What is the a) KVA supplied by each transformer b) KW supplied by each transformer.

   5) A 200 KVA transformer has an efficiency of 98 % at full load, if the maximum efficiency occurs at three quarters of full load calculate the efficiency at half load. Assume negligible magnetizing current and p.f. 0.8 at all loads.

5. Answer **any two** questions. **(8×2=16)**

   1) With a neat sketch explain the parallel operation of 1ϕ transformers.

   2) With a neat sketch explain the Scott connection of a 3ϕ transformer.

   3) A 50 KVA, 4400/220 V transformer has $R_1 = 3.45\ \Omega$, $R_2 = 0.009\ \Omega$ the values of reactances are $X_1 = 5.2\,\Omega$ and $X_2 = 0.051\ \Omega$. Calculate for the transformer
      i) Equivalent resistance as referred to primary
      ii) Equivalent resistance as referred to secondary
      iii) Equivalent reactance as referred to both primary and secondary
      iv) Equivalent impedance as referred to both primary and secondary
      v) Total cu loss, first using individual resistances of the two windings and secondly using equivalent resistances as referred to each side.

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SLR-EP – 320

Seat No.	

Set Q

S.E. (Electrical & Electronics Engineering) (CGPA) (Part – I) Examination, 2016
DC MACHINES AND TRANSFORMERS

Day and Date : Thursday, 15-12-2016 Max. Marks : 70

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

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

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

3) ***Assume*** *suitably the missing data.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The most usual test for determining the efficiency of a traction motor is the _____ test.

a) Field's b) Retardation c) Hopkinson's d) Swinburne's

2) Which of the following is not basic element of a transformer ?

a) Core b) Primary winding

c) Secondary winding d) Mutual flux

3) A 200 KVA transformer has an iron loss of 1 KW and full load cu. loss of 2 KW its load KVA corresponding to maximum efficiency is _____ KVA.

a) 100 b) 141.4 c) 50 d) 200

4) No load test on a transformer is carried out to determine

a) Copper loss

b) Magnetizing current

c) Magnetizing current and No load loss

d) Efficiency of the transformer

P.T.O.

5) When V-V system is converts in to a $\Delta - \Delta$ system increase in capacity of the system is _____ percent.
   a) 86.6 b) 0.75 c) 0.51 d) 0.65

6) If the load p.f. is 0.866 then the average p.f. of the V-V bank is
   a) 0.866 b) 0.75 c) 0.51 d) 0.65

7) Out of the following given choices for poly phase transformer connections which one will you select for three to two phase conversion.
   a) Scott b) Star/Star
   c) Double scott d) Star/double delta

8) The dc armature winding in which coil sides are a pole pitch apart is called _____ winding.
   a) Multiplex b) Fractional pitch
   c) Full pitch d) Pole pitch

9) In a 4 pole 35 slot d.c. armature, 180 electrical degree coil span will be obtained when coil occupy _____ slots.
   a) 1 and 10 b) 1 and 9 c) 2 and 11 d) 3 and 12

10) The main function of inter poles is to minimize _____ between the brushes and the commutator when the d.c. machine is loaded.
   a) Friction b) Sparking c) Current d) Wear and tear

11) The most likely causes of sparking at the brushes in d.c. machines is
   a) open coil in the armature b) defective inter poles
   c) incorrect brush spring pressure d) all of the above

12) Which of the following d.c. generator cannot build up on open circuit
   a) shunt b) series c) short shunt d) long shunt

13) In a d.c. motor, unidirectional torque is produced with the help of
   a) Brushes b) Commutator c) End plates d) Both a and b

14) The E_b/v ratio of d.c. motor is an indication of its
   a) Efficiency b) Speed regulation
   c) Starting torque d) Running torque

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SLR-EP – 320

Seat No.	

S.E. (Electrical & Electronics Engineering) (CGPA) (Part – I) Examination, 2016
DC MACHINES AND TRANSFORMERS

Day and Date : Thursday, 15-12-2016 Marks : 56

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

SECTION – I

2. Answer **any four** questions. **(3×4=12)**

   1) With a neat sketch explain the armature reaction and its effects.

   2) With a neat sketch explain the speed control of dc motor armature and flux control.

   3) With a neat sketch explain the Swinburne's test for dc motor.

   4) A 22.38 KW 440 V, 4 pole wave wound dc shunt motor has 840 armature conductors and 140 commutator segments its full load efficiency is 88 % and the shunt field current is 1.8 A. If brushes are shifted backward through 1.5 segments from the geometrical neutral axis the demagnetizing and distorting amp. Turns/pole.

   5) A dc series motor having a resistance of 1 Ω drives a fan for which the torque varies as the square of the speed at 220 V the set runs at 350 r.p.m. and takes 25 A. The speed is to be raised to 500 r.p.m. by increasing the voltage determine the necessary voltage and the corresponding current assuming the field to be unsaturated.

3. Answer **any two** questions. **(2×8=16)**

   1) With a neat sketch explain the commutation process in DC generator.

   2) With a neat diagram explain the retardation test for finding the efficiency of DC machine.

   3) The Hopkinson's test on two similar shunt machines gave the following full load data.

      Line voltage = 110 V, field currents are 3 A and 3.5 A, line current = 48 A arm resistance of each is 0.035 Ω motor arm current = 230 A. Calculate the efficiency of each machine assuming a brush contact drop of 1 V per brush.

SECTION – II

4. Answer **any four** questions. **(3×4=12)**

   1) Derive an expression for E.M.F. equation of a transformer.

   2) With neat sketch explain how the mutual flux remains constant at any desired load in transformer.

   3) With a neat sketch explain $\Delta - \Delta$ connection of a 3 ϕ transformer.

   4) Two transformers connected in open delta supply a 400 KVA balanced load operating at 0.866 p.f. lag the load voltage is 440V. What is the a) KVA supplied by each transformer b) KW supplied by each transformer.

   5) A 200 KVA transformer has an efficiency of 98 % at full load, if the maximum efficiency occurs at three quarters of full load calculate the efficiency at half load. Assume negligible magnetizing current and p.f. 0.8 at all loads.

5. Answer **any two** questions. **(8×2=16)**

   1) With a neat sketch explain the parallel operation of 1ϕ transformers.

   2) With a neat sketch explain the Scott connection of a 3ϕ transformer.

   3) A 50 KVA, 4400/220 V transformer has $R_1 = 3.45\ \Omega$, $R_2 = 0.009\ \Omega$ the values of reactances are $X_1 = 5.2\,\Omega$ and $X_2 = 0.051\ \Omega$. Calculate for the transformer
      i) Equivalent resistance as referred to primary
      ii) Equivalent resistance as referred to secondary
      iii) Equivalent reactance as referred to both primary and secondary
      iv) Equivalent impedance as referred to both primary and secondary
      v) Total cu loss, first using individual resistances of the two windings and secondly using equivalent resistances as referred to each side.

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SLR-EP – 320

Seat No.	

Set R

S.E. (Electrical & Electronics Engineering) (CGPA) (Part – I) Examination, 2016
DC MACHINES AND TRANSFORMERS

Day and Date : Thursday, 15-12-2016 Max. Marks : 70

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

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

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

3) ***Assume*** *suitably the missing data.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Which of the following d.c. generator cannot build up on open circuit
   a) shunt b) series c) short shunt d) long shunt

2) In a d.c. motor, unidirectional torque is produced with the help of
   a) Brushes b) Commutator c) End plates d) Both a and b

3) The E_b/v ratio of d.c. motor is an indication of its
   a) Efficiency b) Speed regulation
   c) Starting torque d) Running torque

4) The most usual test for determining the efficiency of a traction motor is the _____ test.
   a) Field's b) Retardation c) Hopkinson's d) Swinburne's

5) Which of the following is not basic element of a transformer ?
   a) Core b) Primary winding
   c) Secondary winding d) Mutual flux

6) A 200 KVA transformer has an iron loss of 1 KW and full load cu. loss of 2 KW its load KVA corresponding to maximum efficiency is _____ KVA.
   a) 100 b) 141.4 c) 50 d) 200

P.T.O.

7) No load test on a transformer is carried out to determine
   a) Copper loss
   b) Magnetizing current
   c) Magnetizing current and No load loss
   d) Efficiency of the transformer

8) When V-V system is converts in to a $\Delta - \Delta$ system increase in capacity of the system is _____ percent.
   a) 86.6 b) 0.75 c) 0.51 d) 0.65

9) If the load p.f. is 0.866 then the average p.f. of the V-V bank is
   a) 0.866 b) 0.75 c) 0.51 d) 0.65

10) Out of the following given choices for poly phase transformer connections which one will you select for three to two phase conversion.
   a) Scott b) Star/Star
   c) Double scott d) Star/double delta

11) The dc armature winding in which coil sides are a pole pitch apart is called _____ winding.
   a) Multiplex b) Fractional pitch
   c) Full pitch d) Pole pitch

12) In a 4 pole 35 slot d.c. armature, 180 electrical degree coil span will be obtained when coil occupy _____ slots.
   a) 1 and 10 b) 1 and 9 c) 2 and 11 d) 3 and 12

13) The main function of inter poles is to minimize _____ between the brushes and the commutator when the d.c. machine is loaded.
   a) Friction b) Sparking c) Current d) Wear and tear

14) The most likely causes of sparking at the brushes in d.c. machines is
   a) open coil in the armature b) defective inter poles
   c) incorrect brush spring pressure d) all of the above

_____

SLR-EP – 320

Seat No.	

S.E. (Electrical & Electronics Engineering) (CGPA) (Part – I) Examination, 2016
DC MACHINES AND TRANSFORMERS

Day and Date : Thursday, 15-12-2016 Marks : 56

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

SECTION – I

2. Answer **any four** questions. **(3×4=12)**

   1) With a neat sketch explain the armature reaction and its effects.

   2) With a neat sketch explain the speed control of dc motor armature and flux control.

   3) With a neat sketch explain the Swinburne's test for dc motor.

   4) A 22.38 KW 440 V, 4 pole wave wound dc shunt motor has 840 armature conductors and 140 commutator segments its full load efficiency is 88 % and the shunt field current is 1.8 A. If brushes are shifted backward through 1.5 segments from the geometrical neutral axis the demagnetizing and distorting amp. Turns/pole.

   5) A dc series motor having a resistance of 1 Ω drives a fan for which the torque varies as the square of the speed at 220 V the set runs at 350 r.p.m. and takes 25 A. The speed is to be raised to 500 r.p.m. by increasing the voltage determine the necessary voltage and the corresponding current assuming the field to be unsaturated.

3. Answer **any two** questions. **(2×8=16)**

   1) With a neat sketch explain the commutation process in DC generator.

   2) With a neat diagram explain the retardation test for finding the efficiency of DC machine.

   3) The Hopkinson's test on two similar shunt machines gave the following full load data.

      Line voltage = 110 V, field currents are 3 A and 3.5 A, line current = 48 A arm resistance of each is 0.035 Ω motor arm current = 230 A. Calculate the efficiency of each machine assuming a brush contact drop of 1 V per brush.

SECTION – II

4. Answer **any four** questions. **(3×4=12)**

   1) Derive an expression for E.M.F. equation of a transformer.

   2) With neat sketch explain how the mutual flux remains constant at any desired load in transformer.

   3) With a neat sketch explain $\Delta - \Delta$ connection of a 3 ϕ transformer.

   4) Two transformers connected in open delta supply a 400 KVA balanced load operating at 0.866 p.f. lag the load voltage is 440V. What is the a) KVA supplied by each transformer b) KW supplied by each transformer.

   5) A 200 KVA transformer has an efficiency of 98 % at full load, if the maximum efficiency occurs at three quarters of full load calculate the efficiency at half load. Assume negligible magnetizing current and p.f. 0.8 at all loads.

5. Answer **any two** questions. **(8×2=16)**

   1) With a neat sketch explain the parallel operation of 1ϕ transformers.

   2) With a neat sketch explain the Scott connection of a 3ϕ transformer.

   3) A 50 KVA, 4400/220 V transformer has $R_1 = 3.45\ \Omega$, $R_2 = 0.009\ \Omega$ the values of reactances are $X_1 = 5.2\,\Omega$ and $X_2 = 0.051\ \Omega$. Calculate for the transformer
      i) Equivalent resistance as referred to primary
      ii) Equivalent resistance as referred to secondary
      iii) Equivalent reactance as referred to both primary and secondary
      iv) Equivalent impedance as referred to both primary and secondary
      v) Total cu loss, first using individual resistances of the two windings and secondly using equivalent resistances as referred to each side.

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SLR-EP – 320

Seat No.	

Set S

S.E. (Electrical & Electronics Engineering) (CGPA) (Part – I) Examination, 2016
DC MACHINES AND TRANSFORMERS

Day and Date : Thursday, 15-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A 200 KVA transformer has an iron loss of 1 KW and full load cu. loss of 2 KW its load KVA corresponding to maximum efficiency is _____ KVA.
a) 100 b) 141.4 c) 50 d) 200

2) No load test on a transformer is carried out to determine
a) Copper loss
b) Magnetizing current
c) Magnetizing current and No load loss
d) Efficiency of the transformer

3) When V-V system is converts in to a $\Delta - \Delta$ system increase in capacity of the system is _____ percent.
a) 86.6 b) 0.75 c) 0.51 d) 0.65

4) If the load p.f. is 0.866 then the average p.f. of the V-V bank is
a) 0.866 b) 0.75 c) 0.51 d) 0.65

5) Out of the following given choices for poly phase transformer connections which one will you select for three to two phase conversion.
a) Scott b) Star/Star
c) Double scott d) Star/double delta

P.T.O.

6) The dc armature winding in which coil sides are a pole pitch apart is called _____ winding.
   a) Multiplex b) Fractional pitch
   c) Full pitch d) Pole pitch

7) In a 4 pole 35 slot d.c. armature, 180 electrical degree coil span will be obtained when coil occupy _____ slots.
   a) 1 and 10 b) 1 and 9 c) 2 and 11 d) 3 and 12

8) The main function of inter poles is to minimize _____ between the brushes and the commutator when the d.c. machine is loaded.
   a) Friction b) Sparking c) Current d) Wear and tear

9) The most likely causes of sparking at the brushes in d.c. machines is
   a) open coil in the armature b) defective inter poles
   c) incorrect brush spring pressure d) all of the above

10) Which of the following d.c. generator cannot build up on open circuit
   a) shunt b) series c) short shunt d) long shunt

11) In a d.c. motor, unidirectional torque is produced with the help of
   a) Brushes b) Commutator c) End plates d) Both a and b

12) The E_b/v ratio of d.c. motor is an indication of its
   a) Efficiency b) Speed regulation
   c) Starting torque d) Running torque

13) The most usual test for determining the efficiency of a traction motor is the _____ test.
   a) Field's b) Retardation c) Hopkinson's d) Swinburne's

14) Which of the following is not basic element of a transformer ?
   a) Core b) Primary winding
   c) Secondary winding d) Mutual flux

_____

SLR-EP – 320

Seat No.	

S.E. (Electrical & Electronics Engineering) (CGPA) (Part – I) Examination, 2016
DC MACHINES AND TRANSFORMERS

Day and Date : Thursday, 15-12-2016 Marks : 56

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

SECTION – I

2. Answer **any four** questions. **(3×4=12)**

   1) With a neat sketch explain the armature reaction and its effects.

   2) With a neat sketch explain the speed control of dc motor armature and flux control.

   3) With a neat sketch explain the Swinburne's test for dc motor.

   4) A 22.38 KW 440 V, 4 pole wave wound dc shunt motor has 840 armature conductors and 140 commutator segments its full load efficiency is 88 % and the shunt field current is 1.8 A. If brushes are shifted backward through 1.5 segments from the geometrical neutral axis the demagnetizing and distorting amp. Turns/pole.

   5) A dc series motor having a resistance of 1 Ω drives a fan for which the torque varies as the square of the speed at 220 V the set runs at 350 r.p.m. and takes 25 A. The speed is to be raised to 500 r.p.m. by increasing the voltage determine the necessary voltage and the corresponding current assuming the field to be unsaturated.

3. Answer **any two** questions. **(2×8=16)**

   1) With a neat sketch explain the commutation process in DC generator.

   2) With a neat diagram explain the retardation test for finding the efficiency of DC machine.

   3) The Hopkinson's test on two similar shunt machines gave the following full load data.

      Line voltage = 110 V, field currents are 3 A and 3.5 A, line current = 48 A arm resistance of each is 0.035 Ω motor arm current = 230 A. Calculate the efficiency of each machine assuming a brush contact drop of 1 V per brush.

SECTION – II

4. Answer **any four** questions. **(3×4=12)**

   1) Derive an expression for E.M.F. equation of a transformer.

   2) With neat sketch explain how the mutual flux remains constant at any desired load in transformer.

   3) With a neat sketch explain $\Delta - \Delta$ connection of a 3 ϕ transformer.

   4) Two transformers connected in open delta supply a 400 KVA balanced load operating at 0.866 p.f. lag the load voltage is 440V. What is the a) KVA supplied by each transformer b) KW supplied by each transformer.

   5) A 200 KVA transformer has an efficiency of 98 % at full load, if the maximum efficiency occurs at three quarters of full load calculate the efficiency at half load. Assume negligible magnetizing current and p.f. 0.8 at all loads.

5. Answer **any two** questions. **(8×2=16)**

   1) With a neat sketch explain the parallel operation of 1ϕ transformers.

   2) With a neat sketch explain the Scott connection of a 3ϕ transformer.

   3) A 50 KVA, 4400/220 V transformer has $R_1 = 3.45\ \Omega$, $R_2 = 0.009\ \Omega$ the values of reactances are $X_1 = 5.2\,\Omega$ and $X_2 = 0.051\ \Omega$. Calculate for the transformer
      i) Equivalent resistance as referred to primary
      ii) Equivalent resistance as referred to secondary
      iii) Equivalent reactance as referred to both primary and secondary
      iv) Equivalent impedance as referred to both primary and secondary
      v) Total cu loss, first using individual resistances of the two windings and secondly using equivalent resistances as referred to each side.

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SLR-EP – 321

Seat No.	

Set **P**

S.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL NETWORKS

Day and Date : Saturday, 17-12-2016 Max. Marks : 70

Time : 10.00 a.m. to 1.00 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) **All** questions are **compulsory**.*
*iv) Figures to **right** indicate **full** marks.*
*v) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Which one of the following is an ideal voltage source ?
   a) Voltage independent of current
   b) Current independent of voltage
   c) Both a) and b)
   d) None of the above

2) A network has seven nodes and five independent loops. The number of branches in the network is
   a) 13
   b) 12
   c) 11
   d) 10

3) Mesh Analysis is based on
   a) KCL
   b) KVL
   c) Both
   d) None

4) The reciprocity theorem is applicable to
   a) Linear network only
   b) Linear/bilateral networks
   c) Bilateral networks only
   d) Neither of two

5) Link in network theory refers to
   a) B – N + 1
   b) B – N – 1
   c) N – 1
   d) N – B – 1

6) In order to get maximum power transfer from a capacitive source, the load must
   a) Have a capacitive reactance equal to circuit resistance
   b) Have an impedance that is the complex conjugate of the source impedance
   c) Be as capacitive as it is inductive
   d) None of the above

7) In an electrical circuit the dual term pair for G is
   a) L b) C
   c) KVL d) R

8) The purpose of a parallel resonance is to magnify
   a) Current b) Voltage
   c) Power d) Frequency

9) Second order circuit is over damped when,
   a) $\alpha > \omega_0$ b) $\alpha = \omega_0$
   c) $\alpha < \omega_0$ d) None of the above

10) Laplace transform of e^{-at} coswt is,
   a) $(s + a)/[(s + a)^2 + w^2]$ b) $a/[(s + a)^2 + w^2]$
   c) $w/[(s + a)^2+w^2]$ d) None of the above

11) In series resonance reactance at resonant frequency is,
   a) Capacitive b) Zero
   c) Inductive d) Infinite

12) Time constant of a capacitive circuit
   a) Increases with the decrease of capacitance and resistance
   b) Increases with the decrease of capacitance and increase of resistance
   c) Increases with the increase of capacitance and decrease of resistance
   d) Increase with increase of capacitance and resistance

13) To increase the current in a series RC circuit, the frequency
   a) Should be increased b) Should be decreased
   c) Remain constant d) None of the above

14) The Voltage across capacitor follows
   a) A linear growth b) A linear decay
   c) An exponential decay d) An exponential growth

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SLR-EP – 321

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2016

ELECTRICAL NETWORKS

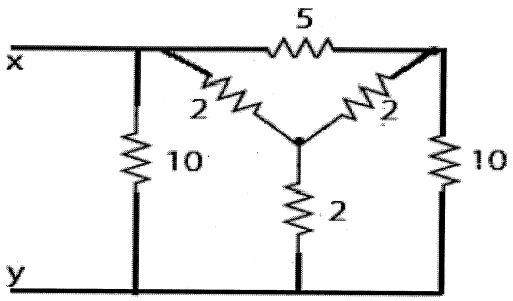
Day and Date : Saturday, 17-12-2016 Marks : 56

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

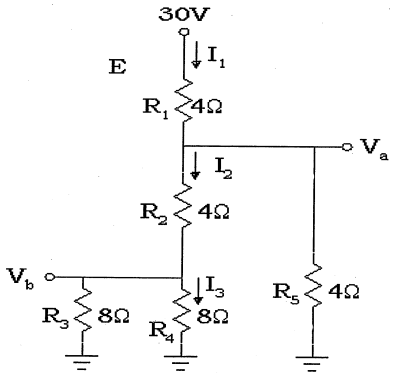
Instructions *: i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any three** of the followings : **(4×3=12)**
   1) Explain the principle of Duality with one example.
   2) Find equivalent resistance between resistance x-y.



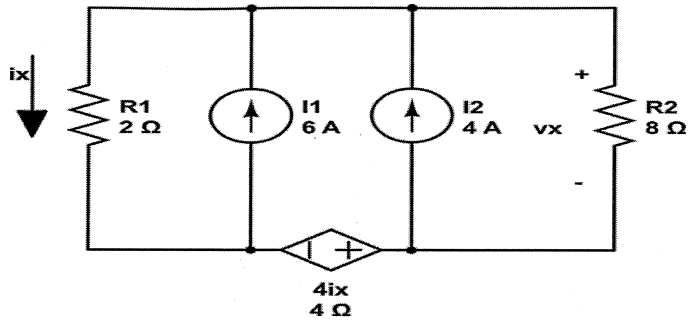
   3) Define the terms : Tree, cotree, Node, Twigs.
   4) Find current I_1 for circuit shown below :



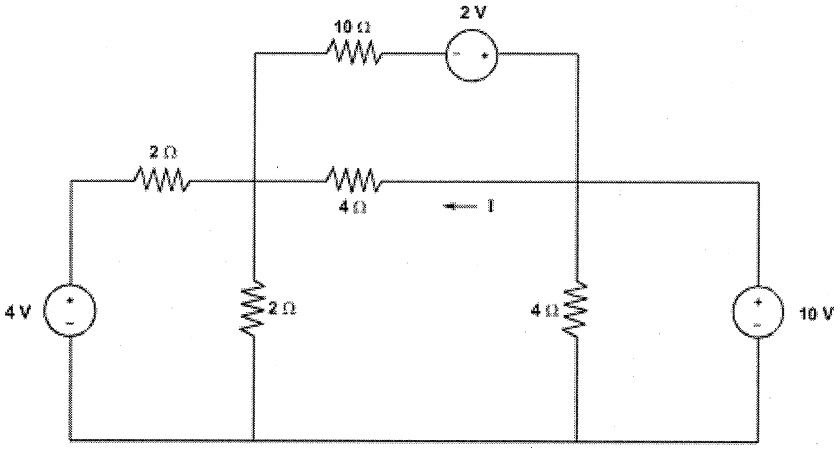
Set P

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

1) Find Vx by using superposition theorem.



2) Determine the current 4Ω in the circuit shown in figure by writing mesh equations.

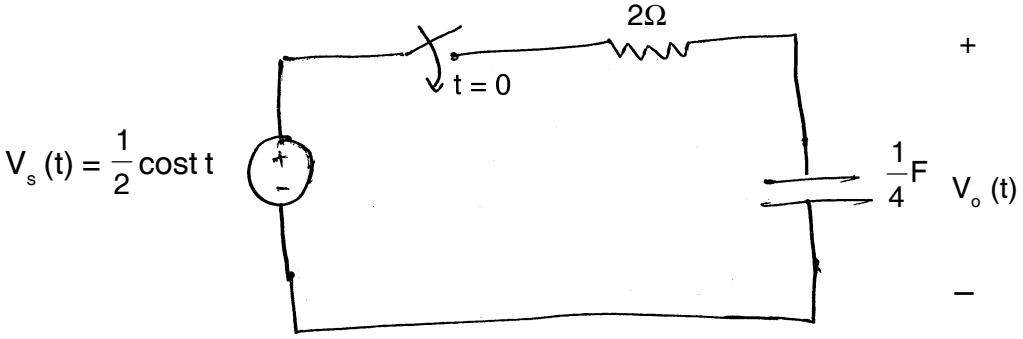


3) State and prove maximum power transfer theorem for DC circuits.

SECTION – II

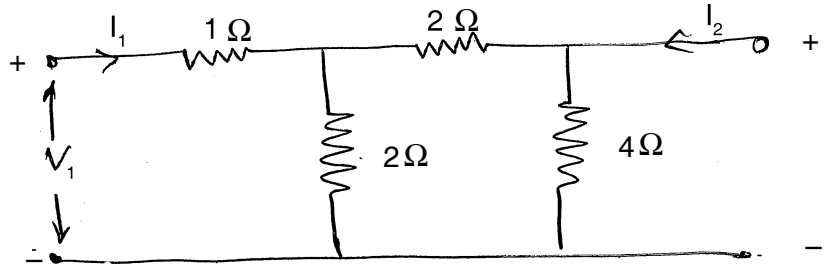
4. Solve **any three** of the followings : **(4×3=12)**

1) Find the value of V_0 (t) by Laplace when switch is closed at t = 0.

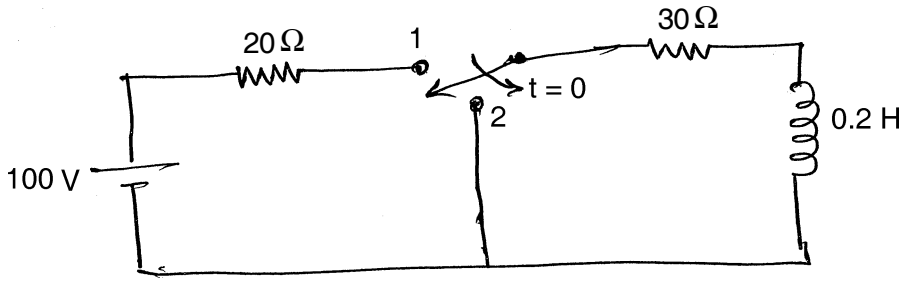


Set P

2) Find the Y-parameter for the circuit shown.



3) Find $i_L(t)$ when the switch is moved from position 1 to 2 at t = 0.



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

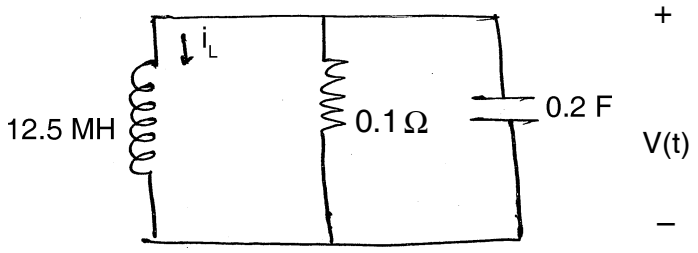
5) A series RLC circuit has following parameters. $R = 10\Omega$, L = 0.2 H, C = $40\,\mu F$ when a variable frequency voltage of 100 V is applied to it, Calculate resonant frequency, and Maximum current, bandwidth, Q factor, power.

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

1) Derive the following :
   a) Y - Parameter in terms of Z, H-parameter
   b) Z - Parameter in terms of Y, Transmission parameters.

2) Find the response given by RC circuit for the following inputs by Laplace transform.
   i) Unit step function ii) Ramp function.

3) In the network shown $i_L(0)$ = 40A, V(0) = 40V. Find the V(t) at t > 0.



Set P

SLR-EP – 321

Seat No.	

Set **Q**

S.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL NETWORKS

Day and Date : Saturday, 17-12-2016 Max. Marks : 70

Time : 10.00 a.m. to 1.00 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) **All** questions are **compulsory**.*
*iv) Figures to **right** indicate **full** marks.*
*v) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) The purpose of a parallel resonance is to magnify
   a) Current b) Voltage
   c) Power d) Frequency

2) Second order circuit is over damped when,
   a) $\alpha > \omega_0$ b) $\alpha = \omega_0$
   c) $\alpha < \omega_0$ d) None of the above

3) Laplace transform of e^{-at} coswt is,
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4) In series resonance reactance at resonant frequency is,
   a) Capacitive b) Zero
   c) Inductive d) Infinite

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   a) Increases with the decrease of capacitance and resistance
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P.T.O.

6) To increase the current in a series RC circuit, the frequency
   a) Should be increased
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7) The Voltage across capacitor follows
   a) A linear growth
   b) A linear decay
   c) An exponential decay
   d) An exponential growth

8) Which one of the following is an ideal voltage source ?
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SLR-EP – 321

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2016

ELECTRICAL NETWORKS

Day and Date : Saturday, 17-12-2016 Marks : 56

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

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

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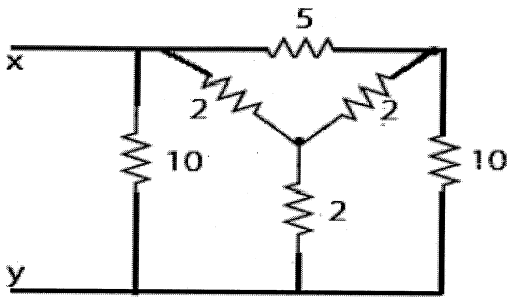

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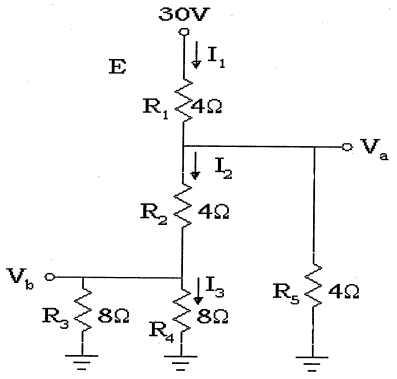

Set Q

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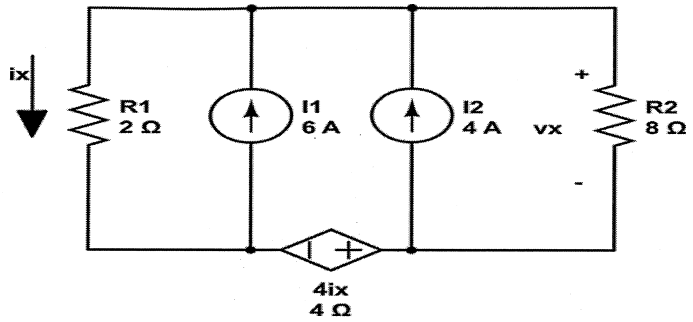

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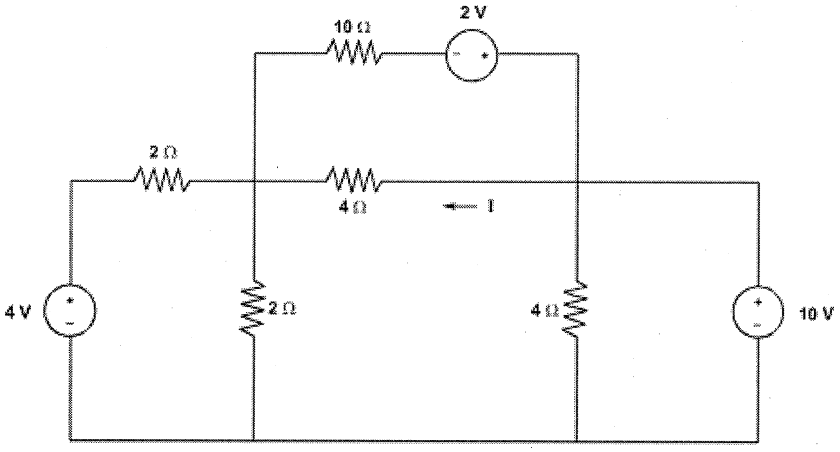

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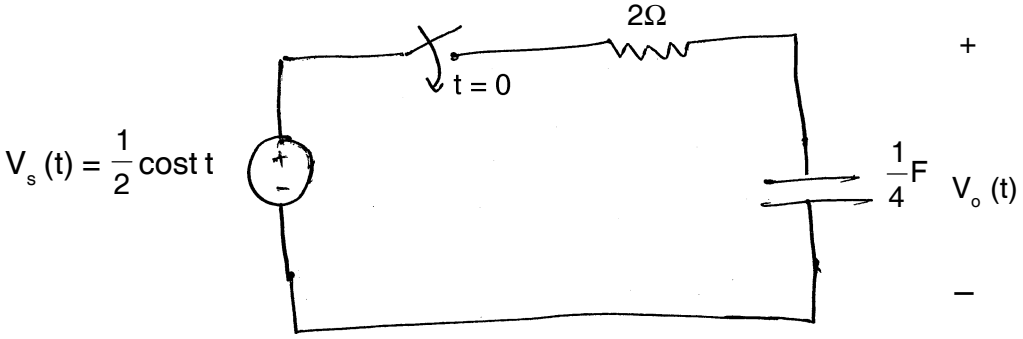
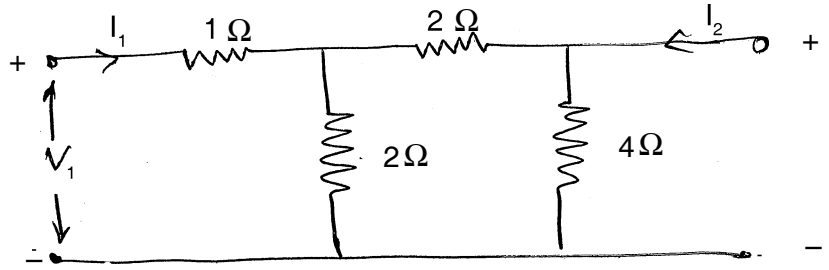


Set Q

2) Find the Y-parameter for the circuit shown.



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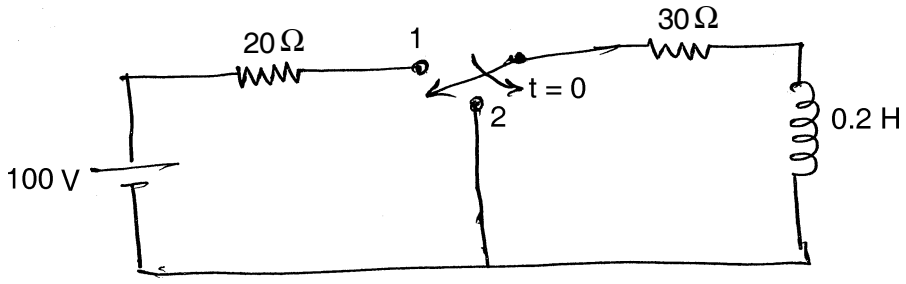

4) Derive an expression for response given by RL circuit.

5) A series RLC circuit has following parameters. $R = 10\Omega$, L = 0.2 H, C = 40 μF when a variable frequency voltage of 100 V is applied to it, Calculate resonant frequency, and Maximum current, bandwidth, Q factor, power.

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1) Derive the following :
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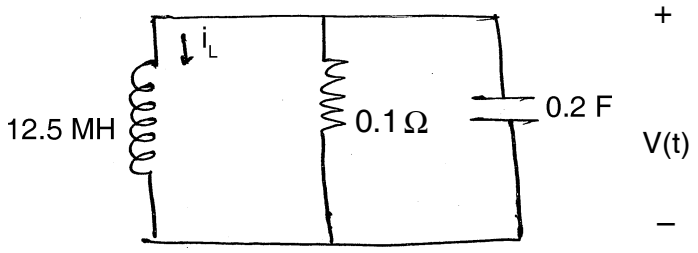

Set Q

SLR-EP – 321

Seat No.	

Set **R**

S.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL NETWORKS

Day and Date : Saturday, 17-12-2016 Max. Marks : 70

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

Instructions :
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Link in network theory refers to
   a) B – N + 1 b) B – N – 1
   c) N – 1 d) N – B – 1

2) In order to get maximum power transfer from a capacitive source, the load must
   a) Have a capacitive reactance equal to circuit resistance
   b) Have an impedance that is the complex conjugate of the source impedance
   c) Be as capacitive as it is inductive
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SLR-EP – 321

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2016

ELECTRICAL NETWORKS

Day and Date : Saturday, 17-12-2016 Marks : 56

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

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

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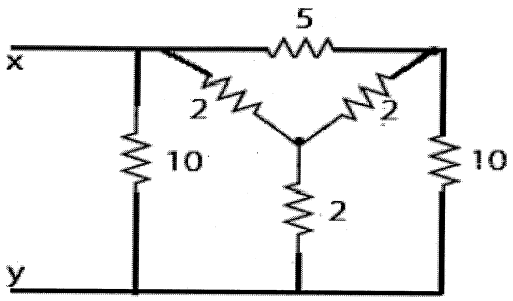

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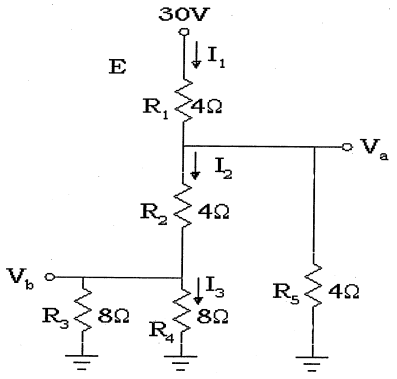

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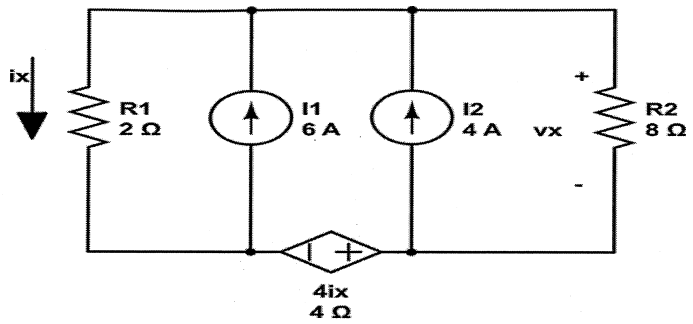
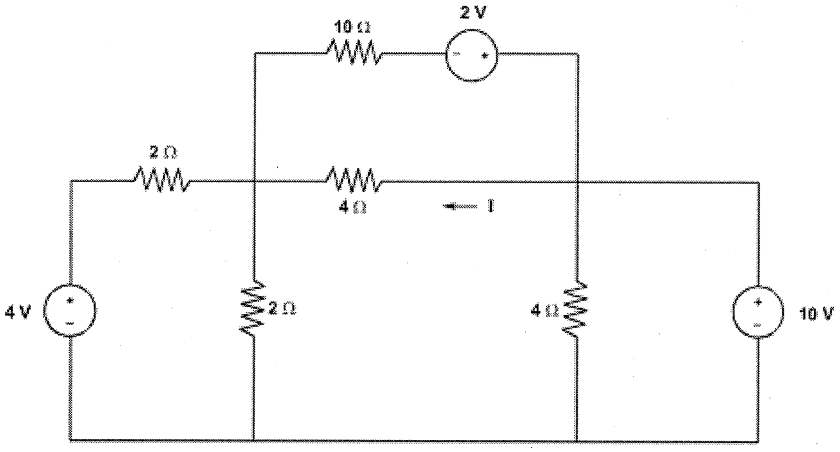


2) Determine the current 4Ω in the circuit shown in figure by writing mesh equations.

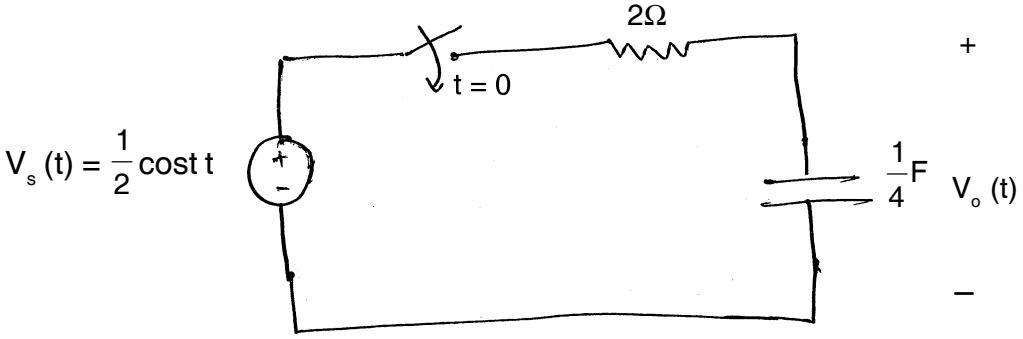


3) State and prove maximum power transfer theorem for DC circuits.

SECTION – II

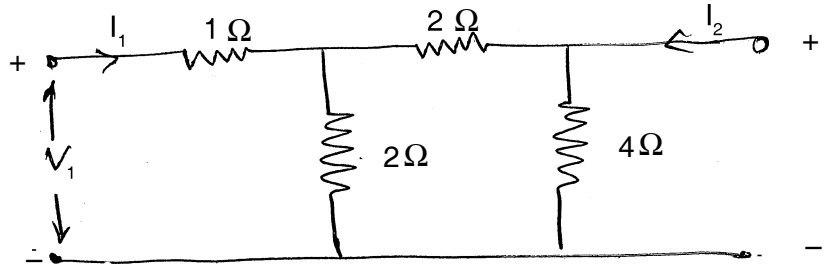
4. Solve **any three** of the followings : **(4×3=12)**

1) Find the value of V_0 (t) by Laplace when switch is closed at t = 0.



Set R

2) Find the Y-parameter for the circuit shown.



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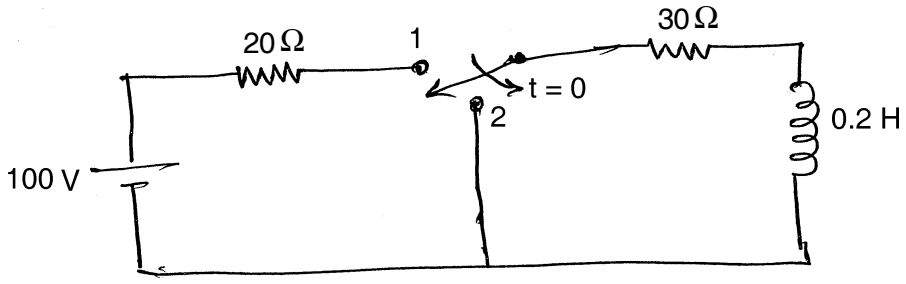

4) Derive an expression for response given by RL circuit.

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

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

1) Derive the following :
   a) Y - Parameter in terms of Z, H-parameter
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2) Find the response given by RC circuit for the following inputs by Laplace transform.
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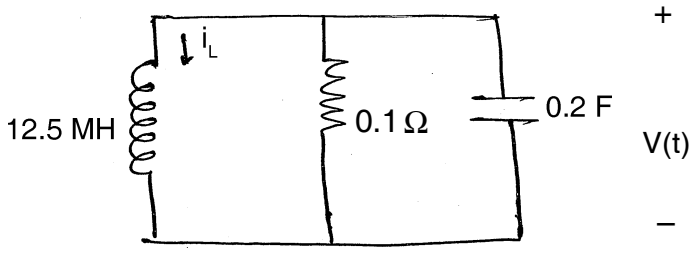


Set R

SLR-EP – 321

Seat No.	

Set **S**

S.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL NETWORKS

Day and Date : Saturday, 17-12-2016 Max. Marks : 70

Time : 10.00 a.m. to 1.00 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) **All** questions are **compulsory**.*
*iv) Figures to **right** indicate **full** marks.*
*v) Assume suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Laplace transform of e^{-at} coswt is,
   a) $(s + a)/[(s + a)^2 + w^2]$ b) $a/[(s + a)^2 + w^2]$
   c) $w/[(s + a)^2+w^2]$ d) None of the above

2) In series resonance reactance at resonant frequency is,
   a) Capacitive b) Zero
   c) Inductive d) Infinite

3) Time constant of a capacitive circuit
   a) Increases with the decrease of capacitance and resistance
   b) Increases with the decrease of capacitance and increase of resistance
   c) Increases with the increase of capacitance and decrease of resistance
   d) Increase with increase of capacitance and resistance

4) To increase the current in a series RC circuit, the frequency
   a) Should be increased b) Should be decreased
   c) Remain constant d) None of the above

5) The Voltage across capacitor follows
   a) A linear growth b) A linear decay
   c) An exponential decay d) An exponential growth

P.T.O.

6) Which one of the following is an ideal voltage source ?
   a) Voltage independent of current
   b) Current independent of voltage
   c) Both a) and b)
   d) None of the above

7) A network has seven nodes and five independent loops. The number of branches in the network is
   a) 13
   b) 12
   c) 11
   d) 10

8) Mesh Analysis is based on
   a) KCL
   b) KVL
   c) Both
   d) None

9) The reciprocity theorem is applicable to
   a) Linear network only
   b) Linear/bilateral networks
   c) Bilateral networks only
   d) Neither of two

10) Link in network theory refers to
   a) B – N + 1
   b) B – N – 1
   c) N – 1
   d) N – B – 1

11) In order to get maximum power transfer from a capacitive source, the load must
   a) Have a capacitive reactance equal to circuit resistance
   b) Have an impedance that is the complex conjugate of the source impedance
   c) Be as capacitive as it is inductive
   d) None of the above

12) In an electrical circuit the dual term pair for G is
   a) L
   b) C
   c) KVL
   d) R

13) The purpose of a parallel resonance is to magnify
   a) Current
   b) Voltage
   c) Power
   d) Frequency

14) Second order circuit is over damped when,
   a) $\alpha > \omega_0$
   b) $\alpha = \omega_0$
   c) $\alpha < \omega_0$
   d) None of the above

SLR-EP – 321

Seat No.	

S.E. (Electrical and Electronics Engg.) (Part – I) (CGPA) Examination, 2016

ELECTRICAL NETWORKS

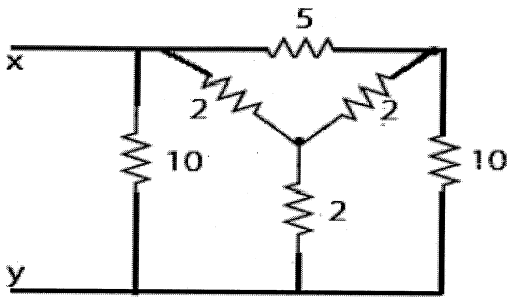
Day and Date : Saturday, 17-12-2016 Marks : 56

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

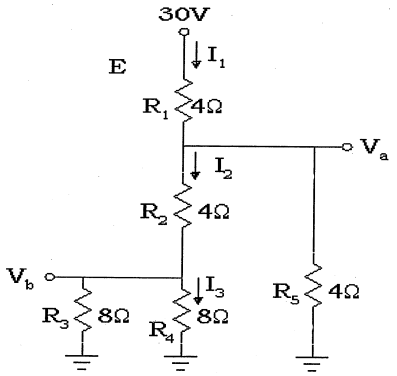
Instructions : *i)* ***All*** *questions are* ***compulsory****.*
ii) Figures to ***right*** *indicate* ***full*** *marks.*
iii) Assume suitable data ***whenever*** *necessary.*

SECTION – I

2. Solve **any three** of the followings : **(4×3=12)**
   1) Explain the principle of Duality with one example.
   2) Find equivalent resistance between resistance x-y.

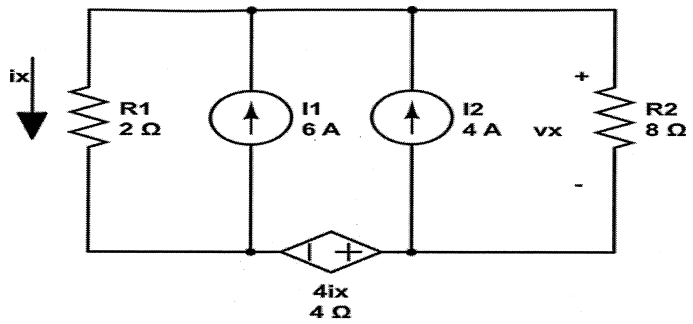


   3) Define the terms : Tree, cotree, Node, Twigs.
   4) Find current I_1 for circuit shown below :



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

1) Find Vx by using superposition theorem.



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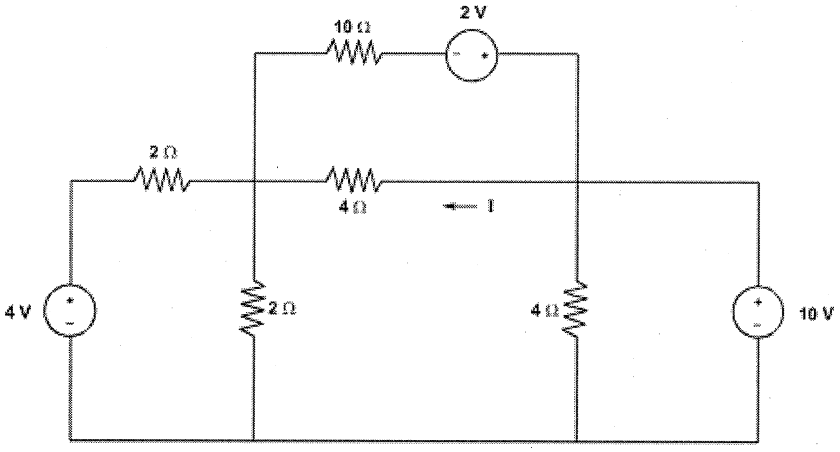

3) State and prove maximum power transfer theorem for DC circuits.

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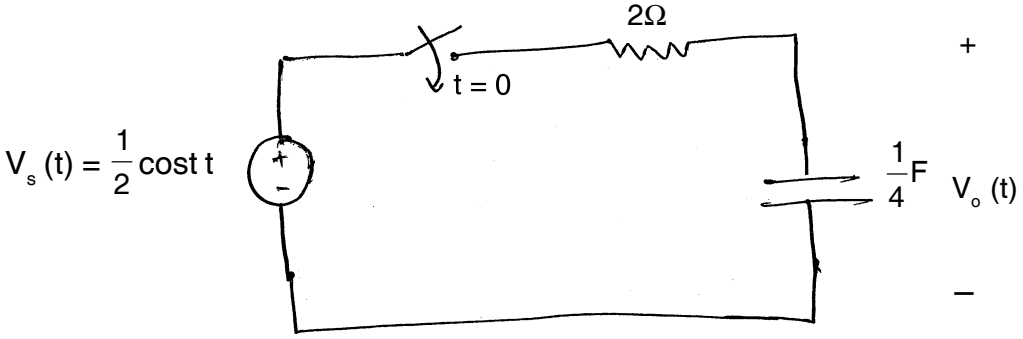
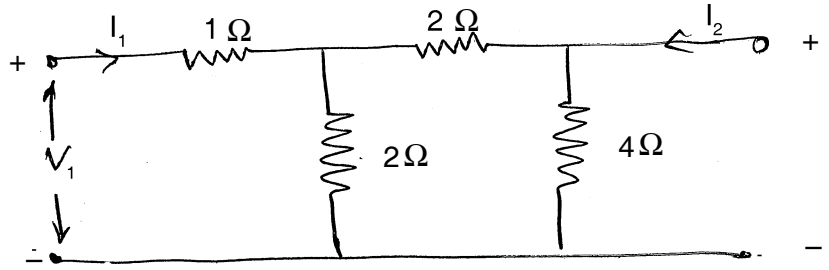
1) Find the value of V_0 (t) by Laplace when switch is closed at t = 0.

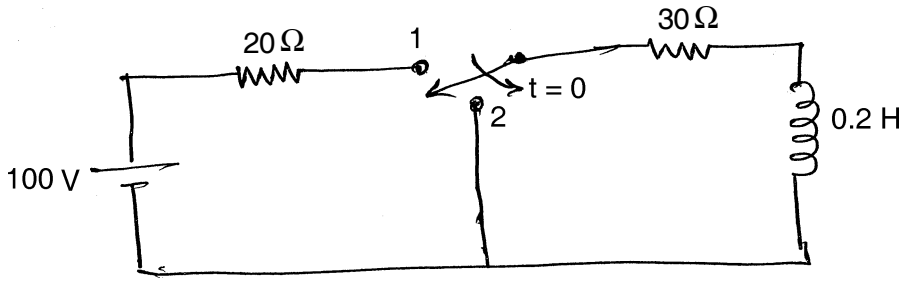


Set S

2) Find the Y-parameter for the circuit shown.



3) Find $i_L(t)$ when the switch is moved from position 1 to 2 at t = 0.



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

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

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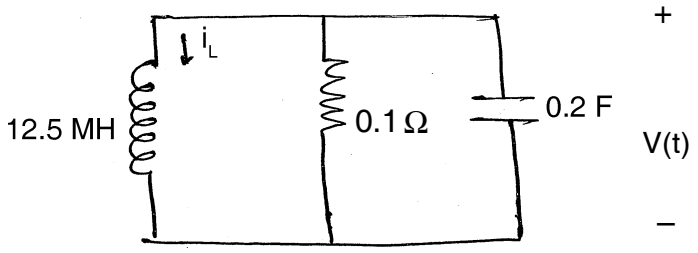


Set S

SLR-EP – 322

Seat No.	

Set P

S.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2016
ANALOG ELECTRONICS

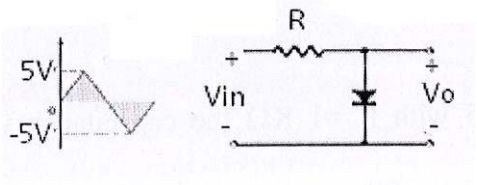
Day and Date : Tuesday, 20-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

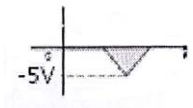
Instructions : 1) ***All*** *questions are* ***compulsory****.*
2) *Assume* ***suitable*** *data if required.*
3) *Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective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

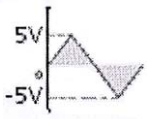
MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

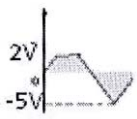
1. Choose the correct answer : **(14×1=14)**
   1) The average value of a half wave rectified voltage with peak value of 200V is
      a) 63.66 V b) 127.3 V c) 141 V d) 200 V
   2) Voltage-divider bias provides
      a) Stable Q point
      b) Q point variation with change in gain
      c) Q point variation with change in collector
      d) Unstable Q point
   3) Which of the following statement is not true in case of MOSFET ?
      a) It has high input impedance b) It is less noisy than BJT
      c) Current controlled device d) Both (a) and (b)
   4) Power amplifier is a power converter which converts _____ under control of input signal.
      a) AC power into DC power b) DC power into AC power
      c) DC power into DC power d) AC power into AC power
   5) In the circuit shown below the output waveform is



a) 

b) 

c) 

d) 

P.T.O.

6) In CLASS A power amplifier collector current in the output circuit flows for
   a) 180°
   b) 360°
   c) less than 180°
   d) greater than 180° and less than 360°

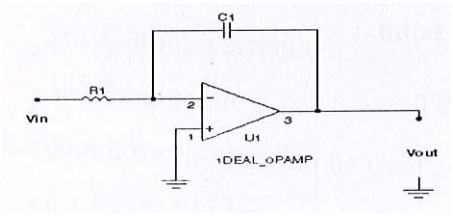
7) BJT is
   a) Voltage controlled device
   b) Current controlled device
   c) Voltage controlled voltage source
   d) Reactance controlled device

8) An Op-Amp has common mode gain of 0.01 and differential mode gain of 10^5. Its CMRR would be
   a) 10^7 b) 10^{-3} c) 10^{-7} d) 10^3

9) Negative feedback in an amplifier
   a) Reduces gain
   b) Input resistance increases
   c) Output resistance decreases
   d) All above

10) In IC 741 pin numbers used for output offset voltage null are
   a) pin 2 and pin 3
   b) pin 1, pin 4 and pin 5
   c) pin 7 and pin 4
   d) None of the above

11) If input of above circuit is square wave, then the output waveform is



   a) Triangular wave
   b) Quasi square wave
   c) Saw tooth wave
   d) Square wave

12) Slew rate for Op-Amp is considered for
   a) AC applications
   b) DC applications
   c) Both (a) and (b)
   d) None of the above

13) To introduce a delay of 5 seconds using IC 555 with R = 1 KΩ the capacitance value required is,
   a) 4.54 μF b) 4.54 mF c) 0.45 μF d) None of these

14) I to V converter is special case of _____ amplifier.
   a) Non-inverting b) Inverting c) Differential d) Scaling

SLR-EP – 322

Seat No.	

S.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2016
ANALOG ELECTRONICS

Day and Date : Tuesday, 20-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume ***suitable*** *data if required.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) What is clamper circuit ? Explain working of positive clamper circuit.
   b) Discuss operation and significance of multiple transistor current mirror circuit.
   c) Explain working of darlingtion amplifier with suitable circuit.
   d) Why MOSFET is called as voltage controlled device ? Compare BJT and MOSFET.
   e) Define stability factor S. Derive the general expression for stability factor of biasing circuits.

3. Solve **any two** : **(2×6=12)**
   1) Distinguish amongst class A, class B, class C and class D power amplifiers.
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SECTION – II

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   a) Explain working of astable multivibrator using IC 555.
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   d) Describe working of Schmitt Trigger circuit using Op-Amp. Discuss the effect of hysteresis in such circuit.
   e) Explain differential amplifier using Op-Amp.

Set P

5. Solve **any two** : **(2×6=12)**

   a) Explain effect of negative feedback in non-inverting amplifier on the following terms.
      i) Voltage gain
      ii) Input resistance
      iii) Output resistance
      iv) Bandwidth

   b) Explain how Op-Amp can be used as an
      i) Phase Shifter
      ii) Voltage to current converter.

   c) Define various electrical parameter of Op-Amp with its ideal and typical values.

SLR-EP – 322

Seat No.	

Set **Q**

S.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2016
ANALOG ELECTRONICS

Day and Date : Tuesday, 20-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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Duration : 30 Minutes Marks : 14

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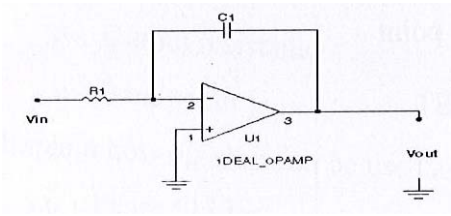

a) Triangular wave b) Quasi square wave
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P.T.O.

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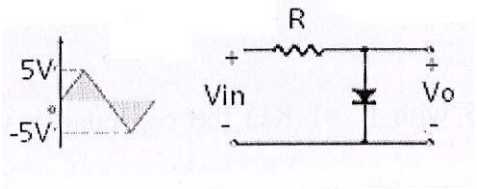
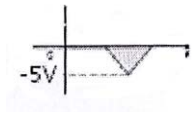
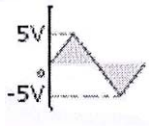
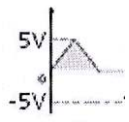
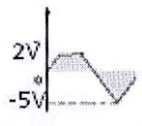


a) 

b) 

c) 

d) 

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Set Q

_____

SLR-EP – 322

Seat No.	

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ANALOG ELECTRONICS

Day and Date : Tuesday, 20-12-2016 Marks : 56
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   b) Explain how Op-Amp can be used as an
      i) Phase Shifter
      ii) Voltage to current converter.

   c) Define various electrical parameter of Op-Amp with its ideal and typical values.

SLR-EP – 322

Seat No.	

Set **R**

S.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2016
ANALOG ELECTRONICS

Day and Date : Tuesday, 20-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

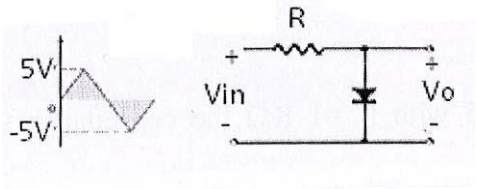
Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume ***suitable*** *data if required.*
3) Q. No. ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
4) ***Answer MCQ/Objective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

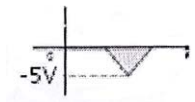
MCQ/Objective Type Questions

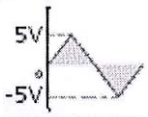
Duration : 30 Minutes Marks : 14

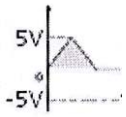
1. Choose the correct answer : **(14×1=14)**

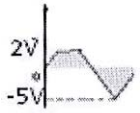
1) In the circuit shown below the output waveform is



a) 

b) 

c) 

d) 

2) In CLASS A power amplifier collector current in the output circuit flows for
   a) 180°
   b) 360°
   c) less than 180°
   d) greater than 180° and less than 360°

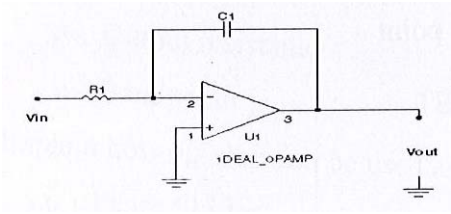
3) BJT is
   a) Voltage controlled device
   b) Current controlled device
   c) Voltage controlled voltage source
   d) Reactance controlled device

4) An Op-Amp has common mode gain of 0.01 and differential mode gain of 10^5. Its CMRR would be
   a) 10^7 b) 10^{-3} c) 10^{-7} d) 10^3

5) Negative feedback in an amplifier
   a) Reduces gain
   b) Input resistance increases
   c) Output resistance decreases
   d) All above

6) In IC 741 pin numbers used for output offset voltage null are
   a) pin 2 and pin 3 b) pin 1, pin 4 and pin 5
   c) pin 7 and pin 4 d) None of the above

7) If input of above circuit is square wave, then the output waveform is



   a) Triangular wave b) Quasi square wave
   c) Saw tooth wave d) Square wave

8) Slew rate for Op-Amp is considered for
   a) AC applications b) DC applications
   c) Both (a) and (b) d) None of the above

9) To introduce a delay of 5 seconds using IC 555 with R = 1 KΩ the capacitance value required is,
   a) 4.54 μF b) 4.54 mF c) 0.45 μF d) None of these

10) I to V converter is special case of _____ amplifier.
   a) Non-inverting b) Inverting c) Differential d) Scaling

11) The average value of a half wave rectified voltage with peak value of 200V is
   a) 63.66 V b) 127.3 V c) 141 V d) 200 V

12) Voltage-divider bias provides
   a) Stable Q point
   b) Q point variation with change in gain
   c) Q point variation with change in collector
   d) Unstable Q point

13) Which of the following statement is not true in case of MOSFET ?
   a) It has high input impedance b) It is less noisy than BJT
   c) Current controlled device d) Both (a) and (b)

14) Power amplifier is a power converter which converts _____ under control of input signal.
   a) AC power into DC power b) DC power into AC power
   c) DC power into DC power d) AC power into AC power

Set R

_____

SLR-EP – 322

Seat No.	

S.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2016
ANALOG ELECTRONICS

Day and Date : Tuesday, 20-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume ***suitable*** *data if required.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) What is clamper circuit ? Explain working of positive clamper circuit.
   b) Discuss operation and significance of multiple transistor current mirror circuit.
   c) Explain working of darlingtion amplifier with suitable circuit.
   d) Why MOSFET is called as voltage controlled device ? Compare BJT and MOSFET.
   e) Define stability factor S. Derive the general expression for stability factor of biasing circuits.

3. Solve **any two** : **(2×6=12)**
   1) Distinguish amongst class A, class B, class C and class D power amplifiers.
   2) Describe the operation of biased series positive and negative clippers.
   3) Why cascading of amplifier is needed ? Discuss effect of cascading on the gain bandwidth and frequency response.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Explain working of astable multivibrator using IC 555.
   b) Draw circuit of precision rectifier and explain working.
   c) Explain working of analog multiplier circuit.
   d) Describe working of Schmitt Trigger circuit using Op-Amp. Discuss the effect of hysteresis in such circuit.
   e) Explain differential amplifier using Op-Amp.

Set R

5. Solve **any two** : **(2×6=12)**

   a) Explain effect of negative feedback in non-inverting amplifier on the following terms.
      i) Voltage gain
      ii) Input resistance
      iii) Output resistance
      iv) Bandwidth

   b) Explain how Op-Amp can be used as an
      i) Phase Shifter
      ii) Voltage to current converter.

   c) Define various electrical parameter of Op-Amp with its ideal and typical values.

SLR-EP – 322

Seat No.	

Set **S**

S.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2016
ANALOG ELECTRONICS

Day and Date : Tuesday, 20-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

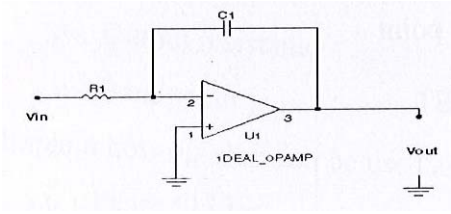
MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In IC 741 pin numbers used for output offset voltage null are
   a) pin 2 and pin 3 b) pin 1, pin 4 and pin 5
   c) pin 7 and pin 4 d) None of the above

2) If input of above circuit is square wave, then the output waveform is



   a) Triangular wave b) Quasi square wave
   c) Saw tooth wave d) Square wave

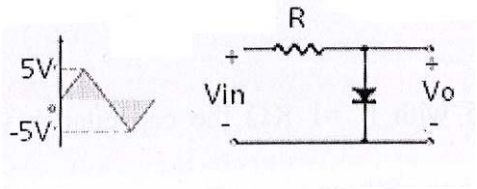
3) Slew rate for Op-Amp is considered for
   a) AC applications b) DC applications
   c) Both (a) and (b) d) None of the above

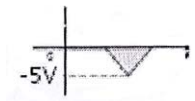
4) To introduce a delay of 5 seconds using IC 555 with R = 1 KΩ the capacitance value required is,
   a) 4.54 μF b) 4.54 mF c) 0.45 μF d) None of these

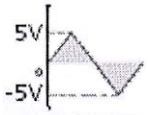
5) I to V converter is special case of _____ amplifier.
   a) Non-inverting b) Inverting c) Differential d) Scaling

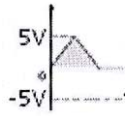
P.T.O.

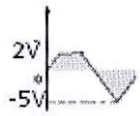
6) The average value of a half wave rectified voltage with peak value of 200V is
   a) 63.66 V b) 127.3 V c) 141 V d) 200 V
7) Voltage-divider bias provides
   a) Stable Q point
   b) Q point variation with change in gain
   c) Q point variation with change in collector
   d) Unstable Q point
8) Which of the following statement is not true in case of MOSFET ?
   a) It has high input impedance b) It is less noisy than BJT
   c) Current controlled device d) Both (a) and (b)
9) Power amplifier is a power converter which converts _____ under control of input signal.
   a) AC power into DC power b) DC power into AC power
   c) DC power into DC power d) AC power into AC power
10) In the circuit shown below the output waveform is



a) 

b) 

c) 

d) 

11) In CLASS A power amplifier collector current in the output circuit flows for
   a) 180°
   b) 360°
   c) less than 180°
   d) greater than 180° and less than 360°
12) BJT is
   a) Voltage controlled device b) Current controlled device
   c) Voltage controlled voltage source d) Reactance controlled device
13) An Op-Amp has common mode gain of 0.01 and differential mode gain of 10^5. Its CMRR would be
   a) 10^7 b) 10^{-3} c) 10^{-7} d) 10^3
14) Negative feedback in an amplifier
   a) Reduces gain
   b) Input resistance increases
   c) Output resistance decreases
   d) All above

_____

SLR-EP – 322

Seat No.	

S.E. (Electrical and Electronics) (Part – I) (CGPA) Examination, 2016
ANALOG ELECTRONICS

Day and Date : Tuesday, 20-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Assume ***suitable*** *data if required.*

SECTION – I

2. Solve **any four** : **(4×4=16)**
   a) What is clamper circuit ? Explain working of positive clamper circuit.
   b) Discuss operation and significance of multiple transistor current mirror circuit.
   c) Explain working of darlingtion amplifier with suitable circuit.
   d) Why MOSFET is called as voltage controlled device ? Compare BJT and MOSFET.
   e) Define stability factor S. Derive the general expression for stability factor of biasing circuits.

3. Solve **any two** : **(2×6=12)**
   1) Distinguish amongst class A, class B, class C and class D power amplifiers.
   2) Describe the operation of biased series positive and negative clippers.
   3) Why cascading of amplifier is needed ? Discuss effect of cascading on the gain bandwidth and frequency response.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Explain working of astable multivibrator using IC 555.
   b) Draw circuit of precision rectifier and explain working.
   c) Explain working of analog multiplier circuit.
   d) Describe working of Schmitt Trigger circuit using Op-Amp. Discuss the effect of hysteresis in such circuit.
   e) Explain differential amplifier using Op-Amp.

Set S

5. Solve **any two** : **(2×6=12)**

   a) Explain effect of negative feedback in non-inverting amplifier on the following terms.
      i) Voltage gain
      ii) Input resistance
      iii) Output resistance
      iv) Bandwidth

   b) Explain how Op-Amp can be used as an
      i) Phase Shifter
      ii) Voltage to current converter.

   c) Define various electrical parameter of Op-Amp with its ideal and typical values.

SLR-EP – 323

Seat No.	

Set **P**

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL POWER GENERATION

Day and Date : Thursday, 22-12-2016 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) Figures to the **right** indicate **maximum** marks.*
*4) Assume the suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) In pumped storage
   a) Power is produced by means of pumps
   b) Water is stored by pumping to high pressures
   c) Downstream water is pumped up-stream during off load periods
   d) Water is recirculated through turbine

2) In Boiler Water Reactor (BWR)
   a) Enriched uranium is used as fuel
   b) The feed water acts both coolant and a moderator
   c) There is danger of radioactive contamination of steam
   d) All of the above

3) Pelton turbine works under
   a) Low head and low quantity of water b) Large head and low quantity of water
   c) Large head and large quantity of water d) All of the above

4) A condenser in a thermal power plant condenses steam combing out of
   a) Boiler b) Super-heater c) Economizer d) Turbine

5) Isotopes of uranium
   a) U_{235} b) U_{234} c) U_{238} d) All of the above

6) Which of the following material can be used as a moderator ?
   a) Graphite b) Heavy water c) Beryllium d) None of the above

7) Reciprocating motion of piston is converted into rotary motion by
   a) Crank shaft b) Connecting rod c) Gudgeon pin d) Gear box

8) Geothermal energy is
   a) A renewable energy resource b) Alternative energy source
   c) Inexhaustible energy source d) None of the above

P.T.O.

9) The area under the daily load curve divided by 24 hrs gives
   a) Average load for the day
   b) Maximum demand
   c) Connected load
   d) Demand factor

10) Biogas consist of
   a) Only methane
   b) Methane and carbon dioxide with some impurities
   c) Only ethane
   d) A special organic gas

11) If a engine has spark plug, it can be safely concluded that the engine is
   a) Not a diesel engine
   b) A two stroke petrol engine
   c) A four stroke petrol engine
   d) An air cooled petrol engine

12) Out of the following which one is not a non-conventional source of energy ?
   a) Tidal power
   b) Geothermal energy
   c) Nuclear energy
   d) Wind power

13) When maximum and average loads are equal, the load factor will be
   a) Zero b) 1.0 c) 0.01 d) 0.5

14) A graphical representation between discharge and time is known as
   a) Monograph
   b) Hectograph
   c) Topograph
   d) Hydrograph

SLR-EP – 323

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL POWER GENERATION

Day and Date : Thursday, 22-12-2016 Marks : 56
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.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   1) Explain pressurized water reactor with neat diagram.
   2) Explain classification of hydroelectric power plant on the basis of head.
   3) Write a short note on present energy scenario.
   4) Write a short note on stream flow and run-off.
   5) Explain site selection criteria for thermal power plant.

3. Solve **any two** : **(8×2=16)**
   1) Draw typical layout of thermal power plant and explain it briefly.
   2) With a neat diagram explain the single line diagram of typical AC power system.
   3) Explain nuclear power plant with the help of block diagram.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) State application of diesel power stations.
   2) Explain construction and working of solar photovoltaic cell.
   3) A generating station has the following load cycle :

Time (Hours) :	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW) :	40	50	60	50	70	40

   Draw the load curve and find :
   i) Maximum demand
   ii) Units generated per day
   iii) Average load
   iv) Load factor.

Set P

4) Discuss the factors which should be considered for tidal power plant.

5) Explain the following :

a) Diversity factor

b) Demand factor.

5. Solve **any two** : **(8×2=16)**

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

2) With a neat diagram explain tidal power plant with its advantages & limitations.

3) The daily demand of three consumers is give below :

Group A : 200 KW between 8 A.M and 6 P.M

Group B : 100 KW between 6 A.M. and 10 A.M

Group C : 50 KW between 6 A.M. and 10 A.M

Group D : 100 KW between 10 A.M and 6 P.M and then between 6 P.M. and 6 A.M.

Plot the load curve and find

i) Diversity factor

ii) Units generated per day

iii) Load factor.

SLR-EP – 323

Seat No.	

Set **Q**

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL POWER GENERATION

Day and Date : Thursday, 22-12-2016 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) Figures to the **right** indicate **maximum** marks.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Geothermal energy is
   a) A renewable energy resource b) Alternative energy source
   c) Inexhaustible energy source d) None of the above

2) The area under the daily load curve divided by 24 hrs gives
   a) Average load for the day b) Maximum demand
   c) Connected load d) Demand factor

3) Biogas consist of
   a) Only methane
   b) Methane and carbon dioxide with some impurities
   c) Only ethane
   d) A special organic gas

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   c) A four stroke petrol engine d) An air cooled petrol engine

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6) When maximum and average loads are equal, the load factor will be
   a) Zero b) 1.0 c) 0.01 d) 0.5

7) A graphical representation between discharge and time is known as
   a) Monograph b) Hectograph
   c) Topograph d) Hydrograph

P.T.O.

8) In pumped storage
   a) Power is produced by means of pumps
   b) Water is stored by pumping to high pressures
   c) Downstream water is pumped up-stream during off load periods
   d) Water is recirculated through turbine

9) In Boiler Water Reactor (BWR)
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   b) The feed water acts both coolant and a moderator
   c) There is danger of radioactive contamination of steam
   d) All of the above

10) Pelton turbine works under
   a) Low head and low quantity of water
   b) Large head and low quantity of water
   c) Large head and large quantity of water
   d) All of the above

11) A condenser in a thermal power plant condenses steam combing out of
   a) Boiler b) Super-heater c) Economizer d) Turbine

12) Isotopes of uranium
   a) U_{235} b) U_{234} c) U_{238} d) All of the above

13) Which of the following material can be used as a moderator ?
   a) Graphite b) Heavy water c) Beryllium d) None of the above

14) Reciprocating motion of piston is converted into rotary motion by
   a) Crank shaft b) Connecting rod c) Gudgeon pin d) Gear box

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SLR-EP – 323

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL POWER GENERATION

Day and Date : Thursday, 22-12-2016 Marks : 56
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.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   1) Explain pressurized water reactor with neat diagram.
   2) Explain classification of hydroelectric power plant on the basis of head.
   3) Write a short note on present energy scenario.
   4) Write a short note on stream flow and run-off.
   5) Explain site selection criteria for thermal power plant.

3. Solve **any two** : **(8×2=16)**
   1) Draw typical layout of thermal power plant and explain it briefly.
   2) With a neat diagram explain the single line diagram of typical AC power system.
   3) Explain nuclear power plant with the help of block diagram.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) State application of diesel power stations.
   2) Explain construction and working of solar photovoltaic cell.
   3) A generating station has the following load cycle :

Time (Hours) :	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW) :	40	50	60	50	70	40

   Draw the load curve and find :
   i) Maximum demand
   ii) Units generated per day
   iii) Average load
   iv) Load factor.

Set Q

4) Discuss the factors which should be considered for tidal power plant.

5) Explain the following :

a) Diversity factor

b) Demand factor.

5. Solve **any two** : **(8×2=16)**

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

2) With a neat diagram explain tidal power plant with its advantages & limitations.

3) The daily demand of three consumers is give below :

Group A : 200 KW between 8 A.M and 6 P.M

Group B : 100 KW between 6 A.M. and 10 A.M

Group C : 50 KW between 6 A.M. and 10 A.M

Group D : 100 KW between 10 A.M and 6 P.M and then between 6 P.M. and 6 A.M.

Plot the load curve and find

i) Diversity factor

ii) Units generated per day

iii) Load factor.

SLR-EP – 323

Seat No.	

Set **R**

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL POWER GENERATION

Day and Date : Thursday, 22-12-2016 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) Figures to the **right** indicate **maximum** marks.*
*4) Assume the suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Isotopes of uranium
   a) U_{235} b) U_{234} c) U_{238} d) All of the above

2) Which of the following material can be used as a moderator ?
   a) Graphite b) Heavy water c) Beryllium d) None of the above

3) Reciprocating motion of piston is converted into rotary motion by
   a) Crank shaft b) Connecting rod c) Gudgeon pin d) Gear box

4) Geothermal energy is
   a) A renewable energy resource b) Alternative energy source
   c) Inexhaustible energy source d) None of the above

5) The area under the daily load curve divided by 24 hrs gives
   a) Average load for the day b) Maximum demand
   c) Connected load d) Demand factor

6) Biogas consist of
   a) Only methane
   b) Methane and carbon dioxide with some impurities
   c) Only ethane
   d) A special organic gas

7) If a engine has spark plug, it can be safely concluded that the engine is
   a) Not a diesel engine b) A two stroke petrol engine
   c) A four stroke petrol engine d) An air cooled petrol engine

8) Out of the following which one is not a non-conventional source of energy ?
   a) Tidal power b) Geothermal energy
   c) Nuclear energy d) Wind power

P.T.O.

9) When maximum and average loads are equal, the load factor will be
   a) Zero b) 1.0 c) 0.01 d) 0.5

10) A graphical representation between discharge and time is known as
   a) Monograph b) Hectograph
   c) Topograph d) Hydrograph

11) In pumped storage
   a) Power is produced by means of pumps
   b) Water is stored by pumping to high pressures
   c) Downstream water is pumped up-stream during off load periods
   d) Water is recirculated through turbine

12) In Boiler Water Reactor (BWR)
   a) Enriched uranium is used as fuel
   b) The feed water acts both coolant and a moderator
   c) There is danger of radioactive contamination of steam
   d) All of the above

13) Pelton turbine works under
   a) Low head and low quantity of water b) Large head and low quantity of water
   c) Large head and large quantity of water d) All of the above

14) A condenser in a thermal power plant condenses steam combing out of
   a) Boiler b) Super-heater c) Economizer d) Turbine

SLR-EP – 323

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL POWER GENERATION

Day and Date : Thursday, 22-12-2016 Marks : 56
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.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   1) Explain pressurized water reactor with neat diagram.
   2) Explain classification of hydroelectric power plant on the basis of head.
   3) Write a short note on present energy scenario.
   4) Write a short note on stream flow and run-off.
   5) Explain site selection criteria for thermal power plant.

3. Solve **any two** : **(8×2=16)**
   1) Draw typical layout of thermal power plant and explain it briefly.
   2) With a neat diagram explain the single line diagram of typical AC power system.
   3) Explain nuclear power plant with the help of block diagram.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) State application of diesel power stations.
   2) Explain construction and working of solar photovoltaic cell.
   3) A generating station has the following load cycle :

Time (Hours) :	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW) :	40	50	60	50	70	40

   Draw the load curve and find :
   i) Maximum demand
   ii) Units generated per day
   iii) Average load
   iv) Load factor.

Set R

4) Discuss the factors which should be considered for tidal power plant.

5) Explain the following :

a) Diversity factor

b) Demand factor.

5. Solve **any two** : **(8×2=16)**

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

2) With a neat diagram explain tidal power plant with its advantages & limitations.

3) The daily demand of three consumers is give below :

Group A : 200 KW between 8 A.M and 6 P.M

Group B : 100 KW between 6 A.M. and 10 A.M

Group C : 50 KW between 6 A.M. and 10 A.M

Group D : 100 KW between 10 A.M and 6 P.M and then between 6 P.M. and 6 A.M.

Plot the load curve and find

i) Diversity factor

ii) Units generated per day

iii) Load factor.

SLR-EP – 323

Seat No.	

Set **S**

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL POWER GENERATION

Day and Date : Thursday, 22-12-2016 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) Figures to the **right** indicate **maximum** marks.*
*4) Assume the suitable data **whenever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

1. Choose the correct answer :

1) Biogas consist of
   a) Only methane
   b) Methane and carbon dioxide with some impurities
   c) Only ethane
   d) A special organic gas

2) If a engine has spark plug, it can be safely concluded that the engine is
   a) Not a diesel engine b) A two stroke petrol engine
   c) A four stroke petrol engine d) An air cooled petrol engine

3) Out of the following which one is not a non-conventional source of energy ?
   a) Tidal power b) Geothermal energy
   c) Nuclear energy d) Wind power

4) When maximum and average loads are equal, the load factor will be
   a) Zero b) 1.0 c) 0.01 d) 0.5

5) A graphical representation between discharge and time is known as
   a) Monograph b) Hectograph
   c) Topograph d) Hydrograph

6) In pumped storage
   a) Power is produced by means of pumps
   b) Water is stored by pumping to high pressures
   c) Downstream water is pumped up-stream during off load periods
   d) Water is recirculated through turbine

P.T.O.

7) In Boiler Water Reactor (BWR)
   a) Enriched uranium is used as fuel
   b) The feed water acts both coolant and a moderator
   c) There is danger of radioactive contamination of steam
   d) All of the above

8) Pelton turbine works under
   a) Low head and low quantity of water
   b) Large head and low quantity of water
   c) Large head and large quantity of water
   d) All of the above

9) A condenser in a thermal power plant condenses steam combing out of
   a) Boiler b) Super-heater c) Economizer d) Turbine

10) Isotopes of uranium
   a) U_{235} b) U_{234} c) U_{238} d) All of the above

11) Which of the following material can be used as a moderator ?
   a) Graphite b) Heavy water c) Beryllium d) None of the above

12) Reciprocating motion of piston is converted into rotary motion by
   a) Crank shaft b) Connecting rod c) Gudgeon pin d) Gear box

13) Geothermal energy is
   a) A renewable energy resource
   b) Alternative energy source
   c) Inexhaustible energy source
   d) None of the above

14) The area under the daily load curve divided by 24 hrs gives
   a) Average load for the day
   b) Maximum demand
   c) Connected load
   d) Demand factor

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SLR-EP – 323

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – I) (CGPA) Examination, 2016
ELECTRICAL POWER GENERATION

Day and Date : Thursday, 22-12-2016 Marks : 56
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.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   1) Explain pressurized water reactor with neat diagram.
   2) Explain classification of hydroelectric power plant on the basis of head.
   3) Write a short note on present energy scenario.
   4) Write a short note on stream flow and run-off.
   5) Explain site selection criteria for thermal power plant.

3. Solve **any two** : **(8×2=16)**
   1) Draw typical layout of thermal power plant and explain it briefly.
   2) With a neat diagram explain the single line diagram of typical AC power system.
   3) Explain nuclear power plant with the help of block diagram.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   1) State application of diesel power stations.
   2) Explain construction and working of solar photovoltaic cell.
   3) A generating station has the following load cycle :

Time (Hours) :	0 – 6	6 – 10	10 – 12	12 – 16	16 – 20	20 – 24
Load (MW) :	40	50	60	50	70	40

   Draw the load curve and find :
   i) Maximum demand
   ii) Units generated per day
   iii) Average load
   iv) Load factor.

Set S

4) Discuss the factors which should be considered for tidal power plant.

5) Explain the following :

a) Diversity factor

b) Demand factor.

5. Solve **any two** : **(8×2=16)**

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

2) With a neat diagram explain tidal power plant with its advantages & limitations.

3) The daily demand of three consumers is give below :

Group A : 200 KW between 8 A.M and 6 P.M

Group B : 100 KW between 6 A.M. and 10 A.M

Group C : 50 KW between 6 A.M. and 10 A.M

Group D : 100 KW between 10 A.M and 6 P.M and then between 6 P.M. and 6 A.M.

Plot the load curve and find

i) Diversity factor

ii) Units generated per day

iii) Load factor.

SLR-EP – 324

Seat No.	

Set P

S.E. (Electrical and Electronics) (Part – I) Examination, 2016
DATA STRUCTURE (Old)

Day and Date : Saturday, 10-12-2016 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) Figures to ***right*** *indicate* ***full*** *marks.*
5) Assume suitable data if ***necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. (**All** questions **compulsory**). **(1×20=20)**

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

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

3) Queue is a DS which is called
a) LIFO b) FIFO c) LILO d) none

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

5) Conversion of A + (B*C) infix expression to postfix is
a) A*BC+ b) AB + C* c) ABC*+ d) none

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

7) POP operation of stack pops
a) 1st inserted element b) last inserted element
c) any element d) none

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

P.T.O.

9) Which of the following is the feature of stack ?
   a) All operation is at one end
   b) It cannot reuse its memory
   c) All elements are of different data types
   d) Any element can be accessed from it directly

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

11) The best data structure to check whether an arithmetic expression has balanced parenthesis
   a) queue b) stack c) linked list d) none

12) The next address field of last node of linked list contains a special value known as
   a) – 1 b) 0 c) 1 d) NULL

13) Avail list is nothing but
   a) finite pool of available nodes b) no of nodes of link list
   c) both a, b d) none

14) A node of linked list contains following fields
   a) info and next b) front and rear c) top d) none

15) The pointer pointing first node of linked list is called
   a) internal pointer b) external pointer
   c) traversal d) none

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

17) Full form of ADT is
   a) Abstract Data Type b) Absolute Data Type
   c) Abstract Data Tree d) None of the above

18) Josephus problem can be solved by using
   a) stack b) queue
   c) singly linked list d) circular linked list

19) Tower of Hanoi problem can be solved by using
   a) recursion b) queue c) structure d) union

20) From following operation select which operation is not related to stack
   a) PUSH b) POP c) TOP d) ENQ

_____

SLR-EP – 324

Seat No.	

S.E. (Electrical and Electronics) (Part – I) Examination, 2016
DATA STRUCTURE (Old)

Day and Date : Saturday, 10-12-2016 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 multidimensional array. Explain with example.

b) Write a short note on abstract data type.

c) Write a short note on :

i) Type conversion

ii) Storage classes.

d) Evaluate the following postfix expressions

i) 98 + 382 / * 2 + –

ii) 546 + * 493 / + *

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

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

i) Write and explain algorithm for evaluation postfix expression.

ii) Explain implementation of stack using linked list.

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

i) Stack Applications

ii) Structure Vs. Union.

Set P

SECTION – II

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

   i) Implementation of linked list

   ii) Deque

   iii) Josephus problem

   iv) Hashing

   v) Selection sort

   vi) Linear search.

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

      i) Explain in brief about selection sort.

      ii) Explain the concept of static storage allocation and dynamic storage allocation in case of recursion.

   b) Write a program to add, delete, search, display and count number of node using singly linked list. **(1×10=10)**

SLR-EP – 324

Seat No.	

Set Q

S.E. (Electrical and Electronics) (Part – I) Examination, 2016
DATA STRUCTURE (Old)

Day and Date : Saturday, 10-12-2016 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) Figures to ***right*** *indicate* ***full*** *marks.*
5) Assume suitable data if ***necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. (**All** questions **compulsory**). **(1×20=20)**

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

2) Full form of ADT is
   a) Abstract Data Type b) Absolute Data Type
   c) Abstract Data Tree d) None of the above

3) Josephus problem can be solved by using
   a) stack b) queue
   c) singly linked list d) circular linked list

4) Tower of Hanoi problem can be solved by using
   a) recursion b) queue c) structure d) union

5) From following operation select which operation is not related to stack
   a) PUSH b) POP c) TOP d) ENQ

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

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

8) Queue is a DS which is called
   a) LIFO b) FIFO c) LILO d) none

P.T.O.

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

10) Conversion of A + (B*C) infix expression to postfix is
   a) A*BC+ b) AB + C* c) ABC*+ d) none

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

12) POP operation of stack pops
   a) 1st inserted element b) last inserted element
   c) any element d) none

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

14) Which of the following is the feature of stack ?
   a) All operation is at one end
   b) It cannot reuse its memory
   c) All elements are of different data types
   d) Any element can be accessed from it directly

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

16) The best data structure to check whether an arithmetic expression has balanced parenthesis
   a) queue b) stack c) linked list d) none

17) The next address field of last node of linked list contains a special value known as
   a) – 1 b) 0 c) 1 d) NULL

18) Avail list is nothing but
   a) finite pool of available nodes b) no of nodes of link list
   c) both a, b d) none

19) A node of linked list contains following fields
   a) info and next b) front and rear c) top d) none

20) The pointer pointing first node of linked list is called
   a) internal pointer b) external pointer
   c) traversal d) none

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SLR-EP – 324

Seat No.	

S.E. (Electrical and Electronics) (Part – I) Examination, 2016
DATA STRUCTURE (Old)

Day and Date : Saturday, 10-12-2016 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 multidimensional array. Explain with example.

b) Write a short note on abstract data type.

c) Write a short note on :

i) Type conversion

ii) Storage classes.

d) Evaluate the following postfix expressions

i) 98 + 382 / * 2 + –

ii) 546 + * 493 / + *

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

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

i) Write and explain algorithm for evaluation postfix expression.

ii) Explain implementation of stack using linked list.

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

i) Stack Applications

ii) Structure Vs. Union.

Set Q

SECTION – II

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

   i) Implementation of linked list

   ii) Deque

   iii) Josephus problem

   iv) Hashing

   v) Selection sort

   vi) Linear search.

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

      i) Explain in brief about selection sort.

      ii) Explain the concept of static storage allocation and dynamic storage allocation in case of recursion.

   b) Write a program to add, delete, search, display and count number of node using singly linked list. **(1×10=10)**

SLR-EP – 324

Seat No.	

Set R

S.E. (Electrical and Electronics) (Part – I) Examination, 2016
DATA STRUCTURE (Old)

Day and Date : Saturday, 10-12-2016 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) Figures to ***right*** *indicate* ***full*** *marks.*
5) Assume suitable data if ***necessary****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. (**All** questions **compulsory**). **(1×20=20)**

1) The best data structure to check whether an arithmetic expression has balanced parenthesis
a) queue b) stack c) linked list d) none

2) The next address field of last node of linked list contains a special value known as
a) – 1 b) 0 c) 1 d) NULL

3) Avail list is nothing but
a) finite pool of available nodes b) no of nodes of link list
c) both a, b d) none

4) A node of linked list contains following fields
a) info and next b) front and rear c) top d) none

5) The pointer pointing first node of linked list is called
a) internal pointer b) external pointer
c) traversal d) none

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

7) Full form of ADT is
a) Abstract Data Type b) Absolute Data Type
c) Abstract Data Tree d) None of the above

P.T.O.

8) Josephus problem can be solved by using
   a) stack b) queue
   c) singly linked list d) circular linked list

9) Tower of Hanoi problem can be solved by using
   a) recursion b) queue c) structure d) union

10) From following operation select which operation is not related to stack
   a) PUSH b) POP c) TOP d) ENQ

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

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

13) Queue is a DS which is called
   a) LIFO b) FIFO c) LILO d) none

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

15) Conversion of A + (B*C) infix expression to postfix is
   a) A*BC+ b) AB + C* c) ABC*+ d) none

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

17) POP operation of stack pops
   a) 1st inserted element b) last inserted element
   c) any element d) none

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

19) Which of the following is the feature of stack ?
   a) All operation is at one end
   b) It cannot reuse its memory
   c) All elements are of different data types
   d) Any element can be accessed from it directly

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

SLR-EP – 324

Seat No.	

S.E. (Electrical and Electronics) (Part – I) Examination, 2016
DATA STRUCTURE (Old)

Day and Date : Saturday, 10-12-2016 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 multidimensional array. Explain with example.

b) Write a short note on abstract data type.

c) Write a short note on :

i) Type conversion

ii) Storage classes.

d) Evaluate the following postfix expressions

i) 98 + 382 / * 2 + –

ii) 546 + * 493 / + *

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

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

i) Write and explain algorithm for evaluation postfix expression.

ii) Explain implementation of stack using linked list.

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

i) Stack Applications

ii) Structure Vs. Union.

Set R

SECTION – II

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

   i) Implementation of linked list

   ii) Deque

   iii) Josephus problem

   iv) Hashing

   v) Selection sort

   vi) Linear search.

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

      i) Explain in brief about selection sort.

      ii) Explain the concept of static storage allocation and dynamic storage allocation in case of recursion.

   b) Write a program to add, delete, search, display and count number of node using singly linked list. **(1×10=10)**

SLR-EP – 324

Seat No.	

Set S

S.E. (Electrical and Electronics) (Part – I) Examination, 2016
DATA STRUCTURE (Old)

Day and Date : Saturday, 10-12-2016 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) Figures to **right** indicate **full** marks.*
*5) Assume suitable data if **necessary**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer. (**All** questions **compulsory**). **(1×20=20)**

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

2) POP operation of stack pops
a) 1st inserted element b) last inserted element
c) any element d) none

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

4) Which of the following is the feature of stack ?
a) All operation is at one end
b) It cannot reuse its memory
c) All elements are of different data types
d) Any element can be accessed from it directly

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

6) The best data structure to check whether an arithmetic expression has balanced parenthesis
a) queue b) stack c) linked list d) none

P.T.O.

7) The next address field of last node of linked list contains a special value known as
   a) – 1 b) 0 c) 1 d) NULL

8) Avail list is nothing but
   a) finite pool of available nodes b) no of nodes of link list
   c) both a, b d) none

9) A node of linked list contains following fields
   a) info and next b) front and rear c) top d) none

10) The pointer pointing first node of linked list is called
   a) internal pointer b) external pointer
   c) traversal d) none

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

12) Full form of ADT is
   a) Abstract Data Type b) Absolute Data Type
   c) Abstract Data Tree d) None of the above

13) Josephus problem can be solved by using
   a) stack b) queue
   c) singly linked list d) circular linked list

14) Tower of Hanoi problem can be solved by using
   a) recursion b) queue c) structure d) union

15) From following operation select which operation is not related to stack
   a) PUSH b) POP c) TOP d) ENQ

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

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

18) Queue is a DS which is called
   a) LIFO b) FIFO c) LILO d) none

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

20) Conversion of A + (B*C) infix expression to postfix is
   a) A*BC+ b) AB + C* c) ABC*+ d) none

SLR-EP – 324

Seat No.	

S.E. (Electrical and Electronics) (Part – I) Examination, 2016
DATA STRUCTURE (Old)

Day and Date : Saturday, 10-12-2016 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 multidimensional array. Explain with example.

b) Write a short note on abstract data type.

c) Write a short note on :

i) Type conversion

ii) Storage classes.

d) Evaluate the following postfix expressions

i) 98 + 382 / * 2 + –

ii) 546 + * 493 / + *

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

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

i) Write and explain algorithm for evaluation postfix expression.

ii) Explain implementation of stack using linked list.

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

i) Stack Applications

ii) Structure Vs. Union.

SECTION – II

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

   i) Implementation of linked list

   ii) Deque

   iii) Josephus problem

   iv) Hashing

   v) Selection sort

   vi) Linear search.

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

      i) Explain in brief about selection sort.

      ii) Explain the concept of static storage allocation and dynamic storage allocation in case of recursion.

   b) Write a program to add, delete, search, display and count number of node using singly linked list. **(1×10=10)**

SLR-EP – 325

Seat No.	

Set P

S.E. (Part – II) (E & E Engg.) (CGPA) Examination, 2016
LINEAR ALGEBRA

Day and Date : Monday, 21-11-2016 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) ***Answer MCQ/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) Rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \end{bmatrix}$ is

a) 1 b) 2 c) 3 d) None of these

2) Given a scalar 'r' the transformation $T : R^2 \rightarrow R^2$ defined by $T(X) = rX$, when $0 \leq r \leq 1$ is called
a) Dilation b) Contraction
c) Translation d) None of these

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

$$\left[\begin{array}{ccc|c} 1 & 3 & 0 & 2 \\ 0 & -1 & 2 & 7 \\ 0 & 1 & -1 & 6 \end{array}\right]$$

a) $x + 3y = 2, y + 2z = 7, y + z = 6$ b) $u + 3v = 2, -v + 2w = 7, v = -w + 6$
c) $r + 3s = 2, -s + 2t = 7, s = t + 6$ d) $a + 3b = 2c, -b - 2c = 7, b - c = 6$

4) Which of the following is true ?
a) rankA + dim column = m b) rankA + dim NullA = m
c) rankA + dim column = n d) rankA + dim NullA = n

P.T.O.

5) Consider a basis B = $\{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. Suppose on X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ then X is

a) $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ b) $\begin{bmatrix} -2 \\ 3 \end{bmatrix}$ c) $\begin{bmatrix} 6 \\ 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 \\ 6 \end{bmatrix}$

6) If $A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$ then the eigen values of A^3 are

a) $-1, 27, -8$ b) $-1, \frac{1}{3}, \frac{-1}{2}$ c) $-1, 3, -2$ d) $1, 27, 8$

7) If 2, 3, 5 are the eigen values of A then $|A|$ =
a) 10 b) 30 c) 40 d) None of these

8) Two vectors u and v are orthogonal to each other if
a) $u + v = 0$ b) $u - v = 0$ c) $u.\ v = 0$ d) none of these

9) If u = [3, 5, 6] and v = [0, 2, 3]. Then u.v is
a) 28 b) [0, 10, 18] c) 19 d) None of these

10) The correlation coefficient r is negative if
a) b_{yx} is negative b) b_{xy} is negative
c) both b_{yx} and b_{xy} are negative d) none of these

11) If $b_{yx} = \frac{5}{18}$, $b_{xy} = \frac{8}{5}$ then r =
a) $\frac{2}{5}$ b) $\frac{1}{5}$ c) $\frac{2}{3}$ d) $\frac{3}{2}$

12) The coefficient of regression of y on x is equal to
a) $r.\frac{\sigma_y}{\sigma_x}$ b) $r.\frac{\sigma_x}{\sigma_y}$ c) $\sigma_x \cdot \sigma_y$ d) $\frac{1}{r}.\frac{\sigma_x}{\sigma_y}$

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

14) Cauchy integral formula is given by
a) $\int_C \frac{f(z)}{z - z_0} = 2\pi i\, f(z_0)$ b) $f(z_0) = \int_C \frac{f(z)}{z - z_0}\, dz$
c) $f(z_0) = \frac{1}{2\pi}\int_C \frac{f(z)}{z - z_0}\, dz$ d) $\int_C \frac{f(z)}{z - z_0}\, dz = 2\pi\, f(z_0)$

Set P

SLR-EP – 325

Seat No.	

S.E. (Part – II) (E & E Engg.) (CGPA) Examination, 2016
LINEAR ALGEBRA

Day and Date : Monday, 21-11-2016 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 non-programmable calculator is **allowed**.*

SECTION – I

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

a) Solve the system

$x_1 - 3x_2 = 5, -x_1 + x_2 + 5x_3 = 2, x_2 + x_3 = 0$

b) Let $a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}, a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$

Determine whether b can be generated as a linear combination of a_1 and a_2.

c) Let $T : R^2 \rightarrow R^2$ be a linear transformation such that

$T(x_1, x_2) = (x_1 - 2x_2, -x_1 + 3x_2, 3x_1 - 2x_2)$.

Find X such that T(X) = (–1, 4, 9).

d) Determine if columns of $\begin{bmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{bmatrix}$ form a linearly independent set.

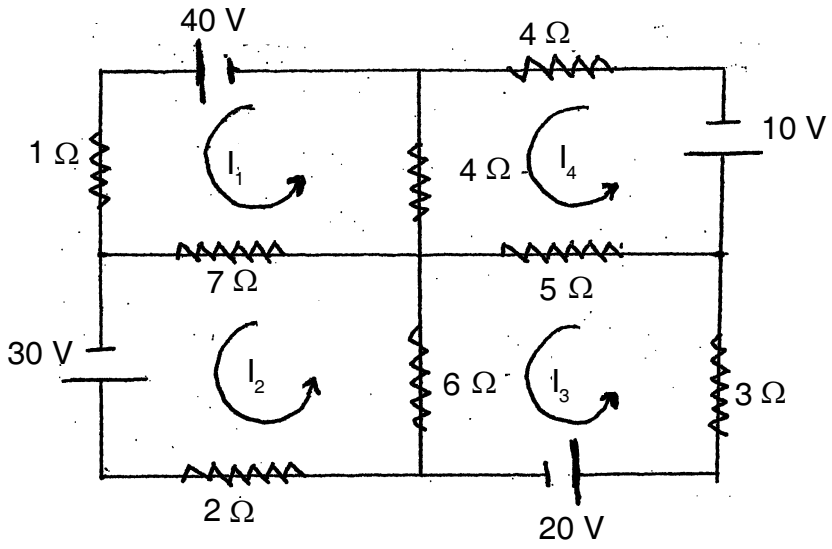
3. a) Solve the equation AX = b by using the LU factorization given for A. **3**

$$A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}, b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix} \text{ and}$$

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

Set P

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



c) Let $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ and define transformation $T : R^2 \rightarrow R^2$ by $T(X) = AX$. **3**

Find T(u) and T(v)

Where $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $v = \begin{bmatrix} a \\ b \end{bmatrix}$

4. a) Assume that A is row equivalent to B. Find bases for Nul A and Col A. **4**

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

b) Find basis and state the dimension of $\left\{ \begin{bmatrix} s-2t \\ s+t \\ 3t \end{bmatrix} : s,t \text{ in } R \right\}$. **3**

c) Consider a basis $B = \{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ suppose on

X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$. Find X. **3**

5. a) Diagonalize the matrix if possible $A = \begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$. **3**

b) Apply power method to $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ with $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ stop when k = 4 and estimate the dominant eigen value and corresponding vector for A. **3**

c) Find the eigen values of A where $A = \begin{bmatrix} 0.5 & -0.6 \\ 0.75 & 1.1 \end{bmatrix}$. **3**

SECTION – II

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

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

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

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

ii) Find a unit vector u in the direction of c.

iii) Show that d is orthogonal to c.

OR

b) Let $u_1 = \begin{bmatrix} -1/\sqrt{5} \\ 2/\sqrt{5} \end{bmatrix}$, $u_2 = \begin{bmatrix} 2/\sqrt{5} \\ 1/\sqrt{5} \end{bmatrix}$ show that $\{u_1, u_2\}$ is an orthonormal basis for R^2. **4**

c) Show that set of vectors $s = \{u_1, u_2, u_3\}$ is orthogonal where $u_1 = (1, 2, -3, 4)$, $u_2 = (3, 4, 1, -2)$, $u_3 = (3, -2, 1, 1)$. **3**

7. a) Is $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2x_3$ positive definite ? **3**

   b)

Given	**x series**	**y series**
Mean	18	100
S.D.	14	20

   Coefficient of correlation between x and y is 0.8 (i. e. r = 0.8). Find two lines of regression. Also find y if x is 70 and x if y is 90. **3**

   c) Equations giving the two lines of regression of y on x and of x on y are

   $7x - 16y = -9$ and $-4x + 5y = 3$.

   Find the means of x and y and the coefficient of correlation. **3**

8. a) Compute the coefficient of correlation between x and y from the following data : **3**

x :	2	4	5	6	8	11
y :	18	12	10	8	7	5

   b) Find the equations of the lines of regression from the following data. Find also the best estimate of y when x = 13 and the best estimate of x when y = 8. **3**

x :	2	4	6	8	12	14
y :	4	2	5	10	11	12

   c) Given :

   Mean of x = 50.07 Mean of y = 9.98

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

   r = 0.898

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

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

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

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

   c) Find an analytic function whose real part is $e^x.\cos y$. **3**

Set P

SLR-EP – 325

Seat No.	

Set Q

S.E. (Part – II) (E & E Engg.) (CGPA) Examination, 2016
LINEAR ALGEBRA

Day and Date : Monday, 21-11-2016 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) ***Answer MCQ/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) Two vectors u and v are orthogonal to each other if
a) $u + v = 0$ b) $u - v = 0$ c) $u.\ v = 0$ d) none of these

2) If u = [3, 5, 6] and v = [0, 2, 3]. Then u.v is
a) 28 b) [0, 10, 18] c) 19 d) None of these

3) The correlation coefficient r is negative if
a) b_{yx} is negative b) b_{xy} is negative
c) both b_{yx} and b_{xy} are negative d) none of these

4) If $b_{yx} = \frac{5}{18}$, $b_{xy} = \frac{8}{5}$ then r =
a) $\frac{2}{5}$ b) $\frac{1}{5}$ c) $\frac{2}{3}$ d) $\frac{3}{2}$

5) The coefficient of regression of y on x is equal to
a) $r.\frac{\sigma_y}{\sigma_x}$ b) $r.\frac{\sigma_x}{\sigma_y}$ c) $\sigma_x \cdot \sigma_y$ d) $\frac{1}{r}.\frac{\sigma_x}{\sigma_y}$

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

7) Cauchy integral formula is given by
a) $\int_C \frac{f(z)}{z - z_0} = 2\pi i\, f(z_0)$ b) $f(z_0) = \int_C \frac{f(z)}{z - z_0}\, dz$
c) $f(z_0) = \frac{1}{2\pi}\int_C \frac{f(z)}{z - z_0}\, dz$ d) $\int_C \frac{f(z)}{z - z_0}\, dz = 2\pi\, f(z_0)$

P.T.O.

8) Rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \end{bmatrix}$ is

a) 1 b) 2 c) 3 d) None of these

9) Given a scalar 'r' the transformation $T : R^2 \to R^2$ defined by $T(X) = rX$, when $0 \leq r \leq 1$ is called

a) Dilation b) Contraction

c) Translation d) None of these

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

$$\left[\begin{array}{ccc|c} 1 & 3 & 0 & 2 \\ 0 & -1 & 2 & 7 \\ 0 & 1 & -1 & 6 \end{array}\right]$$

a) $x + 3y = 2, y + 2z = 7, y + z = 6$ b) $u + 3v = 2, -v + 2w = 7, v = -w + 6$

c) $r + 3s = 2, -s + 2t = 7, s = t + 6$ d) $a + 3b = 2c, -b - 2c = 7, b - c = 6$

11) Which of the following is true ?

a) rankA + dim column = m b) rankA + dim NullA = m

c) rankA + dim column = n d) rankA + dim NullA = n

12) Consider a basis $B = \{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. Suppose on X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ then X is

a) $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ b) $\begin{bmatrix} -2 \\ 3 \end{bmatrix}$ c) $\begin{bmatrix} 6 \\ 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 \\ 6 \end{bmatrix}$

13) If $A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$ then the eigen values of A^3 are

a) $-1, 27, -8$ b) $-1, \frac{1}{3}, \frac{-1}{2}$ c) $-1, 3, -2$ d) $1, 27, 8$

14) If 2, 3, 5 are the eigen values of A then $|A| =$

a) 10 b) 30 c) 40 d) None of these

SLR-EP – 325

Seat No.	

S.E. (Part – II) (E & E Engg.) (CGPA) Examination, 2016
LINEAR ALGEBRA

Day and Date : Monday, 21-11-2016 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 non-programmable calculator is **allowed**.*

SECTION – I

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

a) Solve the system

$x_1 - 3x_2 = 5, -x_1 + x_2 + 5x_3 = 2, x_2 + x_3 = 0$

b) Let $a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}, a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$

Determine whether b can be generated as a linear combination of a_1 and a_2.

c) Let $T : R^2 \rightarrow R^2$ be a linear transformation such that

$T(x_1, x_2) = (x_1 - 2x_2, -x_1 + 3x_2, 3x_1 - 2x_2)$.

Find X such that T(X) = (–1, 4, 9).

d) Determine if columns of $\begin{bmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{bmatrix}$ form a linearly independent set.

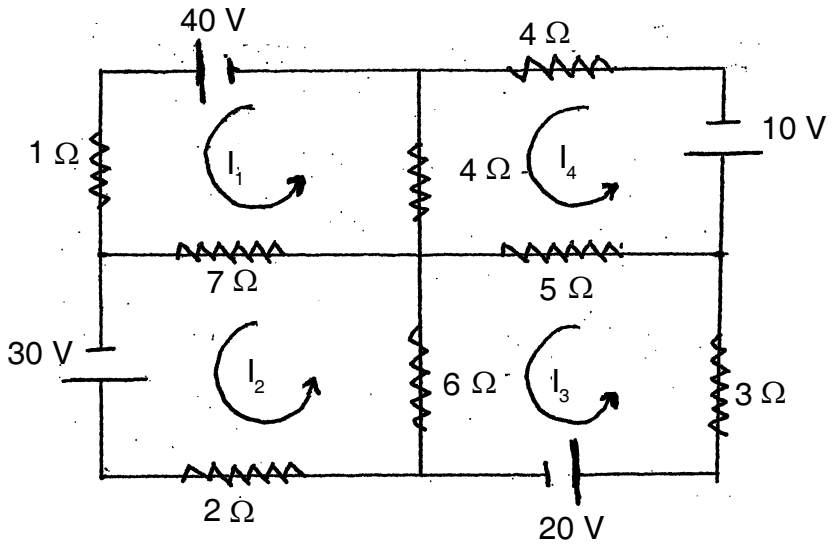
3. a) Solve the equation AX = b by using the LU factorization given for A. **3**

$$A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}, b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix} \text{ and}$$

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

Set Q

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



c) Let $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ and define transformation $T : R^2 \rightarrow R^2$ by $T(X) = AX$. **3**

Find T(u) and T(v)

Where $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $v = \begin{bmatrix} a \\ b \end{bmatrix}$

4. a) Assume that A is row equivalent to B. Find bases for Nul A and Col A. **4**

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

b) Find basis and state the dimension of $\left\{ \begin{bmatrix} s-2t \\ s+t \\ 3t \end{bmatrix} : s,t \text{ in } R \right\}$. **3**

c) Consider a basis $B = \{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ suppose on

X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$. Find X. **3**

Set Q

5. a) Diagonalize the matrix if possible $A = \begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$. **3**

b) Apply power method to $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ with $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ stop when k = 4 and estimate the dominant eigen value and corresponding vector for A. **3**

c) Find the eigen values of A where $A = \begin{bmatrix} 0.5 & -0.6 \\ 0.75 & 1.1 \end{bmatrix}$. **3**

SECTION – II

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

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

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

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

ii) Find a unit vector u in the direction of c.

iii) Show that d is orthogonal to c.

OR

b) Let $u_1 = \begin{bmatrix} -1/\sqrt{5} \\ 2/\sqrt{5} \end{bmatrix}$, $u_2 = \begin{bmatrix} 2/\sqrt{5} \\ 1/\sqrt{5} \end{bmatrix}$ show that $\{u_1, u_2\}$ is an orthonormal basis for R^2. **4**

c) Show that set of vectors $s = \{u_1, u_2, u_3\}$ is orthogonal where $u_1 = (1, 2, -3, 4)$, $u_2 = (3, 4, 1, -2)$, $u_3 = (3, -2, 1, 1)$. **3**

7. a) Is $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2x_3$ positive definite ? **3**

   b)

Given	**x series**	**y series**
Mean	18	100
S.D.	14	20

   Coefficient of correlation between x and y is 0.8 (i. e. r = 0.8). Find two lines of regression. Also find y if x is 70 and x if y is 90. **3**

   c) Equations giving the two lines of regression of y on x and of x on y are

   $7x - 16y = -9$ and $-4x + 5y = 3$.

   Find the means of x and y and the coefficient of correlation. **3**

8. a) Compute the coefficient of correlation between x and y from the following data : **3**

x :	2	4	5	6	8	11
y :	18	12	10	8	7	5

   b) Find the equations of the lines of regression from the following data. Find also the best estimate of y when x = 13 and the best estimate of x when y = 8. **3**

x :	2	4	6	8	12	14
y :	4	2	5	10	11	12

   c) Given :

   Mean of x = 50.07 Mean of y = 9.98

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

   r = 0.898

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

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

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

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

   c) Find an analytic function whose real part is $e^x.\cos y$. **3**

Set Q

SLR-EP – 325

Seat No.	

Set **R**

S.E. (Part – II) (E & E Engg.) (CGPA) Examination, 2016
LINEAR ALGEBRA

Day and Date : Monday, 21-11-2016 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) ***Answer MCQ/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) Consider a basis B = $\{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. Suppose on X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ then X is

a) $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ b) $\begin{bmatrix} -2 \\ 3 \end{bmatrix}$ c) $\begin{bmatrix} 6 \\ 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 \\ 6 \end{bmatrix}$

2) If $A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$ then the eigen values of A^3 are

a) – 1, 27, – 8 b) $-1, \frac{1}{3}, \frac{-1}{2}$ c) – 1, 3, – 2 d) 1, 27, 8

3) If 2, 3, 5 are the eigen values of A then |A| =
a) 10 b) 30 c) 40 d) None of these

4) Two vectors u and v are orthogonal to each other if
a) u + v = 0 b) u – v = 0 c) u. v = 0 d) none of these

5) If u = [3, 5, 6] and v = [0, 2, 3]. Then u.v is
a) 28 b) [0, 10, 18] c) 19 d) None of these

6) The correlation coefficient r is negative if
a) b_{yx} is negative b) b_{xy} is negative
c) both b_{yx} and b_{xy} are negative d) none of these

P.T.O.

7) If $b_{yx} = \frac{5}{18}$, $b_{xy} = \frac{8}{5}$ then r =

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

8) The coefficient of regression of y on x is equal to

a) $r.\frac{\sigma_y}{\sigma_x}$ b) $r.\frac{\sigma_x}{\sigma_y}$ c) $\sigma_x \cdot \sigma_y$ d) $\frac{1}{r}.\frac{\sigma_x}{\sigma_y}$

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

a) $\frac{\partial^2\phi}{\partial x^2} - \frac{\partial^2\phi}{\partial y^2} = 0$ b) $\frac{\partial^2\phi}{\partial x^2} + \frac{\partial^2\phi}{\partial y^2} = 0$ c) $\frac{\partial\phi}{\partial x} + \frac{\partial\phi}{\partial y} = 0$ d) $\frac{\partial\phi}{\partial x} - \frac{\partial\phi}{\partial y} = 0$

10) Cauchy integral formula is given by

a) $\int_C \frac{f(z)}{z - z_0} = 2\pi i\, f(z_0)$ b) $f(z_0) = \int_C \frac{f(z)}{z - z_0}\, dz$

c) $f(z_0) = \frac{1}{2\pi}\int_C \frac{f(z)}{z - z_0}\, dz$ d) $\int_C \frac{f(z)}{z - z_0}\, dz = 2\pi\, f(z_0)$

11) Rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \end{bmatrix}$ is

a) 1 b) 2 c) 3 d) None of these

12) Given a scalar 'r' the transformation $T : R^2 \to R^2$ defined by $T(X) = rX$, when $0 \leq r \leq 1$ is called

a) Dilation b) Contraction
c) Translation d) None of these

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

$$\left[\begin{array}{ccc|c} 1 & 3 & 0 & 2 \\ 0 & -1 & 2 & 7 \\ 0 & 1 & -1 & 6 \end{array}\right]$$

a) $x + 3y = 2, y + 2z = 7, y + z = 6$ b) $u + 3v = 2, -v + 2w = 7, v = -w + 6$
c) $r + 3s = 2, -s + 2t = 7, s = t + 6$ d) $a + 3b = 2c, -b - 2c = 7, b - c = 6$

14) Which of the following is true ?

a) rankA + dim column = m b) rankA + dim NullA = m
c) rankA + dim column = n d) rankA + dim NullA = n

———————

SLR-EP – 325

Seat No.	

S.E. (Part – II) (E & E Engg.) (CGPA) Examination, 2016
LINEAR ALGEBRA

Day and Date : Monday, 21-11-2016 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 non-programmable calculator is **allowed**.*

SECTION – I

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

a) Solve the system

$x_1 - 3x_2 = 5, -x_1 + x_2 + 5x_3 = 2, x_2 + x_3 = 0$

b) Let $a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}, a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$

Determine whether b can be generated as a linear combination of a_1 and a_2.

c) Let $T : R^2 \rightarrow R^2$ be a linear transformation such that

$T(x_1, x_2) = (x_1 - 2x_2, -x_1 + 3x_2, 3x_1 - 2x_2)$.

Find X such that T(X) = (–1, 4, 9).

d) Determine if columns of $\begin{bmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{bmatrix}$ form a linearly independent set.

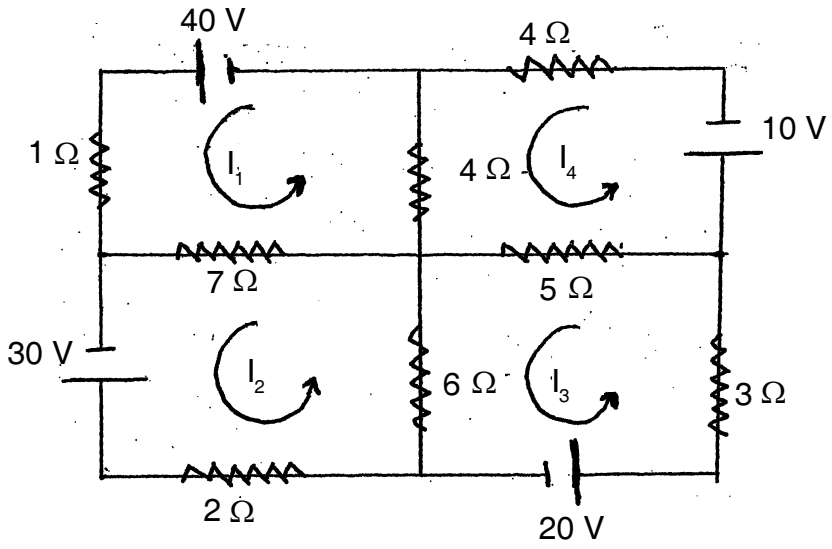
3. a) Solve the equation AX = b by using the LU factorization given for A. **3**

$$A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}, b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix} \text{ and}$$

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

Set R

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



c) Let $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ and define transformation $T : R^2 \rightarrow R^2$ by $T(X) = AX$. **3**

Find T(u) and T(v)

Where $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $v = \begin{bmatrix} a \\ b \end{bmatrix}$

4. a) Assume that A is row equivalent to B. Find bases for Nul A and Col A. **4**

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

b) Find basis and state the dimension of $\left\{ \begin{bmatrix} s-2t \\ s+t \\ 3t \end{bmatrix} : s,t \text{ in } R \right\}$. **3**

c) Consider a basis $B = \{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ suppose on

X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$. Find X. **3**

5. a) Diagonalize the matrix if possible $A = \begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$. **3**

b) Apply power method to $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ with $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ stop when k = 4 and estimate the dominant eigen value and corresponding vector for A. **3**

c) Find the eigen values of A where $A = \begin{bmatrix} 0.5 & -0.6 \\ 0.75 & 1.1 \end{bmatrix}$. **3**

SECTION – II

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

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

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

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

ii) Find a unit vector u in the direction of c.

iii) Show that d is orthogonal to c.

OR

b) Let $u_1 = \begin{bmatrix} -1/\sqrt{5} \\ 2/\sqrt{5} \end{bmatrix}$, $u_2 = \begin{bmatrix} 2/\sqrt{5} \\ 1/\sqrt{5} \end{bmatrix}$ show that $\{u_1, u_2\}$ is an orthonormal basis for R^2. **4**

c) Show that set of vectors $s = \{u_1, u_2, u_3\}$ is orthogonal where $u_1 = (1, 2, -3, 4)$, $u_2 = (3, 4, 1, -2)$, $u_3 = (3, -2, 1, 1)$. **3**

7. a) Is $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2x_3$ positive definite ? **3**

   b)

Given	**x series**	**y series**
Mean	18	100
S.D.	14	20

   Coefficient of correlation between x and y is 0.8 (i. e. r = 0.8). Find two lines of regression. Also find y if x is 70 and x if y is 90. **3**

   c) Equations giving the two lines of regression of y on x and of x on y are

   $7x - 16y = -9$ and $-4x + 5y = 3$.

   Find the means of x and y and the coefficient of correlation. **3**

8. a) Compute the coefficient of correlation between x and y from the following data : **3**

x :	2	4	5	6	8	11
y :	18	12	10	8	7	5

   b) Find the equations of the lines of regression from the following data. Find also the best estimate of y when x = 13 and the best estimate of x when y = 8. **3**

x :	2	4	6	8	12	14
y :	4	2	5	10	11	12

   c) Given :

   Mean of x = 50.07 Mean of y = 9.98

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

   r = 0.898

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

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

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

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

   c) Find an analytic function whose real part is $e^x.\cos y$. **3**

Set R

SLR-EP – 325

Seat No.	

Set S

S.E. (Part – II) (E & E Engg.) (CGPA) Examination, 2016
LINEAR ALGEBRA

Day and Date : Monday, 21-11-2016 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) ***Answer MCQ/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) The correlation coefficient r is negative if
   a) b_{yx} is negative
   b) b_{xy} is negative
   c) both b_{yx} and b_{xy} are negative
   d) none of these

2) If $b_{yx} = \frac{5}{18}$, $b_{xy} = \frac{8}{5}$ then r =
   a) $\frac{2}{5}$ b) $\frac{1}{5}$ c) $\frac{2}{3}$ d) $\frac{3}{2}$

3) The coefficient of regression of y on x is equal to
   a) $r.\frac{\sigma_y}{\sigma_x}$ b) $r.\frac{\sigma_x}{\sigma_y}$ c) $\sigma_x \cdot \sigma_y$ d) $\frac{1}{r}.\frac{\sigma_x}{\sigma_y}$

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

5) Cauchy integral formula is given by
   a) $\int_C \frac{f(z)}{z - z_0} = 2\pi i\, f(z_0)$
   b) $f(z_0) = \int_C \frac{f(z)}{z - z_0}\, dz$
   c) $f(z_0) = \frac{1}{2\pi}\int_C \frac{f(z)}{z - z_0}\, dz$
   d) $\int_C \frac{f(z)}{z - z_0}\, dz = 2\pi\, f(z_0)$

P.T.O.

6) Rank of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \\ 1 & 2 & 3 \end{bmatrix}$ is

a) 1 b) 2 c) 3 d) None of these

7 Given a scalar 'r' the transformation $T : R^2 \to R^2$ defined by $T(X) = rX$, when $0 \leq r \leq 1$ is called

a) Dilation b) Contraction
c) Translation d) None of these

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

$$\left[\begin{array}{ccc|c} 1 & 3 & 0 & 2 \\ 0 & -1 & 2 & 7 \\ 0 & 1 & -1 & 6 \end{array}\right]$$

a) $x + 3y = 2, y + 2z = 7, y + z = 6$ b) $u + 3v = 2, -v + 2w = 7, v = -w + 6$
c) $r + 3s = 2, -s + 2t = 7, s = t + 6$ d) $a + 3b = 2c, -b - 2c = 7, b - c = 6$

9) Which of the following is true ?

a) rankA + dim column = m b) rankA + dim NullA = m
c) rankA + dim column = n d) rankA + dim NullA = n

10) Consider a basis $B = \{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 0 \\ 1 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. Suppose on X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ then X is

a) $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ b) $\begin{bmatrix} -2 \\ 3 \end{bmatrix}$ c) $\begin{bmatrix} 6 \\ 1 \end{bmatrix}$ d) $\begin{bmatrix} 1 \\ 6 \end{bmatrix}$

11) If $A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix}$ then the eigen values of A^3 are

a) $-1, 27, -8$ b) $-1, \frac{1}{3}, \frac{-1}{2}$ c) $-1, 3, -2$ d) $1, 27, 8$

12) If 2, 3, 5 are the eigen values of A then $|A| =$

a) 10 b) 30 c) 40 d) None of these

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

a) $u + v = 0$ b) $u - v = 0$ c) $u.\ v = 0$ d) none of these

14) If u = [3, 5, 6] and v = [0, 2, 3]. Then u.v is

a) 28 b) [0, 10, 18] c) 19 d) None of these

Set S

SLR-EP – 325

Seat No.	

S.E. (Part – II) (E & E Engg.) (CGPA) Examination, 2016
LINEAR ALGEBRA

Day and Date : Monday, 21-11-2016 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 non-programmable calculator is **allowed**.*

SECTION – I

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

a) Solve the system

$x_1 - 3x_2 = 5, -x_1 + x_2 + 5x_3 = 2, x_2 + x_3 = 0$

b) Let $a_1 = \begin{bmatrix} 1 \\ -2 \\ -5 \end{bmatrix}, a_2 = \begin{bmatrix} 2 \\ 5 \\ 6 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 4 \\ -3 \end{bmatrix}$

Determine whether b can be generated as a linear combination of a_1 and a_2.

c) Let $T : R^2 \rightarrow R^2$ be a linear transformation such that

$T(x_1, x_2) = (x_1 - 2x_2, -x_1 + 3x_2, 3x_1 - 2x_2)$.

Find X such that T(X) = (–1, 4, 9).

d) Determine if columns of $\begin{bmatrix} 1 & 4 & -3 & 0 \\ -2 & -7 & 5 & 1 \\ -4 & -5 & 7 & 5 \end{bmatrix}$ form a linearly independent set.

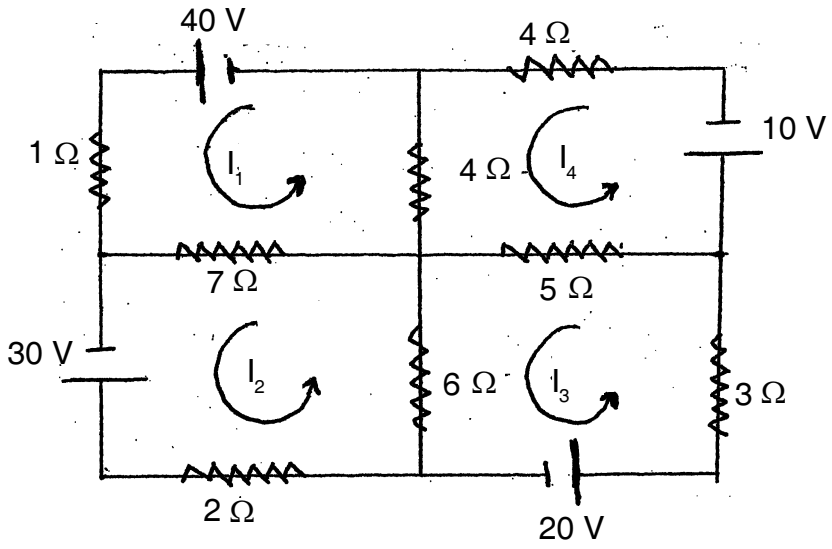
3. a) Solve the equation AX = b by using the LU factorization given for A. **3**

$$A = \begin{bmatrix} 3 & -7 & -2 \\ -3 & 5 & 1 \\ 6 & -4 & 0 \end{bmatrix}, b = \begin{bmatrix} -7 \\ 5 \\ 2 \end{bmatrix} \text{ and}$$

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

Set S

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



c) Let $A = \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix}$ and define transformation $T : R^2 \rightarrow R^2$ by $T(X) = AX$. **3**

Find T(u) and T(v)

Where $u = \begin{bmatrix} 1 \\ -3 \end{bmatrix}$ and $v = \begin{bmatrix} a \\ b \end{bmatrix}$

4. a) Assume that A is row equivalent to B. Find bases for Nul A and Col A. **4**

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

b) Find basis and state the dimension of $\left\{ \begin{bmatrix} s-2t \\ s+t \\ 3t \end{bmatrix} : s,t \text{ in } R \right\}$. **3**

c) Consider a basis $B = \{b_1, b_2\}$ for R^2, where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ suppose on

X in R^2 has the co-ordinate vector $[X]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$. Find X. **3**

Set S

5. a) Diagonalize the matrix if possible $A = \begin{bmatrix} 3 & -1 \\ 1 & 5 \end{bmatrix}$. **3**

b) Apply power method to $A = \begin{bmatrix} 2 & 1 \\ 4 & 5 \end{bmatrix}$ with $X_0 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ stop when k = 4 and estimate the dominant eigen value and corresponding vector for A. **3**

c) Find the eigen values of A where $A = \begin{bmatrix} 0.5 & -0.6 \\ 0.75 & 1.1 \end{bmatrix}$. **3**

SECTION – II

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

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

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

i) Compute $\frac{a \,.\, b}{a \,.\, a}$

ii) Find a unit vector u in the direction of c.

iii) Show that d is orthogonal to c.

OR

b) Let $u_1 = \begin{bmatrix} -1/\sqrt{5} \\ 2/\sqrt{5} \end{bmatrix}$, $u_2 = \begin{bmatrix} 2/\sqrt{5} \\ 1/\sqrt{5} \end{bmatrix}$ show that $\{u_1, u_2\}$ is an orthonormal basis for R^2. **4**

c) Show that set of vectors $s = \{u_1, u_2, u_3\}$ is orthogonal where $u_1 = (1, 2, -3, 4)$, $u_2 = (3, 4, 1, -2)$, $u_3 = (3, -2, 1, 1)$. **3**

7. a) Is $Q(x) = 3x_1^2 + 2x_2^2 + x_3^2 + 4x_1x_2 + 4x_2x_3$ positive definite ? **3**

   b)

Given	**x series**	**y series**
Mean	18	100
S.D.	14	20

   Coefficient of correlation between x and y is 0.8 (i. e. r = 0.8). Find two lines of regression. Also find y if x is 70 and x if y is 90. **3**

   c) Equations giving the two lines of regression of y on x and of x on y are

   $7x - 16y = -9$ and $-4x + 5y = 3$.

   Find the means of x and y and the coefficient of correlation. **3**

8. a) Compute the coefficient of correlation between x and y from the following data : **3**

x :	2	4	5	6	8	11
y :	18	12	10	8	7	5

   b) Find the equations of the lines of regression from the following data. Find also the best estimate of y when x = 13 and the best estimate of x when y = 8. **3**

x :	2	4	6	8	12	14
y :	4	2	5	10	11	12

   c) Given :

   Mean of x = 50.07 Mean of y = 9.98

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

   r = 0.898

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

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

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

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

   c) Find an analytic function whose real part is $e^x.\cos y$. **3**

Set S

SLR-EP – 326

Seat No.	

Set **P**

S.E. (Electrical and Electronics) Part – II (CGPA) Examination, 2016
AC MACHINES

Day and Date : Tuesday, 22-11-2016 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 alternatives : **(14×1=14)**

1) A two pole synchronous generator (alternator) of 60 Hz generation/supply frequency will have synchronous speed of
   a) 1500 r.p.m. b) 1800 r.p.m.
   c) 3600 r.p.m. d) none of the above

2) If S = no. of slots on the armature of 3 phase alternator, then the slot angle between two adjacent slot =
   a) 180/S b) S/180
   c) 90/S d) none of the above

3) An over excited synchronous motor operates at _____ P.F.
   a) lagging b) leading
   c) unity d) zero

4) When an alternator is connected to a load of zero power factor lag the armature reaction is
   a) cross magnetising
   b) demagnetising
   c) cross magnetising and demagnetising
   d) none of the above

5) KVA rating of alternator delivering a load of 200 kW at 0.8 P.F. lagging is
   a) 250 KVA b) 160 KVA
   c) 200 KVA d) none of the above

6) Damper winding in a synchronous machine is made up of
   a) aluminium coils
   b) thick aluminium bars
   c) copper coils
   d) thick copper bars

7) A 50 Hz, synchronous machine runs at 500 r.p.m., its rotor has _____ salient poles.
   a) 6 poles
   b) 8 poles
   c) 12 poles
   d) 10 poles

8) When the stator winding of a 3 phase induction motor is supplied with 3 phase balance supply it provides _____ magnetic field in the air gap.
   a) pulsating
   b) rotating
   c) steady
   d) alternating

9) The effect of increase in the length of air gap in case of an induction motor will result in increase of
   a) magnetising current
   b) air gap flux
   c) speed
   d) power factor

10) The efficiency and power factor of 3 phase squirrel cage induction motor increases in proportion to its
   a) mechanical load
   b) voltage
   c) speed
   d) motor torque

11) The crawling in the squirrel cage induction motor is caused by
   a) low voltage
   b) harmonics torque produced in the rotor
   c) high load
   d) improper design of the motor

12) A single phase induction motor has a _____ rotor.
   a) slip ring
   b) wound
   c) squirrel cage or wound
   d) squirrel cage

13) If the starting winding of a single phase induction motor is disconnected from the circuit it will
   a) run slower
   b) draw excessive current and overheat
   c) run faster
   d) cause sparking

14) A 50 Hz, 6 pole, 3 phase induction motor runs at a speed of 960 r.p.m., its % slip will be equal to
   a) 10 %
   b) 8 %
   c) 2 %
   d) 4 %

_____

SLR-EP – 326

Seat No.	

S.E. (Electrical and Electronics) Part – II (CGPA) Examination, 2016
AC MACHINES

Day and Date : Tuesday, 22-11-2016 Marks : 56
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 three** : **(3×4=12)**
   a) Explain in detail losses in an induction motor.
   b) Derive expression for rotor current and power factor at standstill and at running for 3 phase induction motor.
   c) Derive expression for relation between starting and full load torque.
   d) Explain effect of slip on the rotor circuit of 3 phase induction motor.
   e) A 50 Hz, 4 pole, 3 phase induction motor has a rotor current of frequency 2 Hz. Determine : (i) the slip (ii) speed of the motor.

3. Solve **any two** : **(8×2=16)**
   a) Explain the blocked rotor test for three phase induction motor.
   b) Explain with diagram double field revolving theory for single phase induction motor.
   c) A single phase split phase motor is rated at 220 V, 175 W, 180 rad/sec., 0.5 pf and 45% efficiency at rated load. Calculate its rated load, line current and torque.

SECTION – II

4. Solve **any three** : **(3×4=12)**
   a) Explain the parallel operation of alternators in detail with diagram.
   b) Describe the characteristics of different classes of squirrel cage motor.
   c) Explain crawling of induction motor.
   d) An alternator has 9 slots per pole. If each coil spans 8 slot pitches, what is the value of pitch factor.
   e) Explain the principle of operation of synchronous generator.

5. Solve **any two** : **(8×2=16)**
   a) Explain with diagram different methods of starting 3 phase squirrel cage motor.
   b) Explain in detail V curves in case of synchronous motor.
   c) Determine a suitable auto transformer ratio for starting a 3 phase induction motor with line current not exceeding twice the full load current. The short circuit current is 4 times the full load current and full load slip is 2.5%. Estimate the starting torque in terms of the full load torque.

SLR-EP – 326

Seat No.	

Set Q

S.E. (Electrical and Electronics) Part – II (CGPA) Examination, 2016
AC MACHINES

Day and Date : Tuesday, 22-11-2016 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 alternatives : **(14×1=14)**

1) When the stator winding of a 3 phase induction motor is supplied with 3 phase balance supply it provides _____ magnetic field in the air gap.
   a) pulsating b) rotating
   c) steady d) alternating

2) The effect of increase in the length of air gap in case of an induction motor will result in increase of
   a) magnetising current b) air gap flux
   c) speed d) power factor

3) The efficiency and power factor of 3 phase squirrel cage induction motor increases in proportion to its
   a) mechanical load b) voltage
   c) speed d) motor torque

4) The crawling in the squirrel cage induction motor is caused by
   a) low voltage
   b) harmonics torque produced in the rotor
   c) high load
   d) improper design of the motor

5) A single phase induction motor has a _____ rotor.
   a) slip ring b) wound
   c) squirrel cage or wound d) squirrel cage

P.T.O.

6) If the starting winding of a single phase induction motor is disconnected from the circuit it will
   a) run slower
   b) draw excessive current and overheat
   c) run faster
   d) cause sparking

7) A 50 Hz, 6 pole, 3 phase induction motor runs at a speed of 960 r.p.m., its % slip will be equal to
   a) 10 % b) 8 %
   c) 2 % d) 4 %

8) A two pole synchronous generator (alternator) of 60 Hz generation/supply frequency will have synchronous speed of
   a) 1500 r.p.m. b) 1800 r.p.m.
   c) 3600 r.p.m. d) none of the above

9) If S = no. of slots on the armature of 3 phase alternator, then the slot angle between two adjacent slot =
   a) 180/S b) S/180
   c) 90/S d) none of the above

10) An over excited synchronous motor operates at _____ P.F.
   a) lagging b) leading
   c) unity d) zero

11) When an alternator is connected to a load of zero power factor lag the armature reaction is
   a) cross magnetising
   b) demagnetising
   c) cross magnetising and demagnetising
   d) none of the above

12) KVA rating of alternator delivering a load of 200 kW at 0.8 P.F. lagging is
   a) 250 KVA b) 160 KVA
   c) 200 KVA d) none of the above

13) Damper winding in a synchronous machine is made up of
   a) aluminium coils b) thick aluminium bars
   c) copper coils d) thick copper bars

14) A 50 Hz, synchronous machine runs at 500 r.p.m., its rotor has _____ salient poles.
   a) 6 poles b) 8 poles
   c) 12 poles d) 10 poles

_____

SLR-EP – 326

Seat No.	

S.E. (Electrical and Electronics) Part – II (CGPA) Examination, 2016
AC MACHINES

Day and Date : Tuesday, 22-11-2016 Marks : 56
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 three** : **(3×4=12)**
   a) Explain in detail losses in an induction motor.
   b) Derive expression for rotor current and power factor at standstill and at running for 3 phase induction motor.
   c) Derive expression for relation between starting and full load torque.
   d) Explain effect of slip on the rotor circuit of 3 phase induction motor.
   e) A 50 Hz, 4 pole, 3 phase induction motor has a rotor current of frequency 2 Hz. Determine : (i) the slip (ii) speed of the motor.

3. Solve **any two** : **(8×2=16)**
   a) Explain the blocked rotor test for three phase induction motor.
   b) Explain with diagram double field revolving theory for single phase induction motor.
   c) A single phase split phase motor is rated at 220 V, 175 W, 180 rad/sec., 0.5 pf and 45% efficiency at rated load. Calculate its rated load, line current and torque.

SECTION – II

4. Solve **any three** : **(3×4=12)**
   a) Explain the parallel operation of alternators in detail with diagram.
   b) Describe the characteristics of different classes of squirrel cage motor.
   c) Explain crawling of induction motor.
   d) An alternator has 9 slots per pole. If each coil spans 8 slot pitches, what is the value of pitch factor.
   e) Explain the principle of operation of synchronous generator.

Set Q

5. Solve **any two** : **(8×2=16)**
   a) Explain with diagram different methods of starting 3 phase squirrel cage motor.
   b) Explain in detail V curves in case of synchronous motor.
   c) Determine a suitable auto transformer ratio for starting a 3 phase induction motor with line current not exceeding twice the full load current. The short circuit current is 4 times the full load current and full load slip is 2.5%. Estimate the starting torque in terms of the full load torque.

SLR-EP – 326

Seat No.	

Set **R**

S.E. (Electrical and Electronics) Part – II (CGPA) Examination, 2016
AC MACHINES

Day and Date : Tuesday, 22-11-2016 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 alternatives : **(14×1=14)**

1) KVA rating of alternator delivering a load of 200 kW at 0.8 P.F. lagging is
   a) 250 KVA b) 160 KVA
   c) 200 KVA d) none of the above

2) Damper winding in a synchronous machine is made up of
   a) aluminium coils b) thick aluminium bars
   c) copper coils d) thick copper bars

3) A 50 Hz, synchronous machine runs at 500 r.p.m., its rotor has _____ salient poles.
   a) 6 poles b) 8 poles
   c) 12 poles d) 10 poles

4) When the stator winding of a 3 phase induction motor is supplied with 3 phase balance supply it provides _____ magnetic field in the air gap.
   a) pulsating b) rotating
   c) steady d) alternating

5) The effect of increase in the length of air gap in case of an induction motor will result in increase of
   a) magnetising current b) air gap flux
   c) speed d) power factor

6) The efficiency and power factor of 3 phase squirrel cage induction motor increases in proportion to its
   a) mechanical load b) voltage
   c) speed d) motor torque

7) The crawling in the squirrel cage induction motor is caused by
   a) low voltage
   b) harmonics torque produced in the rotor
   c) high load
   d) improper design of the motor

8) A single phase induction motor has a _____ rotor.
   a) slip ring
   b) wound
   c) squirrel cage or wound
   d) squirrel cage

9) If the starting winding of a single phase induction motor is disconnected from the circuit it will
   a) run slower
   b) draw excessive current and overheat
   c) run faster
   d) cause sparking

10) A 50 Hz, 6 pole, 3 phase induction motor runs at a speed of 960 r.p.m., its % slip will be equal to
   a) 10 %
   b) 8 %
   c) 2 %
   d) 4 %

11) A two pole synchronous generator (alternator) of 60 Hz generation/supply frequency will have synchronous speed of
   a) 1500 r.p.m.
   b) 1800 r.p.m.
   c) 3600 r.p.m.
   d) none of the above

12) If S = no. of slots on the armature of 3 phase alternator, then the slot angle between two adjacent slot =
   a) 180/S
   b) S/180
   c) 90/S
   d) none of the above

13) An over excited synchronous motor operates at _____ P.F.
   a) lagging
   b) leading
   c) unity
   d) zero

14) When an alternator is connected to a load of zero power factor lag the armature reaction is
   a) cross magnetising
   b) demagnetising
   c) cross magnetising and demagnetising
   d) none of the above

_____

SLR-EP – 326

Seat No.	

S.E. (Electrical and Electronics) Part – II (CGPA) Examination, 2016
AC MACHINES

Day and Date : Tuesday, 22-11-2016 Marks : 56
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 three** : **(3×4=12)**
   a) Explain in detail losses in an induction motor.
   b) Derive expression for rotor current and power factor at standstill and at running for 3 phase induction motor.
   c) Derive expression for relation between starting and full load torque.
   d) Explain effect of slip on the rotor circuit of 3 phase induction motor.
   e) A 50 Hz, 4 pole, 3 phase induction motor has a rotor current of frequency 2 Hz. Determine : (i) the slip (ii) speed of the motor.

3. Solve **any two** : **(8×2=16)**
   a) Explain the blocked rotor test for three phase induction motor.
   b) Explain with diagram double field revolving theory for single phase induction motor.
   c) A single phase split phase motor is rated at 220 V, 175 W, 180 rad/sec., 0.5 pf and 45% efficiency at rated load. Calculate its rated load, line current and torque.

SECTION – II

4. Solve **any three** : **(3×4=12)**
   a) Explain the parallel operation of alternators in detail with diagram.
   b) Describe the characteristics of different classes of squirrel cage motor.
   c) Explain crawling of induction motor.
   d) An alternator has 9 slots per pole. If each coil spans 8 slot pitches, what is the value of pitch factor.
   e) Explain the principle of operation of synchronous generator.

Set R

5. Solve **any two** : **(8×2=16)**
   a) Explain with diagram different methods of starting 3 phase squirrel cage motor.
   b) Explain in detail V curves in case of synchronous motor.
   c) Determine a suitable auto transformer ratio for starting a 3 phase induction motor with line current not exceeding twice the full load current. The short circuit current is 4 times the full load current and full load slip is 2.5%. Estimate the starting torque in terms of the full load torque.

SLR-EP – 326

Seat No.	

Set **S**

S.E. (Electrical and Electronics) Part – II (CGPA) Examination, 2016
AC MACHINES

Day and Date : Tuesday, 22-11-2016 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 alternatives : **(14×1=14)**

1) The efficiency and power factor of 3 phase squirrel cage induction motor increases in proportion to its
   a) mechanical load b) voltage
   c) speed d) motor torque

2) The crawling in the squirrel cage induction motor is caused by
   a) low voltage
   b) harmonics torque produced in the rotor
   c) high load
   d) improper design of the motor

3) A single phase induction motor has a _____ rotor.
   a) slip ring b) wound
   c) squirrel cage or wound d) squirrel cage

4) If the starting winding of a single phase induction motor is disconnected from the circuit it will
   a) run slower
   b) draw excessive current and overheat
   c) run faster
   d) cause sparking

5) A 50 Hz, 6 pole, 3 phase induction motor runs at a speed of 960 r.p.m., its % slip will be equal to
   a) 10 % b) 8 %
   c) 2 % d) 4 %

P.T.O.

6) A two pole synchronous generator (alternator) of 60 Hz generation/supply frequency will have synchronous speed of
   a) 1500 r.p.m. b) 1800 r.p.m.
   c) 3600 r.p.m. d) none of the above

7) If S = no. of slots on the armature of 3 phase alternator, then the slot angle between two adjacent slot =
   a) 180/S b) S/180
   c) 90/S d) none of the above

8) An over excited synchronous motor operates at _____ P.F.
   a) lagging b) leading
   c) unity d) zero

9) When an alternator is connected to a load of zero power factor lag the armature reaction is
   a) cross magnetising
   b) demagnetising
   c) cross magnetising and demagnetising
   d) none of the above

10) KVA rating of alternator delivering a load of 200 kW at 0.8 P.F. lagging is
   a) 250 KVA b) 160 KVA
   c) 200 KVA d) none of the above

11) Damper winding in a synchronous machine is made up of
   a) aluminium coils b) thick aluminium bars
   c) copper coils d) thick copper bars

12) A 50 Hz, synchronous machine runs at 500 r.p.m., its rotor has _____ salient poles.
   a) 6 poles b) 8 poles
   c) 12 poles d) 10 poles

13) When the stator winding of a 3 phase induction motor is supplied with 3 phase balance supply it provides _____ magnetic field in the air gap.
   a) pulsating b) rotating
   c) steady d) alternating

14) The effect of increase in the length of air gap in case of an induction motor will result in increase of
   a) magnetising current b) air gap flux
   c) speed d) power factor

_____

SLR-EP – 326

Seat No.	

S.E. (Electrical and Electronics) Part – II (CGPA) Examination, 2016
AC MACHINES

Day and Date : Tuesday, 22-11-2016 Marks : 56
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 three** : **(3×4=12)**
   a) Explain in detail losses in an induction motor.
   b) Derive expression for rotor current and power factor at standstill and at running for 3 phase induction motor.
   c) Derive expression for relation between starting and full load torque.
   d) Explain effect of slip on the rotor circuit of 3 phase induction motor.
   e) A 50 Hz, 4 pole, 3 phase induction motor has a rotor current of frequency 2 Hz. Determine : (i) the slip (ii) speed of the motor.

3. Solve **any two** : **(8×2=16)**
   a) Explain the blocked rotor test for three phase induction motor.
   b) Explain with diagram double field revolving theory for single phase induction motor.
   c) A single phase split phase motor is rated at 220 V, 175 W, 180 rad/sec., 0.5 pf and 45% efficiency at rated load. Calculate its rated load, line current and torque.

SECTION – II

4. Solve **any three** : **(3×4=12)**
   a) Explain the parallel operation of alternators in detail with diagram.
   b) Describe the characteristics of different classes of squirrel cage motor.
   c) Explain crawling of induction motor.
   d) An alternator has 9 slots per pole. If each coil spans 8 slot pitches, what is the value of pitch factor.
   e) Explain the principle of operation of synchronous generator.

Set S

5. Solve **any two** : **(8×2=16)**
   a) Explain with diagram different methods of starting 3 phase squirrel cage motor.
   b) Explain in detail V curves in case of synchronous motor.
   c) Determine a suitable auto transformer ratio for starting a 3 phase induction motor with line current not exceeding twice the full load current. The short circuit current is 4 times the full load current and full load slip is 2.5%. Estimate the starting torque in terms of the full load torque.

SLR-EP – 327

Seat No.	

Set P

S.E. (E&E) (Part – II) (New) (CGPA) Examination, 2016
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Wednesday, 23-11-2016 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 (**one** mark **each**): **(14×1=14)**

1) In a ballistic galvanometer, the deflecting torque is proportional to
   a) the current through coil b) square of current through coil
   c) square-root of current through coil d) sine of measured

2) Which of the following essential features is possessed by an indicating instrument ?
   a) Deflecting device b) Controlling device
   c) Damping device d) All of the above

3) For measurements on high voltage capacitors, the suitable bridge is
   a) Wein bridge b) Modified De Santy's bridge
   c) Schering bridge d) All of the above

4) In a Schering bridge the potential of the detector above earth potential is
   a) a few volts only b) 1 kV c) 5 kV d) 10 kV

5) 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 5 A, 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

6) The power of a n-phase circuit can be measured by using a minimum of
   a) (n – 1) wattmeter elements b) n wattmeter elements
   c) (n + 1) wattmeter elements d) 2n wattmeter elements

7) Wattmeter cannot be designed on the principle of
   a) electrostatic instrument b) thermocouple instrument
   c) moving iron instrument d) electrodynamic instrument

8) An instrument transformer is used to extend the range of
   a) induction instrument b) electrostatic instrument
   c) moving coil instrument d) all of the above

P.T.O.

9) 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

10) In a Weston frequency meter, the magnetic axes of the two fixed coils are
   a) parallel b) perpendicular
   c) inclined at 60° d) inclined at 120°

11) In a single phase power factor meter the phase difference between the currents in the two pressure coils is
   a) exactly 0° b) approximately 0°
   c) exactly 90° d) approximately 90°

12) An oscilloscope indicates
   a) Peak to peak value of voltage b) DC value of voltage
   c) RMS value d) Average value

13) Strain gauge, LVDT and thermocouple are examples of
   a) Active transducers b) Passive transducers
   c) Analog transducers d) Primary transducers

14) LVDT windings are wound on
   a) Steel sheets b) Aluminium c) Ferrite d) Copper

SLR-EP – 327

Seat No.	

S.E. (E&E) (Part – II) (New) (CGPA) Examination, 2016
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Wednesday, 23-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four**. **Four** marks **each**.

a) A simple slide wire is used for the measurement of current in a circuit. The voltage across standard resistance of 1 Ohm is balanced at 75 cm. Find the magnitude of current if the standard cell having an emf of 1.45 V is balanced at 50 cm.

b) Explain briefly with the help of neat sketch how inductance can be measured by using Maxwell's bridge.

c) Describe working of Electronic Energy Meter with block diagram.

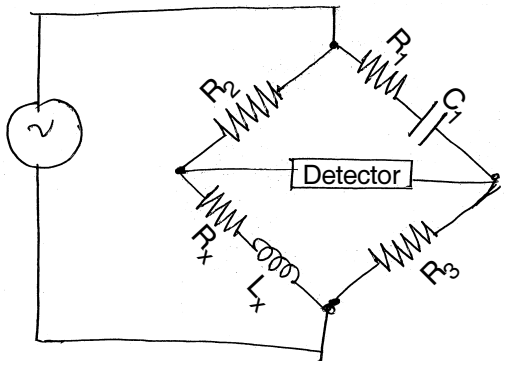
d) The meter reads 1 kWh = 15000 revolutions. In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in the circuit.

e) Explain construction and operation of MI type instrument.

f) 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.

3. Solve following. **Six** marks **each**.

a) Find the series equivalent inductance and resistance of the network that causes an opposite angle to null the following bridge arm ω = 3000 rad/sec R_2 = 9 K Ohm R_1 = 1.8 K Ohm, C_1 = 0.9 μf , R_3 = 0.9 K Ohm.



OR

Set P

1000/5A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of 1.6Ω. The primary winding has one turn. Calculate flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5 W at full load. The magnetizing mmf is 100 A.

b) Explain the effect of power factor on the readings of wattmeter.

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) Describe briefly a digital multimeter with the help of block diagram.

c) Write a short note on Lissajous patterns for measurement of frequency.

d) Explain briefly construction and working of resistance thermometer.

e) What are the operating principles of LCD display ?

f) Explain how capacitive type of transducer used for pressure measurement.

5. Solve **any two**. **Six** marks **each**.

a) Explain briefly with neat diagram the working of following instruments :
   1) Ramp type digital voltmeter.
   2) Integrating type digital voltmeter.

b) Explain briefly with neat diagram the working of
   1) single trace oscilloscope
   2) dual trace oscilloscope.

c) Explain briefly photo conductive and photo-voltaic cells.

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SLR-EP – 327

Seat No.	

Set Q

S.E. (E&E) (Part – II) (New) (CGPA) Examination, 2016
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Wednesday, 23-11-2016 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 (**one** mark **each**): **(14×1=14)**

1) An instrument transformer is used to extend the range of
   a) induction instrument b) electrostatic instrument
   c) moving coil instrument d) all of the above

2) 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

3) In a Weston frequency meter, the magnetic axes of the two fixed coils are
   a) parallel b) perpendicular
   c) inclined at 60° d) inclined at 120°

4) In a single phase power factor meter the phase difference between the currents in the two pressure coils is
   a) exactly 0° b) approximately 0°
   c) exactly 90° d) approximately 90°

5) An oscilloscope indicates
   a) Peak to peak value of voltage b) DC value of voltage
   c) RMS value d) Average value

6) Strain gauge, LVDT and thermocouple are examples of
   a) Active transducers b) Passive transducers
   c) Analog transducers d) Primary transducers

P.T.O.

7) LVDT windings are wound on
   a) Steel sheets b) Aluminium c) Ferrite d) Copper

8) In a ballistic galvanometer, the deflecting torque is proportional to
   a) the current through coil b) square of current through coil
   c) square-root of current through coil d) sine of measured

9) Which of the following essential features is possessed by an indicating instrument ?
   a) Deflecting device b) Controlling device
   c) Damping device d) All of the above

10) For measurements on high voltage capacitors, the suitable bridge is
   a) Wein bridge b) Modified De Santy's bridge
   c) Schering bridge d) All of the above

11) In a Schering bridge the potential of the detector above earth potential is
   a) a few volts only b) 1 kV c) 5 kV d) 10 kV

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 5 A, 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 power of a n-phase circuit can be measured by using a minimum of
   a) (n – 1) wattmeter elements b) n wattmeter elements
   c) (n + 1) wattmeter elements d) 2n wattmeter elements

14) Wattmeter cannot be designed on the principle of
   a) electrostatic instrument b) thermocouple instrument
   c) moving iron instrument d) electrodynamic instrument

SLR-EP – 327

Seat No.	

S.E. (E&E) (Part – II) (New) (CGPA) Examination, 2016
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Wednesday, 23-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four**. **Four** marks **each**.

a) A simple slide wire is used for the measurement of current in a circuit. The voltage across standard resistance of 1 Ohm is balanced at 75 cm. Find the magnitude of current if the standard cell having an emf of 1.45 V is balanced at 50 cm.

b) Explain briefly with the help of neat sketch how inductance can be measured by using Maxwell's bridge.

c) Describe working of Electronic Energy Meter with block diagram.

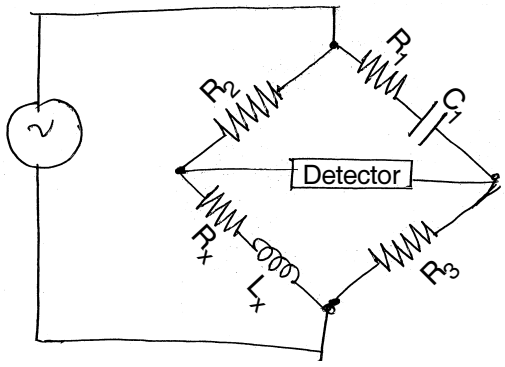
d) The meter reads 1 kWh = 15000 revolutions. In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in the circuit.

e) Explain construction and operation of MI type instrument.

f) 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.

3. Solve following. **Six** marks **each**.

a) Find the series equivalent inductance and resistance of the network that causes an opposite angle to null the following bridge arm $\omega = 3000$ rad/sec $R_2 = 9$ K Ohm $R_1 = 1.8$ K Ohm, $C_1 = 0.9 \mu f$, $R_3 = 0.9$ K Ohm.



OR

Set Q

1000/5A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of 1.6Ω. The primary winding has one turn. Calculate flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5 W at full load. The magnetizing mmf is 100 A.

b) Explain the effect of power factor on the readings of wattmeter.

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) Describe briefly a digital multimeter with the help of block diagram.

c) Write a short note on Lissajous patterns for measurement of frequency.

d) Explain briefly construction and working of resistance thermometer.

e) What are the operating principles of LCD display ?

f) Explain how capacitive type of transducer used for pressure measurement.

5. Solve **any two**. **Six** marks **each**.

a) Explain briefly with neat diagram the working of following instruments :
   1) Ramp type digital voltmeter.
   2) Integrating type digital voltmeter.

b) Explain briefly with neat diagram the working of
   1) single trace oscilloscope
   2) dual trace oscilloscope.

c) Explain briefly photo conductive and photo-voltaic cells.

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SLR-EP – 327

Seat No.	

Set R

S.E. (E&E) (Part – II) (New) (CGPA) Examination, 2016
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Wednesday, 23-11-2016 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 (**one** mark **each**): **(14×1=14)**

1) 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 5 A, 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

2) The power of a n-phase circuit can be measured by using a minimum of
a) (n – 1) wattmeter elements b) n wattmeter elements
c) (n + 1) wattmeter elements d) 2n wattmeter elements

3) Wattmeter cannot be designed on the principle of
a) electrostatic instrument b) thermocouple instrument
c) moving iron instrument d) electrodynamic instrument

4) An instrument transformer is used to extend the range of
a) induction instrument b) electrostatic instrument
c) moving coil instrument d) all of the above

5) 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

6) In a Weston frequency meter, the magnetic axes of the two fixed coils are
a) parallel b) perpendicular
c) inclined at 60° d) inclined at 120°

P.T.O.

7) In a single phase power factor meter the phase difference between the currents in the two pressure coils is
   a) exactly 0° b) approximately 0°
   c) exactly 90° d) approximately 90°

8) An oscilloscope indicates
   a) Peak to peak value of voltage b) DC value of voltage
   c) RMS value d) Average value

9) Strain gauge, LVDT and thermocouple are examples of
   a) Active transducers b) Passive transducers
   c) Analog transducers d) Primary transducers

10) LVDT windings are wound on
   a) Steel sheets b) Aluminium c) Ferrite d) Copper

11) In a ballistic galvanometer, the deflecting torque is proportional to
   a) the current through coil b) square of current through coil
   c) square-root of current through coil d) sine of measured

12) Which of the following essential features is possessed by an indicating instrument ?
   a) Deflecting device b) Controlling device
   c) Damping device d) All of the above

13) For measurements on high voltage capacitors, the suitable bridge is
   a) Wein bridge b) Modified De Santy's bridge
   c) Schering bridge d) All of the above

14) In a Schering bridge the potential of the detector above earth potential is
   a) a few volts only b) 1 kV c) 5 kV d) 10 kV

SLR-EP – 327

Seat No.	

S.E. (E&E) (Part – II) (New) (CGPA) Examination, 2016
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Wednesday, 23-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four**. **Four** marks **each**.

a) A simple slide wire is used for the measurement of current in a circuit. The voltage across standard resistance of 1 Ohm is balanced at 75 cm. Find the magnitude of current if the standard cell having an emf of 1.45 V is balanced at 50 cm.

b) Explain briefly with the help of neat sketch how inductance can be measured by using Maxwell's bridge.

c) Describe working of Electronic Energy Meter with block diagram.

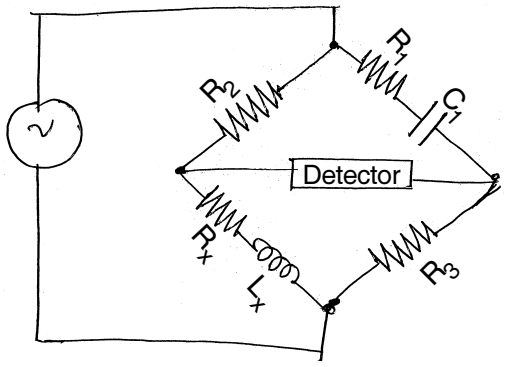
d) The meter reads 1 kWh = 15000 revolutions. In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in the circuit.

e) Explain construction and operation of MI type instrument.

f) 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.

3. Solve following. **Six** marks **each**.

a) Find the series equivalent inductance and resistance of the network that causes an opposite angle to null the following bridge arm ω = 3000 rad/sec R_2 = 9 K Ohm R_1 = 1.8 K Ohm, C_1 = 0.9 μf , R_3 = 0.9 K Ohm.



OR

Set R

1000/5A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of 1.6Ω. The primary winding has one turn. Calculate flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5 W at full load. The magnetizing mmf is 100 A.

b) Explain the effect of power factor on the readings of wattmeter.

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) Describe briefly a digital multimeter with the help of block diagram.

c) Write a short note on Lissajous patterns for measurement of frequency.

d) Explain briefly construction and working of resistance thermometer.

e) What are the operating principles of LCD display ?

f) Explain how capacitive type of transducer used for pressure measurement.

5. Solve **any two**. **Six** marks **each**.

a) Explain briefly with neat diagram the working of following instruments :
   1) Ramp type digital voltmeter.
   2) Integrating type digital voltmeter.

b) Explain briefly with neat diagram the working of
   1) single trace oscilloscope
   2) dual trace oscilloscope.

c) Explain briefly photo conductive and photo-voltaic cells.

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SLR-EP – 327

Seat No.	

Set S

S.E. (E&E) (Part – II) (New) (CGPA) Examination, 2016
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Wednesday, 23-11-2016 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 (**one** mark **each**): **(14×1=14)**

1) In a Weston frequency meter, the magnetic axes of the two fixed coils are
   a) parallel b) perpendicular
   c) inclined at 60° d) inclined at 120°

2) In a single phase power factor meter the phase difference between the currents in the two pressure coils is
   a) exactly 0° b) approximately 0°
   c) exactly 90° d) approximately 90°

3) An oscilloscope indicates
   a) Peak to peak value of voltage b) DC value of voltage
   c) RMS value d) Average value

4) Strain gauge, LVDT and thermocouple are examples of
   a) Active transducers b) Passive transducers
   c) Analog transducers d) Primary transducers

5) LVDT windings are wound on
   a) Steel sheets b) Aluminium c) Ferrite d) Copper

6) In a ballistic galvanometer, the deflecting torque is proportional to
   a) the current through coil b) square of current through coil
   c) square-root of current through coil d) sine of measured

7) Which of the following essential features is possessed by an indicating instrument ?
   a) Deflecting device b) Controlling device
   c) Damping device d) All of the above

P.T.O.

8) For measurements on high voltage capacitors, the suitable bridge is
   a) Wein bridge
   b) Modified De Santy's bridge
   c) Schering bridge
   d) All of the above

9) In a Schering bridge the potential of the detector above earth potential is
   a) a few volts only b) 1 kV c) 5 kV d) 10 kV

10) 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 5 A, 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

11) The power of a n-phase circuit can be measured by using a minimum of
   a) (n – 1) wattmeter elements
   b) n wattmeter elements
   c) (n + 1) wattmeter elements
   d) 2n wattmeter elements

12) Wattmeter cannot be designed on the principle of
   a) electrostatic instrument
   b) thermocouple instrument
   c) moving iron instrument
   d) electrodynamic instrument

13) An instrument transformer is used to extend the range of
   a) induction instrument
   b) electrostatic instrument
   c) moving coil instrument
   d) all of the above

14) 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

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SLR-EP – 327

Seat No.	

S.E. (E&E) (Part – II) (New) (CGPA) Examination, 2016
ELECTRICAL AND ELECTRONICS MEASUREMENT

Day and Date : Wednesday, 23-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four**. **Four** marks **each**.

a) A simple slide wire is used for the measurement of current in a circuit. The voltage across standard resistance of 1 Ohm is balanced at 75 cm. Find the magnitude of current if the standard cell having an emf of 1.45 V is balanced at 50 cm.

b) Explain briefly with the help of neat sketch how inductance can be measured by using Maxwell's bridge.

c) Describe working of Electronic Energy Meter with block diagram.

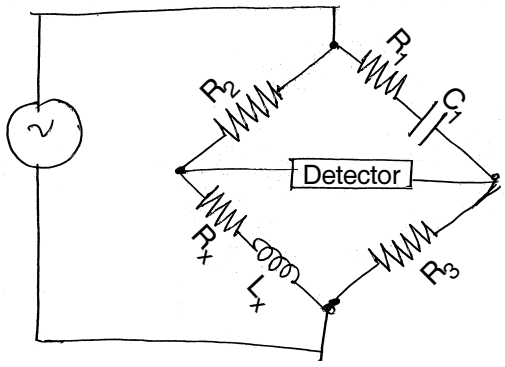
d) The meter reads 1 kWh = 15000 revolutions. In a checkup, the meter completed 150 revolutions during 45 seconds. Calculate the power in the circuit.

e) Explain construction and operation of MI type instrument.

f) 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.

3. Solve following. **Six** marks **each**.

a) Find the series equivalent inductance and resistance of the network that causes an opposite angle to null the following bridge arm ω = 3000 rad/sec R_2 = 9 K Ohm R_1 = 1.8 K Ohm, C_1 = 0.9 μf , R_3 = 0.9 K Ohm.



OR

Set S

1000/5A, 50 Hz current transformer has secondary burden comprising a non-inductive impedance of 1.6Ω. The primary winding has one turn. Calculate flux in the core and ratio error at full load. Neglect leakage reactance and assume iron loss in the core to be 1.5 W at full load. The magnetizing mmf is 100 A.

b) Explain the effect of power factor on the readings of wattmeter.

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) Describe briefly a digital multimeter with the help of block diagram.

c) Write a short note on Lissajous patterns for measurement of frequency.

d) Explain briefly construction and working of resistance thermometer.

e) What are the operating principles of LCD display ?

f) Explain how capacitive type of transducer used for pressure measurement.

5. Solve **any two**. **Six** marks **each**.

a) Explain briefly with neat diagram the working of following instruments :
   1) Ramp type digital voltmeter.
   2) Integrating type digital voltmeter.

b) Explain briefly with neat diagram the working of
   1) single trace oscilloscope
   2) dual trace oscilloscope.

c) Explain briefly photo conductive and photo-voltaic cells.

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SLR-EP – 328

Seat No.	

Set **P**

S.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2016
SIGNALS & SYSTEMS

Day and Date : Thursday, 24-11-2016 Total 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 alternatives : **(14×1=14)**

1) $X(n) = 2^n u(2 - n)$ is

a) Causal b) Non-causal c) Anti-causal d) None

2) The product of even and odd signal is

a) Even signal b) Odd signal
c) Even and odd signal d) None

3) A given sequence x1(n) = (1, – 2, 3, 1) and x2(n) = (2, – 3, – 2). The convolution y(n) is

a) (2, – 7, 10, – 7) b) (2, – 7, 10, – 3, – 9, – 2)
c) (10, – 7, – 9, – 2) d) (2, – 7, 10, – 7, 9)

4) Poles of the Laplace transform are those complex points out which the transfer function becomes

a) Infinity b) Zero c) One d) None

5) Graphical representation of signal in time domain is called

a) Waveform b) Frequency
c) Frequency spectrum d) None

6) If a signal f(t) has a energy E then energy of the signal f(2t) is equal to
   a) 2E b) E/2 c) E d) 4E

7) Convolution integral of $x(t) * \delta(t)$ is
   a) u(T) b) $\delta(t)$ c) x(t) d) none

8) Z transform of $\delta(n-1)$ is
   a) $1+Z$ b) $1-Z$ c) Z^{-1} d) Z

9) Fourier transform of $e^{-at}.u(t)$ is
   a) $a+j\omega$ b) $1/(a+j\omega)$ c) $a-j\omega$ d) $1/(a-j\omega)$

10) $x(t) = 3\sin(50\pi t)$ can be sampled at
   a) 50 Hz b) 75 Hz c) 100 Hz d) All

11) Interpolator is used for
   a) Reconstruction b) Sampling
   c) Filtering d) Aliasing

12) 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) $x(j\omega).\ y(j\omega)$ d) $x(j\omega)/y(j\omega)$

13) Aliasing effect is seen if sampling frequency is _____ of signal frequency.
   a) greater than b) less than
   c) greater than twice d) less than twice

14) Multiplication in frequency domain is _____ in time domain.
   a) Sampling b) Convolution c) Multiplication d) Addition

_____

SLR-EP – 328

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2016
SIGNALS & SYSTEMS

Day and Date : Thursday, 24-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** of the followings : **(4×4=16)**

1) What is state transition matrix ? Explain its role.

2) Find the following signal is energy or power : $x(t) = e^{-3}tu(t)$.

3) Explain the general process of checking a given system equation as linear or non-linear.

4) What is the notion of eigen functions ? Also explain its basis.

5) Find $y(t) = x(t) * h(t)$ where $x(t) = h(t) = u(t)$.

3. Solve **any two** of the followings : **(2×6=12)**

1) Find step response of the following system $h(t) = t.u(t)$. Justify whether the LTI system is stable of unstable.

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) Find the convolution of signal by using graphical analysis

$x(t) = u(t + 1)$; $h(t) = u(t – 2)$.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Find IDFT X(k) = {1, 1 – 2j, –1, 1 + 2j}

   b) What do you mean by aliasing ? Explain its effects.

   c) Find Z transform and comment on ROC if x(n) = u(n) – u(n – 3).

   d) Explain ideal interpolator with zero order hold.

5. Attempt **any two** : **(8×2=16)**

   i) Find 4 point DFT for x(n) = sinn π/2.

   ii) A signal x(t) = sinC(150 π t) is sampled at a rates of 100, 150, 200 and 300 Hz. Explain for these cases, if you can recover original signal with plot of spectrum.

   iii) Explain generalization of Parsevals theorem.

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SLR-EP – 328

Seat No.	

Set Q

S.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2016
SIGNALS & SYSTEMS

Day and Date : Thursday, 24-11-2016 Total 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 alternatives : **(14×1=14)**

1) Z transform of $\delta(n-1)$ is

a) $1+Z$ b) $1-Z$ c) Z^{-1} d) Z

2) Fourier transform of $e^{-at}.\ u(t)$ is

a) $a+j\omega$ b) $1/(a+j\omega)$ c) $a-j\omega$ d) $1/(a-j\omega)$

3) $x(t) = 3\sin(50\pi t)$ can be sampled at

a) 50 Hz b) 75 Hz c) 100 Hz d) All

4) Interpolator is used for

a) Reconstruction b) Sampling
c) Filtering d) Aliasing

5) 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) $x(j\omega).\ y(j\omega)$ d) $x(j\omega)/y(j\omega)$

6) Aliasing effect is seen if sampling frequency is _____ of signal frequency.

a) greater than b) less than
c) greater than twice d) less than twice

P.T.O.

7) Multiplication in frequency domain is _____ in time domain.
   a) Sampling b) Convolution c) Multiplication d) Addition

8) $X(n) = 2^n u(2 - n)$ is
   a) Causal b) Non-causal c) Anti-causal d) None

9) The product of even and odd signal is
   a) Even signal b) Odd signal
   c) Even and odd signal d) None

10) A given sequence x1(n) = (1, – 2, 3, 1) and x2(n) = (2, – 3, – 2). The convolution y(n) is
   a) (2, – 7, 10, – 7) b) (2, – 7, 10, – 3, – 9, – 2)
   c) (10, – 7, – 9, – 2) d) (2, – 7, 10, – 7, 9)

11) Poles of the Laplace transform are those complex points out which the transfer function becomes
   a) Infinity b) Zero c) One d) None

12) Graphical representation of signal in time domain is called
   a) Waveform b) Frequency
   c) Frequency spectrum d) None

13) If a signal f(t) has a energy E then energy of the signal f(2t) is equal to
   a) 2E b) E/2 c) E d) 4E

14) Convolution integral of $x(t) * \delta(t)$ is
   a) u(T) b) $\delta(t)$ c) x(t) d) none

_____

SLR-EP – 328

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2016
SIGNALS & SYSTEMS

Day and Date : Thursday, 24-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** of the followings : **(4×4=16)**

1) What is state transition matrix ? Explain its role.

2) Find the following signal is energy or power : $x(t) = e^{-3}tu(t)$.

3) Explain the general process of checking a given system equation as linear or non-linear.

4) What is the notion of eigen functions ? Also explain its basis.

5) Find $y(t) = x(t) * h(t)$ where $x(t) = h(t) = u(t)$.

3. Solve **any two** of the followings : **(2×6=12)**

1) Find step response of the following system $h(t) = t.u(t)$. Justify whether the LTI system is stable of unstable.

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) Find the convolution of signal by using graphical analysis

$x(t) = u(t + 1)$; $h(t) = u(t – 2)$.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Find IDFT X(k) = {1, 1 – 2j, –1, 1 + 2j}

   b) What do you mean by aliasing ? Explain its effects.

   c) Find Z transform and comment on ROC if x(n) = u(n) – u(n – 3).

   d) Explain ideal interpolator with zero order hold.

5. Attempt **any two** : **(8×2=16)**

   i) Find 4 point DFT for x(n) = sinn π/2.

   ii) A signal x(t) = sinC(150 π t) is sampled at a rates of 100, 150, 200 and 300 Hz. Explain for these cases, if you can recover original signal with plot of spectrum.

   iii) Explain generalization of Parsevals theorem.

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SLR-EP – 328

Seat No.	

Set R

S.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2016
SIGNALS & SYSTEMS

Day and Date : Thursday, 24-11-2016 Total 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 alternatives : **(14×1=14)**

1) Graphical representation of signal in time domain is called

a) Waveform b) Frequency
c) Frequency spectrum d) None

2) If a signal f(t) has a energy E then energy of the signal f(2t) is equal to

a) 2E b) E/2 c) E d) 4E

3) Convolution integral of $x(t) * \delta(t)$ is

a) u(T) b) $\delta(t)$ c) x(t) d) none

4) Z transform of $\delta(n-1)$ is

a) $1+Z$ b) $1-Z$ c) Z^{-1} d) Z

5) Fourier transform of $e^{-at}.u(t)$ is

a) $a+j\omega$ b) $1/(a+j\omega)$ c) $a-j\omega$ d) $1/(a-j\omega)$

6) $x(t) = 3\sin(50\pi t)$ can be sampled at

a) 50 Hz b) 75 Hz c) 100 Hz d) All

P.T.O.

7) Interpolator is used for
   a) Reconstruction b) Sampling
   c) Filtering d) Aliasing

8) 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) $x(j\omega).\ y(j\omega)$ d) $x(j\omega)/y(j\omega)$

9) Aliasing effect is seen if sampling frequency is _____ of signal frequency.
   a) greater than b) less than
   c) greater than twice d) less than twice

10) Multiplication in frequency domain is _____ in time domain.
   a) Sampling b) Convolution c) Multiplication d) Addition

11) $X(n) = 2^n u(2 - n)$ is
   a) Causal b) Non-causal c) Anti-causal d) None

12) The product of even and odd signal is
   a) Even signal b) Odd signal
   c) Even and odd signal d) None

13) A given sequence x1(n) = (1, – 2, 3, 1) and x2(n) = (2, – 3, – 2). The convolution y(n) is
   a) (2, – 7, 10, – 7) b) (2, – 7, 10, – 3, – 9, – 2)
   c) (10, – 7, – 9, – 2) d) (2, – 7, 10, – 7, 9)

14) Poles of the Laplace transform are those complex points out which the transfer function becomes
   a) Infinity b) Zero c) One d) None

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SLR-EP – 328

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2016
SIGNALS & SYSTEMS

Day and Date : Thursday, 24-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** of the followings : **(4×4=16)**

1) What is state transition matrix ? Explain its role.

2) Find the following signal is energy or power : $x(t) = e^{-3}tu(t)$.

3) Explain the general process of checking a given system equation as linear or non-linear.

4) What is the notion of eigen functions ? Also explain its basis.

5) Find $y(t) = x(t) * h(t)$ where $x(t) = h(t) = u(t)$.

3. Solve **any two** of the followings : **(2×6=12)**

1) Find step response of the following system $h(t) = t.u(t)$. Justify whether the LTI system is stable of unstable.

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) Find the convolution of signal by using graphical analysis

$x(t) = u(t + 1)$; $h(t) = u(t – 2)$.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Find IDFT X(k) = {1, 1 – 2j, –1, 1 + 2j}

   b) What do you mean by aliasing ? Explain its effects.

   c) Find Z transform and comment on ROC if x(n) = u(n) – u(n – 3).

   d) Explain ideal interpolator with zero order hold.

5. Attempt **any two** : **(8×2=16)**

   i) Find 4 point DFT for x(n) = sinn π/2.

   ii) A signal x(t) = sinC(150 π t) is sampled at a rates of 100, 150, 200 and 300 Hz. Explain for these cases, if you can recover original signal with plot of spectrum.

   iii) Explain generalization of Parsevals theorem.

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SLR-EP – 328

Seat No.	

Set S

S.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2016
SIGNALS & SYSTEMS

Day and Date : Thursday, 24-11-2016 Total 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 alternatives : **(14×1=14)**

1) $x(t) = 3\sin(50\pi t)$ can be sampled at
   a) 50 Hz b) 75 Hz c) 100 Hz d) All

2) Interpolator is used for
   a) Reconstruction b) Sampling
   c) Filtering d) Aliasing

3) 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) $x(j\omega).\ y(j\omega)$ d) $x(j\omega)/y(j\omega)$

4) Aliasing effect is seen if sampling frequency is _____ of signal frequency.
   a) greater than b) less than
   c) greater than twice d) less than twice

5) Multiplication in frequency domain is _____ in time domain.
   a) Sampling b) Convolution c) Multiplication d) Addition

6) $X(n) = 2^n u(2 - n)$ is
   a) Causal b) Non-causal c) Anti-causal d) None

P.T.O.

7) The product of even and odd signal is
   a) Even signal b) Odd signal
   c) Even and odd signal d) None

8) A given sequence x1(n) = (1, – 2, 3, 1) and x2(n) = (2, – 3, – 2). The convolution y(n) is
   a) (2, – 7, 10, – 7) b) (2, – 7, 10, – 3, – 9, – 2)
   c) (10, – 7, – 9, – 2) d) (2, – 7, 10, – 7, 9)

9) Poles of the Laplace transform are those complex points out which the transfer function becomes
   a) Infinity b) Zero c) One d) None

10) Graphical representation of signal in time domain is called
   a) Waveform b) Frequency
   c) Frequency spectrum d) None

11) If a signal f(t) has a energy E then energy of the signal f(2t) is equal to
   a) 2E b) E/2 c) E d) 4E

12) Convolution integral of $x(t) * \delta(t)$ is
   a) u(T) b) $\delta(t)$ c) x(t) d) none

13) Z transform of $\delta(n-1)$ is
   a) $1 + Z$ b) $1 - Z$ c) Z^{-1} d) Z

14) Fourier transform of e^{-at}. u(t) is
   a) $a + j\omega$ b) $1/(a + j\omega)$ c) $a - j\omega$ d) $1/(a - j\omega)$

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SLR-EP – 328

Seat No.	

S.E. (Electrical & Electronics Engg.) (Part – II) (CGPA) Examination, 2016
SIGNALS & SYSTEMS

Day and Date : Thursday, 24-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** of the followings : **(4×4=16)**

1) What is state transition matrix ? Explain its role.

2) Find the following signal is energy or power : $x(t) = e^{-3}tu(t)$.

3) Explain the general process of checking a given system equation as linear or non-linear.

4) What is the notion of eigen functions ? Also explain its basis.

5) Find $y(t) = x(t) * h(t)$ where $x(t) = h(t) = u(t)$.

3. Solve **any two** of the followings : **(2×6=12)**

1) Find step response of the following system $h(t) = t.u(t)$. Justify whether the LTI system is stable of unstable.

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) Find the convolution of signal by using graphical analysis

$x(t) = u(t + 1)$; $h(t) = u(t – 2)$.

SECTION – II

4. Solve **any three** : **(4×3=12)**

   a) Find IDFT X(k) = {1, 1 – 2j, –1, 1 + 2j}

   b) What do you mean by aliasing ? Explain its effects.

   c) Find Z transform and comment on ROC if x(n) = u(n) – u(n – 3).

   d) Explain ideal interpolator with zero order hold.

5. Attempt **any two** : **(8×2=16)**

   i) Find 4 point DFT for x(n) = sinn π/2.

   ii) A signal x(t) = sinC(150 π t) is sampled at a rates of 100, 150, 200 and 300 Hz. Explain for these cases, if you can recover original signal with plot of spectrum.

   iii) Explain generalization of Parsevals theorem.

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SLR-EP – 329

Seat No.	

Set **P**

S.E. (E&E) (Part – II) (CGPA) Examination, 2016
DIGITAL TECHNIQUES

Day and Date : Friday, 25-11-2016 Total 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) ***All*** *questions are* ***compulsory****.*
4) Figures to the ***right*** *indicates* ***full*** *marks.*
5) Assume suitable data ***wherever*** *necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Excess-3 code is known as
a) Weighted code b) Cyclic redundancy code
c) Self complementing code d) Algebraic code

2) 1-Digit BCD adder requires _____ numbers of full adders.
a) one b) two c) four d) eight

3) What is the number of inputs, outputs of a decoder that accepts 64 different combinations ?
a) 5 b) 6 c) 8 d) 64

4) The following logic has the highest speed
a) TTL b) CMOS c) ECL d) none

5) The Fan-out for TTL family is
a) 5 b) 10 c) 15 d) 20

6) The given maxterm is ABC, its equivalent binary representation is
a) 101 b) 010 c) 111 d) 000

7) A.B = B.A is _____ Law.
a) Commutative b) Associative c) Distributive d) Absorption

8) The output frequency of mod-16 counter, clocked from a 20KHz clock input signal is
a) 20KHz b) 52KHz c) 625Hz d) 1250Hz

9) A mod-2 counter followed by mod-5 counter is
   a) the same as mod-2 counter followed by mod-5 counter
   b) a decade counter
   c) a mod-7 counter
   d) none of the above

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) A 4-bit presettable up-counter has present input 0101. The presetting operation takes place as soon as counter becomes maximum i.e 1111. The modulus of this counter is
   a) 5 b) 10 c) 11 d) 15

12) 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

13) 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

14) The minimum number of flip flops required for mod-12 ripple counter is
   a) 3 b) 4 c) 6 d) 12

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SLR-EP – 329

Seat No.	

S.E. (E&E) (Part – II) (CGPA) Examination, 2016
DIGITAL TECHNIQUES

Day and Date : Friday, 25-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 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** of the followings : **(4×4=16)**
   1) Implement
      i) AND gate with OR and NOT gates
      ii) OR gate with AND and NOT gates
   2) Explain 2 to 4 line decoder.
   3) Explain Don't care conditions with suitable example.
   4) Compare TTL and CMOS logic family.
   5) Minimize the following expression using 4 variable K-map
      i) $f = \sum m\,(0,2,3,8,9,10,11)$ ii) $f = \sum m\,(0,2,5,7,8,10,13,15)$

3. Solve **any two** of the followings : **(2×6=12)**
   1) Explain Parallel adder and design 8 bit parallel adder.
   2) Design gray to binary code converter.
   3) Explain interfacing of TTL and CMOS.

SECTION – II

4. Solve **any four** of the followings : **(4×4=16)**
   1) Explain the significance of characteristics and excitation table.
   2) Explain the operation of JK flip flop.

3) A binary ripple counter is required up to a count of $(16383)_{10}$. How many flip flops are required ? If the clock frequency is 8.192MHz, what is the frequency at output of the MSB ?

4) Design a Asynchronous mod-6 counter using D flip flops.

5) What is modulus of a counter ? Explain the lock out problem.

5. Solve **any two** of the followings : **(2×6=12)**

1) Draw and explain 4 bit up/down counter with negative edge triggering.

2) Draw and explain Ring and Johnsons counters. Distinguish between them.

3) Write the design steps for designing synchronous counters with suitable example.

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SLR-EP – 329

Seat No.	

Set **Q**

S.E. (E&E) (Part – II) (CGPA) Examination, 2016
DIGITAL TECHNIQUES

Day and Date : Friday, 25-11-2016 Total 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) **All** questions are **compulsory**.*
*4) Figures to the **right** indicates **full** marks.*
*5) Assume suitable data **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The output frequency of mod-16 counter, clocked from a 20KHz clock input signal is
a) 20KHz b) 52KHz c) 625Hz d) 1250Hz

2) A mod-2 counter followed by mod-5 counter is
a) the same as mod-2 counter followed by mod-5 counter
b) a decade counter
c) a mod-7 counter
d) none of the above

3) 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

4) A 4-bit presettable up-counter has present input 0101. The presetting operation takes place as soon as counter becomes maximum i.e 1111. The modulus of this counter is
a) 5 b) 10 c) 11 d) 15

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

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 minimum number of flip flops required for mod-12 ripple counter is
   a) 3 b) 4 c) 6 d) 12

8) Excess-3 code is known as
   a) Weighted code b) Cyclic redundancy code
   c) Self complementing code d) Algebraic code

9) 1-Digit BCD adder requires _____ numbers of full adders.
   a) one b) two c) four d) eight

10) What is the number of inputs, outputs of a decoder that accepts 64 different combinations ?
   a) 5 b) 6 c) 8 d) 64

11) The following logic has the highest speed
   a) TTL b) CMOS c) ECL d) none

12) The Fan-out for TTL family is
   a) 5 b) 10 c) 15 d) 20

13) The given maxterm is ABC, its equivalent binary representation is
   a) 101 b) 010 c) 111 d) 000

14) A.B = B.A is _____ Law.
   a) Commutative b) Associative c) Distributive d) Absorption

_____

SLR-EP – 329

Seat No.	

S.E. (E&E) (Part – II) (CGPA) Examination, 2016
DIGITAL TECHNIQUES

Day and Date : Friday, 25-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 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** of the followings : **(4×4=16)**
   1) Implement
      i) AND gate with OR and NOT gates
      ii) OR gate with AND and NOT gates
   2) Explain 2 to 4 line decoder.
   3) Explain Don't care conditions with suitable example.
   4) Compare TTL and CMOS logic family.
   5) Minimize the following expression using 4 variable K-map
      i) $f = \sum m\,(0,2,3,8,9,10,11)$ ii) $f = \sum m\,(0,2,5,7,8,10,13,15)$

3. Solve **any two** of the followings : **(2×6=12)**
   1) Explain Parallel adder and design 8 bit parallel adder.
   2) Design gray to binary code converter.
   3) Explain interfacing of TTL and CMOS.

SECTION – II

4. Solve **any four** of the followings : **(4×4=16)**
   1) Explain the significance of characteristics and excitation table.
   2) Explain the operation of JK flip flop.

Set Q

3) A binary ripple counter is required up to a count of $(16383)_{10}$. How many flip flops are required ? If the clock frequency is 8.192MHz, what is the frequency at output of the MSB ?

4) Design a Asynchronous mod-6 counter using D flip flops.

5) What is modulus of a counter ? Explain the lock out problem.

5. Solve **any two** of the followings : **(2×6=12)**

1) Draw and explain 4 bit up/down counter with negative edge triggering.

2) Draw and explain Ring and Johnsons counters. Distinguish between them.

3) Write the design steps for designing synchronous counters with suitable example.

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SLR-EP – 329

Seat No.	

Set **R**

S.E. (E&E) (Part – II) (CGPA) Examination, 2016
DIGITAL TECHNIQUES

Day and Date : Friday, 25-11-2016 Total 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) **All** questions are **compulsory**.*
*4) Figures to the **right** indicates **full** marks.*
*5) Assume suitable data **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The Fan-out for TTL family is
a) 5 b) 10 c) 15 d) 20

2) The given maxterm is ABC, its equivalent binary representation is
a) 101 b) 010 c) 111 d) 000

3) A.B = B.A is _____ Law.
a) Commutative b) Associative c) Distributive d) Absorption

4) The output frequency of mod-16 counter, clocked from a 20KHz clock input signal is
a) 20KHz b) 52KHz c) 625Hz d) 1250Hz

5) A mod-2 counter followed by mod-5 counter is
a) the same as mod-2 counter followed by mod-5 counter
b) a decade counter
c) a mod-7 counter
d) none of the above

6) 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

7) A 4-bit presettable up-counter has present input 0101. The presetting operation takes place as soon as counter becomes maximum i.e 1111. The modulus of this counter is
a) 5 b) 10 c) 11 d) 15

P.T.O.

8) 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

9) 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

10) The minimum number of flip flops required for mod-12 ripple counter is
   a) 3 b) 4 c) 6 d) 12

11) Excess-3 code is known as
   a) Weighted code b) Cyclic redundancy code
   c) Self complementing code d) Algebraic code

12) 1-Digit BCD adder requires _____ numbers of full adders.
   a) one b) two c) four d) eight

13) What is the number of inputs, outputs of a decoder that accepts 64 different combinations ?
   a) 5 b) 6 c) 8 d) 64

14) The following logic has the highest speed
   a) TTL b) CMOS c) ECL d) none

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SLR-EP – 329

Seat No.	

S.E. (E&E) (Part – II) (CGPA) Examination, 2016
DIGITAL TECHNIQUES

Day and Date : Friday, 25-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 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** of the followings : **(4×4=16)**
   1) Implement
      i) AND gate with OR and NOT gates
      ii) OR gate with AND and NOT gates
   2) Explain 2 to 4 line decoder.
   3) Explain Don't care conditions with suitable example.
   4) Compare TTL and CMOS logic family.
   5) Minimize the following expression using 4 variable K-map
      i) $f = \sum m\,(0,2,3,8,9,10,11)$ ii) $f = \sum m\,(0,2,5,7,8,10,13,15)$

3. Solve **any two** of the followings : **(2×6=12)**
   1) Explain Parallel adder and design 8 bit parallel adder.
   2) Design gray to binary code converter.
   3) Explain interfacing of TTL and CMOS.

SECTION – II

4. Solve **any four** of the followings : **(4×4=16)**
   1) Explain the significance of characteristics and excitation table.
   2) Explain the operation of JK flip flop.

Set R

3) A binary ripple counter is required up to a count of $(16383)_{10}$. How many flip flops are required ? If the clock frequency is 8.192MHz, what is the frequency at output of the MSB ?

4) Design a Asynchronous mod-6 counter using D flip flops.

5) What is modulus of a counter ? Explain the lock out problem.

5. Solve **any two** of the followings : **(2×6=12)**

1) Draw and explain 4 bit up/down counter with negative edge triggering.

2) Draw and explain Ring and Johnsons counters. Distinguish between them.

3) Write the design steps for designing synchronous counters with suitable example.

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SLR-EP – 329

Seat No.	

Set **S**

S.E. (E&E) (Part – II) (CGPA) Examination, 2016
DIGITAL TECHNIQUES

Day and Date : Friday, 25-11-2016 Total 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) **All** questions are **compulsory**.*
*4) Figures to the **right** indicates **full** marks.*
*5) Assume suitable data **wherever** necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) 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

2) A 4-bit presettable up-counter has present input 0101. The presetting operation takes place as soon as counter becomes maximum i.e 1111. The modulus of this counter is
   a) 5 b) 10 c) 11 d) 15

3) 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

4) 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

5) The minimum number of flip flops required for mod-12 ripple counter is
   a) 3 b) 4 c) 6 d) 12

6) Excess-3 code is known as
   a) Weighted code b) Cyclic redundancy code
   c) Self complementing code d) Algebraic code

7) 1-Digit BCD adder requires _____ numbers of full adders.
   a) one b) two c) four d) eight

P.T.O.

8) What is the number of inputs, outputs of a decoder that accepts 64 different combinations ?
   a) 5 b) 6 c) 8 d) 64

9) The following logic has the highest speed
   a) TTL b) CMOS c) ECL d) none

10) The Fan-out for TTL family is
   a) 5 b) 10 c) 15 d) 20

11) The given maxterm is ABC, its equivalent binary representation is
   a) 101 b) 010 c) 111 d) 000

12) A.B = B.A is _____ Law.
   a) Commutative b) Associative c) Distributive d) Absorption

13) The output frequency of mod-16 counter, clocked from a 20KHz clock input signal is
   a) 20KHz b) 52KHz c) 625Hz d) 1250Hz

14) A mod-2 counter followed by mod-5 counter is
   a) the same as mod-2 counter followed by mod-5 counter
   b) a decade counter
   c) a mod-7 counter
   d) none of the above

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SLR-EP – 329

Seat No.	

S.E. (E&E) (Part – II) (CGPA) Examination, 2016
DIGITAL TECHNIQUES

Day and Date : Friday, 25-11-2016 Marks : 56
Time : 3.00 p.m. to 6.00 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** of the followings : **(4×4=16)**
   1) Implement
      i) AND gate with OR and NOT gates
      ii) OR gate with AND and NOT gates
   2) Explain 2 to 4 line decoder.
   3) Explain Don't care conditions with suitable example.
   4) Compare TTL and CMOS logic family.
   5) Minimize the following expression using 4 variable K-map
      i) $f = \sum m\,(0,2,3,8,9,10,11)$ ii) $f = \sum m\,(0,2,5,7,8,10,13,15)$

3. Solve **any two** of the followings : **(2×6=12)**
   1) Explain Parallel adder and design 8 bit parallel adder.
   2) Design gray to binary code converter.
   3) Explain interfacing of TTL and CMOS.

SECTION – II

4. Solve **any four** of the followings : **(4×4=16)**
   1) Explain the significance of characteristics and excitation table.
   2) Explain the operation of JK flip flop.

3) A binary ripple counter is required up to a count of $(16383)_{10}$. How many flip flops are required ? If the clock frequency is 8.192MHz, what is the frequency at output of the MSB ?

4) Design a Asynchronous mod-6 counter using D flip flops.

5) What is modulus of a counter ? Explain the lock out problem.

5. Solve **any two** of the followings : **(2×6=12)**

1) Draw and explain 4 bit up/down counter with negative edge triggering.

2) Draw and explain Ring and Johnsons counters. Distinguish between them.

3) Write the design steps for designing synchronous counters with suitable example.

———————————

SLR-EP – 330

Seat No.	

Set P

T.E. (Electrical and Electronics Engineering) (Part – I) (New – CGPA) Examination, 2016
ELECTROMAGNETIC ENGINEERING

Day and Date : Monday, 28-11-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A field line and an equipotential surface are
   a) always parallel b) always at 90°
   c) inclined at any angle d) none of the above

2) According to Coulomb's Law, force between two point charges is
   a) α (distance)^2 b) α (distance) c) a) and b) d) none

3) Potential energy of a test charge, when moved from a lower potential point to a higher potential point
   a) remains the same b) increases
   c) decreases d) becomes zero

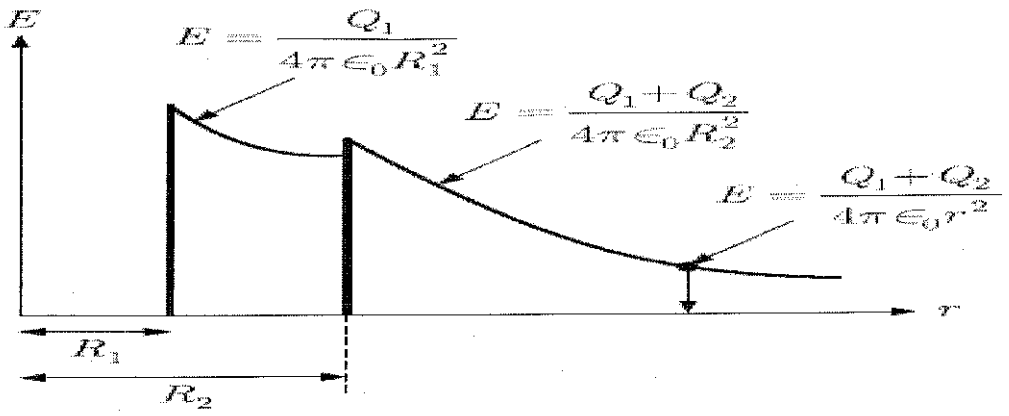
4) Poisson's equation is given as
   a) $E = -\nabla^2 V$ b) $\nabla^2 V = -\rho\upsilon \in$ c) $\nabla^2 V = 0$ d) All

5) The electric field at a point situated at a distance d from straight charged conductor is
   a) proportional to d b) inversely proportional to d
   c) inversely proportional to d^2 d) none of the above

P.T.O.

6) Boundary condition for conductor, Dielectric-Dielectric interface boundary is
   a) $E_{t1} = E_{t2}$ and $D_{N1} - D_{N2} = \rho_v$ b) $E_{t1} = E_{t2} = 0$ and $D_{N1} = \rho_s$
   c) $E_{t1} = E_{t2}$ and $D_{N1} = D_{N2}$ d) None of these

7) The given fig. represents the variation of electric field 'E'



   a) due to a spherical volume charge $Q = Q_1 + Q_2$
   b) due to two concentric shells of charges Q_1 and Q_2 uniformly distributed over spheres of radii R_1 and R_2
   c) due to two point charge Q_1 and Q_2 located at any two points 'r'(= R_1 and R_2)
   d) in a single spherical shell of charges Q uniformly distributed $Q = Q_1 + Q_2$

8) Energy is
   a) Power/sec b) Power x sec c) Watts d) Joules

9) $\nabla.(\nabla \times A)$ is
   a) 1 b) 2 c) 0 d) 3

10) $\nabla.D = \rho_v$ is
   a) Ohm's law b) Faraday's law c) Gauss law d) Coulomb's law

11) If $\nabla \times D = 0$, then vector is called
   a) Irreversible b) Irrotational c) Solenoidal d) None of the above

12) Across the surface of charged conductor the electric
   a) Field is continuous b) Potential is discontinuous
   c) Field is discontinuous d) None of the above

13) Scalar Magnetic Potential exist where J is present
   a) Yes b) No
   c) Can't determine d) None of these

14) Energy density in electrostatic field is
   a) $\frac{1}{2} \in E^2 Ad$ b) $\frac{1}{2} \in E^2$ c) $\frac{1}{2} \in E$ d) $\frac{1}{2} \in E^3$

SLR-EP – 330

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – I) (New – CGPA) Examination, 2016
ELECTROMAGNETIC ENGINEERING

Day and Date : Monday, 28-11-2016 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) Explain Electric Dipole and derive expression for E.

2) Derive expression on potential due to point charge also explain equipotential surface.

3) Explain Coulombs Law and vector form.

4) Find out work done in moving point charge of 6 C from one point (1, 8, 5) to another point (2, 18, 6) along the path $y = 3x^2 + z$, $z = x + 4$ if, $E = -8xy\, a_x - 4x^2\, a_y + a_z$ V/m.

5) Given the potential $V = \frac{60}{r^2} \sin \theta$ find V and E at (3°, 60°, 25°).

3. Solve **any two** : **(8×2=16)**

1) State and prove Uniqueness theorem.

2) State and prove Divergence theorem.

If $D = 2y^2z^2a_x + 3xy^2z^2a_y + 2xyz\, a_z$ pC/m^2 in free space. Find the total charge contained in an incremental sphere of radius 1 μm centre at p(2,2,2).

3) Derive expression for energy density in an electrostatic field.

Set P

SECTION – II

4. Solve **any three** : **(3×4=12)**
   1) Explain Biot-Savart law.
   2) Write a short note on self and mutual inductances.
   3) State the applications of Ampere's circuital law.
   4) What is meant by magnetic flux density ? Explain magnetic flux density for different current distribution.

5. Solve **any two** : **(8×2=16)**
   1) Electric field intensity of uniform plane wave in air has of magnitude of 800v/m in x direction if the wave is propagating in az direction and has a wavelength of 2m. Find the frequency the value of field is expressed in the form of cos(wt-Bx).
   2) Derive the expression for magnetic field intensity due to finite long straight filament.
   3) Short note on :
      a) Nature of magnetic materials
      b) Force on moving charge.

SLR-EP – 330

Seat No.	

Set Q

T.E. (Electrical and Electronics Engineering) (Part – I) (New – CGPA) Examination, 2016
ELECTROMAGNETIC ENGINEERING

Day and Date : Monday, 28-11-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Energy is
a) Power/sec b) Power x sec c) Watts d) Joules

2) $\nabla.(\nabla \times A)$ is
a) 1 b) 2 c) 0 d) 3

3) $\nabla.D = \rho_v$ is
a) Ohm's law b) Faraday's law c) Gauss law d) Coulomb's law

4) If $\nabla \times D = 0,$ then vector is called
a) Irreversible b) Irrotational c) Solenoidal d) None of the above

5) Across the surface of charged conductor the electric
a) Field is continuous b) Potential is discontinuous
c) Field is discontinuous d) None of the above

6) Scalar Magnetic Potential exist where J is present
a) Yes b) No c) Can't determine d) None of these

7) Energy density in electrostatic field is
a) $\frac{1}{2} \in E^2 Ad$ b) $\frac{1}{2} \in E^2$ c) $\frac{1}{2} \in E$ d) $\frac{1}{2} \in E^3$

P.T.O.

8) A field line and an equipotential surface are
   a) always parallel
   b) always at 90°
   c) inclined at any angle
   d) none of the above

9) According to Coulomb's Law, force between two point charges is
   a) α (distance)^2 b) α (distance) c) a) and b) d) none

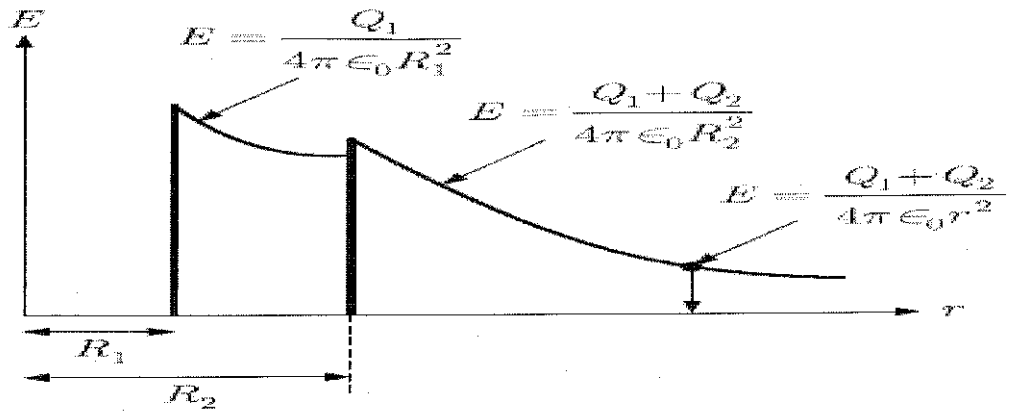
10) Potential energy of a test charge, when moved from a lower potential point to a higher potential point
   a) remains the same
   b) increases
   c) decreases
   d) becomes zero

11) Poisson's equation is given as
   a) $E = -\nabla^2 V$ b) $\nabla^2 V = -\rho\upsilon \in$ c) $\nabla^2 V = 0$ d) All

12) The electric field at a point situated at a distance d from straight charged conductor is
   a) proportional to d
   b) inversely proportional to d
   c) inversely proportional to d^2
   d) none of the above

13) Boundary condition for conductor, Dielectric-Dielectric interface boundary is
   a) $E_{t1} = E_{t2}$ and $D_{N1} - D_{N2} = \rho_v$ b) $E_{t1} = E_{t2} = 0$ and $D_{N1} = \rho_s$
   c) $E_{t1} = E_{t2}$ and $D_{N1} = D_{N2}$ d) None of these

14) The given fig. represents the variation of electric field 'E'



   a) due to a spherical volume charge $Q = Q_1 + Q_2$
   b) due to two concentric shells of charges Q_1 and Q_2 uniformly distributed over spheres of radii R_1 and R_2
   c) due to two point charge Q_1 and Q_2 located at any two points 'r'(= R_1 and R_2)
   d) in a single spherical shell of charges Q uniformly distributed $Q = Q_1 + Q_2$

SLR-EP – 330

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – I) (New – CGPA) Examination, 2016
ELECTROMAGNETIC ENGINEERING

Day and Date : Monday, 28-11-2016 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) Explain Electric Dipole and derive expression for E.

2) Derive expression on potential due to point charge also explain equipotential surface.

3) Explain Coulombs Law and vector form.

4) Find out work done in moving point charge of 6 C from one point (1, 8, 5) to another point (2, 18, 6) along the path $y = 3x^2 + z$, $z = x + 4$ if, $E = -8xy\, a_x - 4x^2\, a_y + a_z$ V/m.

5) Given the potential $V = \frac{60}{r^2} \sin \theta$ find V and E at (3°, 60°, 25°).

3. Solve **any two** : **(8×2=16)**

1) State and prove Uniqueness theorem.

2) State and prove Divergence theorem.

If $D = 2y^2z^2a_x + 3xy^2z^2a_y + 2xyz\, a_z$ pC/m^2 in free space. Find the total charge contained in an incremental sphere of radius 1 μm centre at p(2,2,2).

3) Derive expression for energy density in an electrostatic field.

Set Q

SECTION – II

4. Solve **any three** : **(3×4=12)**
   1) Explain Biot-Savart law.
   2) Write a short note on self and mutual inductances.
   3) State the applications of Ampere's circuital law.
   4) What is meant by magnetic flux density ? Explain magnetic flux density for different current distribution.

5. Solve **any two** : **(8×2=16)**
   1) Electric field intensity of uniform plane wave in air has of magnitude of 800v/m in x direction if the wave is propagating in az direction and has a wavelength of 2m. Find the frequency the value of field is expressed in the form of cos(wt-Bx).
   2) Derive the expression for magnetic field intensity due to finite long straight filament.
   3) Short note on :
      a) Nature of magnetic materials
      b) Force on moving charge.

SLR-EP – 330

Seat No.	

Set **R**

T.E. (Electrical and Electronics Engineering) (Part – I) (New – CGPA) Examination, 2016
ELECTROMAGNETIC ENGINEERING

Day and Date : Monday, 28-11-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

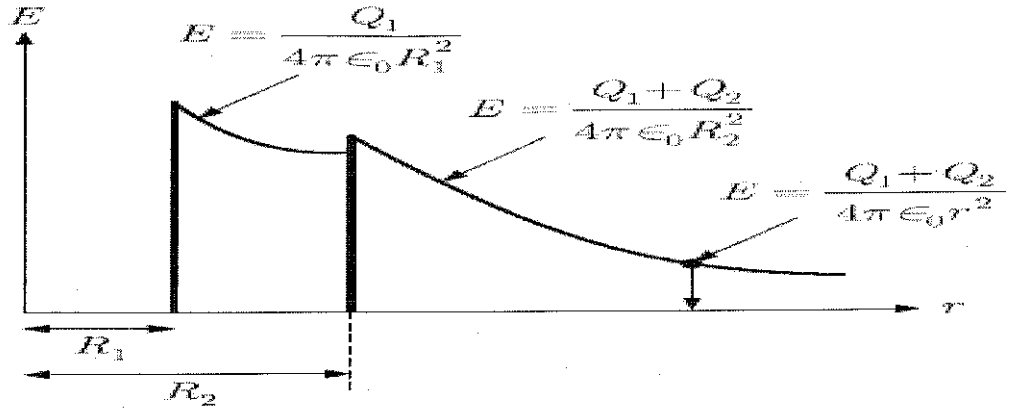
Duration : 30 Minutes Marks : 14

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

1) The electric field at a point situated at a distance d from straight charged conductor is
   a) proportional to d
   b) inversely proportional to d
   c) inversely proportional to d^2
   d) none of the above

2) Boundary condition for conductor, Dielectric-Dielectric interface boundary is
   a) $E_{t1} = E_{t2}$ and $D_{N1} - D_{N2} = \rho_v$
   b) $E_{t1} = E_{t2} = 0$ and $D_{N1} = \rho_s$
   c) $E_{t1} = E_{t2}$ and $D_{N1} = D_{N2}$
   d) None of these

3) The given fig. represents the variation of electric field 'E'



   a) due to a spherical volume charge $Q = Q_1 + Q_2$
   b) due to two concentric shells of charges Q_1 and Q_2 uniformly distributed over spheres of radii R_1 and R_2
   c) due to two point charge Q_1 and Q_2 located at any two points 'r'(= R_1 and R_2)
   d) in a single spherical shell of charges Q uniformly distributed $Q = Q_1 + Q_2$

P.T.O.

4) Energy is
   a) Power/sec b) Power x sec c) Watts d) Joules

5) $\nabla.(\nabla \times A)$ is
   a) 1 b) 2 c) 0 d) 3

6) $\nabla.D = \rho_v$ is
   a) Ohm's law b) Faraday's law
   c) Gauss law d) Coulomb's law

7) If $\nabla \times D = 0$, then vector is called
   a) Irreversible b) Irrotational c) Solenoidal d) None of the above

8) Across the surface of charged conductor the electric
   a) Field is continuous b) Potential is discontinuous
   c) Field is discontinuous d) None of the above

9) Scalar Magnetic Potential exist where J is present
   a) Yes b) No
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10) Energy density in electrostatic field is
   a) $\frac{1}{2} \in E^2 Ad$ b) $\frac{1}{2} \in E^2$ c) $\frac{1}{2} \in E$ d) $\frac{1}{2} \in E^3$

11) A field line and an equipotential surface are
   a) always parallel b) always at 90°
   c) inclined at any angle d) none of the above

12) According to Coulomb's Law, force between two point charges is
   a) α (distance)^2 b) α (distance) c) a) and b) d) none

13) Potential energy of a test charge, when moved from a lower potential point to a higher potential point
   a) remains the same b) increases
   c) decreases d) becomes zero

14) Poisson's equation is given as
   a) $E = -\nabla^2 V$ b) $\nabla^2 V = -\rho \upsilon \in$ c) $\nabla^2 V = 0$ d) All

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SLR-EP – 330

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – I) (New – CGPA) Examination, 2016
ELECTROMAGNETIC ENGINEERING

Day and Date : Monday, 28-11-2016 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) Explain Electric Dipole and derive expression for E.

2) Derive expression on potential due to point charge also explain equipotential surface.

3) Explain Coulombs Law and vector form.

4) Find out work done in moving point charge of 6 C from one point (1, 8, 5) to another point (2, 18, 6) along the path $y = 3x^2 + z$, $z = x + 4$ if, $E = -8xy\, a_x - 4x^2\, a_y + a_z$ V/m.

5) Given the potential $V = \frac{60}{r^2} \sin \theta$ find V and E at (3°, 60°, 25°).

3. Solve **any two** : **(8×2=16)**

1) State and prove Uniqueness theorem.

2) State and prove Divergence theorem.

If $D = 2y^2z^2a_x + 3xy^2z^2a_y + 2xyz\, a_z$ pC/m^2 in free space. Find the total charge contained in an incremental sphere of radius 1 μm centre at p(2,2,2).

3) Derive expression for energy density in an electrostatic field.

Set R

SECTION – II

4. Solve **any three** : **(3×4=12)**
   1) Explain Biot-Savart law.
   2) Write a short note on self and mutual inductances.
   3) State the applications of Ampere's circuital law.
   4) What is meant by magnetic flux density ? Explain magnetic flux density for different current distribution.

5. Solve **any two** : **(8×2=16)**
   1) Electric field intensity of uniform plane wave in air has of magnitude of 800v/m in x direction if the wave is propagating in az direction and has a wavelength of 2m. Find the frequency the value of field is expressed in the form of cos(wt-Bx).
   2) Derive the expression for magnetic field intensity due to finite long straight filament.
   3) Short note on :
      a) Nature of magnetic materials
      b) Force on moving charge.

SLR-EP – 330

Seat No.	

Set S

T.E. (Electrical and Electronics Engineering) (Part – I) (New – CGPA) Examination, 2016
ELECTROMAGNETIC ENGINEERING

Day and Date : Monday, 28-11-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) $\nabla.D = \rho_v$ is
a) Ohm's law b) Faraday's law c) Gauss law d) Coulomb's law

2) If $\nabla \times D = 0$, then vector is called
a) Irreversible b) Irrotational c) Solenoidal d) None of the above

3) Across the surface of charged conductor the electric
a) Field is continuous b) Potential is discontinuous
c) Field is discontinuous d) None of the above

4) Scalar Magnetic Potential exist where J is present
a) Yes b) No
c) Can't determine d) None of these

5) Energy density in electrostatic field is
a) $\frac{1}{2} \in E^2 Ad$ b) $\frac{1}{2} \in E^2$ c) $\frac{1}{2} \in E$ d) $\frac{1}{2} \in E^3$

6) A field line and an equipotential surface are
a) always parallel b) always at 90°
c) inclined at any angle d) none of the above

P.T.O.

7) According to Coulomb's Law, force between two point charges is
   a) α (distance)^2 b) α (distance) c) a) and b) d) none

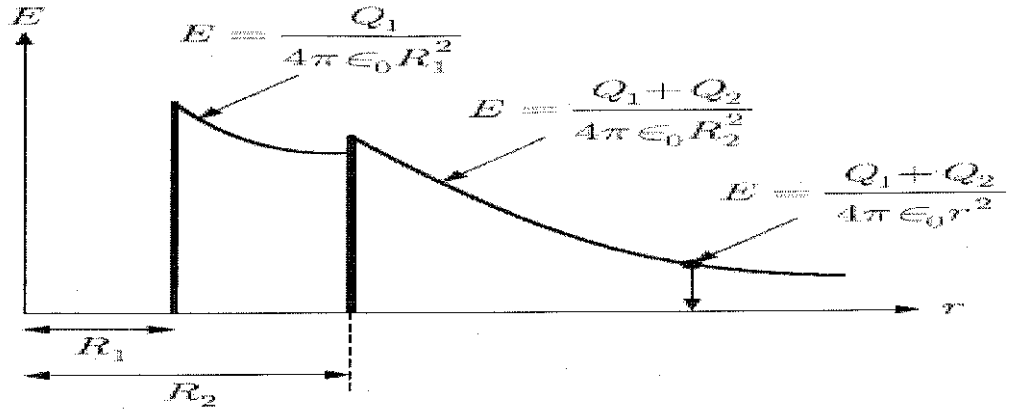
8) Potential energy of a test charge, when moved from a lower potential point to a higher potential point
   a) remains the same b) increases
   c) decreases d) becomes zero

9) Poisson's equation is given as
   a) $E = -\nabla^2 V$ b) $\nabla^2 V = -\rho \upsilon \in$ c) $\nabla^2 V = 0$ d) All

10) The electric field at a point situated at a distance d from straight charged conductor is
   a) proportional to d b) inversely proportional to d
   c) inversely proportional to d^2 d) none of the above

11) Boundary condition for conductor, Dielectric-Dielectric interface boundary is
   a) $E_{t1} = E_{t2}$ and $D_{N1} - D_{N2} = \rho_v$ b) $E_{t1} = E_{t2} = 0$ and $D_{N1} = \rho_s$
   c) $E_{t1} = E_{t2}$ and $D_{N1} = D_{N2}$ d) None of these

12) The given fig. represents the variation of electric field 'E'



   a) due to a spherical volume charge $Q = Q_1 + Q_2$
   b) due to two concentric shells of charges Q_1 and Q_2 uniformly distributed over spheres of radii R_1 and R_2
   c) due to two point charge Q_1 and Q_2 located at any two points 'r'(= R_1 and R_2)
   d) in a single spherical shell of charges Q uniformly distributed $Q = Q_1 + Q_2$

13) Energy is
   a) Power/sec b) Power x sec c) Watts d) Joules

14) $\nabla.(\nabla \times A)$ is
   a) 1 b) 2 c) 0 d) 3

SLR-EP – 330

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – I) (New – CGPA) Examination, 2016
ELECTROMAGNETIC ENGINEERING

Day and Date : Monday, 28-11-2016 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) Explain Electric Dipole and derive expression for E.

2) Derive expression on potential due to point charge also explain equipotential surface.

3) Explain Coulombs Law and vector form.

4) Find out work done in moving point charge of 6 C from one point (1, 8, 5) to another point (2, 18, 6) along the path $y = 3x^2 + z$, $z = x + 4$ if, $E = -8xy\, a_x - 4x^2\, a_y + a_z$ V/m.

5) Given the potential $V = \frac{60}{r^2} \sin \theta$ find V and E at (3°, 60°, 25°).

3. Solve **any two** : **(8×2=16)**

1) State and prove Uniqueness theorem.

2) State and prove Divergence theorem.

If $D = 2y^2z^2a_x + 3xy^2z^2a_y + 2xyz\, a_z$ pC/m^2 in free space. Find the total charge contained in an incremental sphere of radius 1 μm centre at p(2,2,2).

3) Derive expression for energy density in an electrostatic field.

Set S

SECTION – II

4. Solve **any three** : **(3×4=12)**
   1) Explain Biot-Savart law.
   2) Write a short note on self and mutual inductances.
   3) State the applications of Ampere's circuital law.
   4) What is meant by magnetic flux density ? Explain magnetic flux density for different current distribution.

5. Solve **any two** : **(8×2=16)**
   1) Electric field intensity of uniform plane wave in air has of magnitude of 800v/m in x direction if the wave is propagating in az direction and has a wavelength of 2m. Find the frequency the value of field is expressed in the form of cos(wt-Bx).
   2) Derive the expression for magnetic field intensity due to finite long straight filament.
   3) Short note on :
      a) Nature of magnetic materials
      b) Force on moving charge.

SLR-EP – 331

Seat No.	

Set P

T.E. (Electrical & Electronics Engg.) (Part – I) (New – CGPA)
Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Wednesday, 30-11-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A resistance potentiometer is a
   a) First order instrument b) Zero order instrument
   c) Second order instrument d) None of these

2) In a resistance potentiometer, the non-linearity
   a) Increases with increase of load to potentiometer resistance
   b) Decrease with increase of load to potentiometer resistance
   c) Is not dependent upon load to potentiometer resistance
   d) None of these

3) In a resistance potentiometer high value of resistance of POT leads to
   a) High value of sensitivity b) Low value of sensitivity
   c) Low value of non-linearity d) Low value of error

4) For wire wound strain gauges the approximate value of gauge factor is
   a) $1+2\Delta\rho/\rho$ b) $1+2\Delta R/R$ c) $1+2\nu$ d) $1+2\Delta D/D$

   Where ρ, R, ν, D are respectively resistivity, resistance, poisson's constant and diameter.

5) The temperature transducers exhibit nonlinear behaviors. The order in which they exhibit non linearity (highest to lower) is
   a) Thermocouples, RTD, thermistors
   b) Thermistor, thermocouples, RTDs
   c) RTDs, thermocouples, thermistors
   d) Thermistors, RTDs, thermocouples

P.T.O.

6) The properties of an ideal OPAMP are
   a) It should have zero input impedance
   b) It should have an infinite output impedance
   c) It should have a zero open loop gain
   d) None of these

7) A buffer amplifier has gain of
   a) Infinity
   b) Zero
   c) Unity
   d) Dependent upon the circuit parameters

8) The gain of 741 OPAMP falls at low frequency of
   a) 10 KHz b) 10 Hz c) 100 Hz d) 1000 Hz

9) A low pass RC filter acts as a pure differentiator when
   a) $\omega\tau = 1$ b) $\omega\tau << 1$ c) $\omega\tau >> 1$ d) $\omega\tau = 0$
   Where ω is applied frequency and τ is the time constant of RC circuit.

10) The FM telemetry as compared with AM telemetry requires a channel that is
   a) Equal to that of AM telemetry
   b) Smaller than what is required for AM telemetry
   c) 100 times of that required for AM telemetry
   d) 10 times of that required for AM telemetry

11) Digital Instruments have input impedance of the order of
   a) Ω b) $K\Omega$ c) $M\Omega$ d) $m\Omega$

12) LEDs emit light
   a) Only in red colour
   b) Only in yellow colour
   c) Only in green colour
   d) In red, green, yellow and amber colour

13) An LCD requires power of
   a) 20 W b) 20 mW c) 20 μW d) 20 nW

14) The witching time of LEDs is of the order of
   a) 1 s b) 1 ms c) 1 μs d) 1 ns

SLR-EP – 331

Seat No.	

T.E. (Electrical & Electronics Engg.) (Part – I) (New – CGPA) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Wednesday, 30-11-2016 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) Resolution

      2) Accuracy

      3) Threshold

      4) Static error

   b) Explain isolation amplifier.

   c) Write a short note on R-2R ADC.

   d) What is error ? Explain various types errors in instrumentation system.

   e) Explain Data acquisition system.

   f) What are types of DACS ? Explain any one in detail.

3. Solve **any two** : **(6×2=12)**

   a) Draw and explain block diagram of instrumentation system and function of each block.

   b) By using opamp generate sine waveform generation.

   c) What is active filters ? Derive the expression of fc for first order low pass filter. Draw the output response graph.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Why ladder diagram is used in PLC ? Support your answer.
   b) What is selection criteria of PLC ?
   c) Explain magnetic tape recorder.
   d) Write a short note on :
      i) LCD display
      ii) LED display.
   e) What is radio telemetry ? Explain Am modulation.
   f) What is modulation ? Explain Amplitude Modulation in detail.

5. Solve **any two** : **(6×2=12)**
   a) Define telemetry system. Explain voltage and current telemetering.
   b) What is application of oscillograph ? Explain with neat diagram.
   c) Explain Harmonic distortion analyzer. Give its applications in industry.

SLR-EP – 331

Seat No.	

Set **Q**

T.E. (Electrical & Electronics Engg.) (Part – I) (New – CGPA) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Wednesday, 30-11-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The gain of 741 OPAMP falls at low frequency of
a) 10 KHz b) 10 Hz c) 100 Hz d) 1000 Hz

2) A low pass RC filter acts as a pure differentiator when
a) $\omega\tau = 1$ b) $\omega\tau << 1$ c) $\omega\tau >> 1$ d) $\omega\tau = 0$
Where ω is applied frequency and τ is the time constant of RC circuit.

3) The FM telemetry as compared with AM telemetry requires a channel that is
a) Equal to that of AM telemetry
b) Smaller than what is required for AM telemetry
c) 100 times of that required for AM telemetry
d) 10 times of that required for AM telemetry

4) Digital Instruments have input impedance of the order of
a) Ω b) KΩ c) MΩ d) mΩ

5) LEDs emit light
a) Only in red colour
b) Only in yellow colour
c) Only in green colour
d) In red, green, yellow and amber colour

6) An LCD requires power of
a) 20 W b) 20 mW c) 20 μW d) 20 nW

P.T.O.

7) The witching time of LEDs is of the order of
   a) 1 s b) 1 ms c) 1 μs d) 1 ns
8) A resistance potentiometer is a
   a) First order instrument b) Zero order instrument
   c) Second order instrument d) None of these
9) In a resistance potentiometer, the non-linearity
   a) Increases with increase of load to potentiometer resistance
   b) Decrease with increase of load to potentiometer resistance
   c) Is not dependent upon load to potentiometer resistance
   d) None of these
10) In a resistance potentiometer high value of resistance of POT leads to
   a) High value of sensitivity b) Low value of sensitivity
   c) Low value of non-linearity d) Low value of error
11) For wire wound strain gauges the approximate value of gauge factor is
   a) $1+2\Delta\rho/\rho$ b) $1+2\Delta R/R$ c) $1+2\nu$ d) $1+2\Delta D/D$

   Where ρ, R, ν, D are respectively resistivity, resistance, poisson's constant and diameter.
12) The temperature transducers exhibit nonlinear behaviors. The order in which they exhibit non linearity (highest to lower) is
   a) Thermocouples, RTD, thermistors
   b) Thermistor, thermocouples, RTDs
   c) RTDs, thermocouples, thermistors
   d) Thermistors, RTDs, thermocouples
13) The properties of an ideal OPAMP are
   a) It should have zero input impedance
   b) It should have an infinite output impedance
   c) It should have a zero open loop gain
   d) None of these
14) A buffer amplifier has gain of
   a) Infinity
   b) Zero
   c) Unity
   d) Dependent upon the circuit parameters

_____

SLR-EP – 331

Seat No.	

T.E. (Electrical & Electronics Engg.) (Part – I) (New – CGPA) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Wednesday, 30-11-2016 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) Resolution

      2) Accuracy

      3) Threshold

      4) Static error

   b) Explain isolation amplifier.

   c) Write a short note on R-2R ADC.

   d) What is error ? Explain various types errors in instrumentation system.

   e) Explain Data acquisition system.

   f) What are types of DACS ? Explain any one in detail.

3. Solve **any two** : **(6×2=12)**

   a) Draw and explain block diagram of instrumentation system and function of each block.

   b) By using opamp generate sine waveform generation.

   c) What is active filters ? Derive the expression of fc for first order low pass filter. Draw the output response graph.

Set Q

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Why ladder diagram is used in PLC ? Support your answer.
   b) What is selection criteria of PLC ?
   c) Explain magnetic tape recorder.
   d) Write a short note on :
      i) LCD display
      ii) LED display.
   e) What is radio telemetry ? Explain Am modulation.
   f) What is modulation ? Explain Amplitude Modulation in detail.

5. Solve **any two** : **(6×2=12)**
   a) Define telemetry system. Explain voltage and current telemetering.
   b) What is application of oscillograph ? Explain with neat diagram.
   c) Explain Harmonic distortion analyzer. Give its applications in industry.

SLR-EP – 331

Seat No.	

Set **R**

T.E. (Electrical & Electronics Engg.) (Part – I) (New – CGPA)
Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Wednesday, 30-11-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The temperature transducers exhibit nonlinear behaviors. The order in which they exhibit non linearity (highest to lower) is
   a) Thermocouples, RTD, thermistors
   b) Thermistor, thermocouples, RTDs
   c) RTDs, thermocouples, thermistors
   d) Thermistors, RTDs, thermocouples

2) The properties of an ideal OPAMP are
   a) It should have zero input impedance
   b) It should have an infinite output impedance
   c) It should have a zero open loop gain
   d) None of these

3) A buffer amplifier has gain of
   a) Infinity
   b) Zero
   c) Unity
   d) Dependent upon the circuit parameters

4) The gain of 741 OPAMP falls at low frequency of
   a) 10 KHz b) 10 Hz c) 100 Hz d) 1000 Hz

5) A low pass RC filter acts as a pure differentiator when
   a) $\omega\tau = 1$ b) $\omega\tau << 1$ c) $\omega\tau >> 1$ d) $\omega\tau = 0$
   Where ω is applied frequency and τ is the time constant of RC circuit.

P.T.O.

6) The FM telemetry as compared with AM telemetry requires a channel that is
   a) Equal to that of AM telemetry
   b) Smaller than what is required for AM telemetry
   c) 100 times of that required for AM telemetry
   d) 10 times of that required for AM telemetry

7) Digital Instruments have input impedance of the order of
   a) Ω b) KΩ c) MΩ d) mΩ

8) LEDs emit light
   a) Only in red colour
   b) Only in yellow colour
   c) Only in green colour
   d) In red, green, yellow and amber colour

9) An LCD requires power of
   a) 20 W b) 20 mW c) 20 μW d) 20 nW

10) The witching time of LEDs is of the order of
   a) 1 s b) 1 ms c) 1 μs d) 1 ns

11) A resistance potentiometer is a
   a) First order instrument b) Zero order instrument
   c) Second order instrument d) None of these

12) In a resistance potentiometer, the non-linearity
   a) Increases with increase of load to potentiometer resistance
   b) Decrease with increase of load to potentiometer resistance
   c) Is not dependent upon load to potentiometer resistance
   d) None of these

13) In a resistance potentiometer high value of resistance of POT leads to
   a) High value of sensitivity b) Low value of sensitivity
   c) Low value of non-linearity d) Low value of error

14) For wire wound strain gauges the approximate value of gauge factor is
   a) $1+2\Delta\rho/\rho$ b) $1+2\Delta R/R$ c) $1+2\nu$ d) $1+2\Delta D/D$

   Where ρ, R, ν, D are respectively resistivity, resistance, poisson's constant and diameter.

SLR-EP – 331

Seat No.	

T.E. (Electrical & Electronics Engg.) (Part – I) (New – CGPA) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Wednesday, 30-11-2016 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) Resolution

      2) Accuracy

      3) Threshold

      4) Static error

   b) Explain isolation amplifier.

   c) Write a short note on R-2R ADC.

   d) What is error ? Explain various types errors in instrumentation system.

   e) Explain Data acquisition system.

   f) What are types of DACS ? Explain any one in detail.

3. Solve **any two** : **(6×2=12)**

   a) Draw and explain block diagram of instrumentation system and function of each block.

   b) By using opamp generate sine waveform generation.

   c) What is active filters ? Derive the expression of fc for first order low pass filter. Draw the output response graph.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Why ladder diagram is used in PLC ? Support your answer.
   b) What is selection criteria of PLC ?
   c) Explain magnetic tape recorder.
   d) Write a short note on :
      i) LCD display
      ii) LED display.
   e) What is radio telemetry ? Explain Am modulation.
   f) What is modulation ? Explain Amplitude Modulation in detail.

5. Solve **any two** : **(6×2=12)**
   a) Define telemetry system. Explain voltage and current telemetering.
   b) What is application of oscillograph ? Explain with neat diagram.
   c) Explain Harmonic distortion analyzer. Give its applications in industry.

SLR-EP – 331

Seat No.	

Set S

T.E. (Electrical & Electronics Engg.) (Part – I) (New – CGPA)
Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Wednesday, 30-11-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The FM telemetry as compared with AM telemetry requires a channel that is
   a) Equal to that of AM telemetry
   b) Smaller than what is required for AM telemetry
   c) 100 times of that required for AM telemetry
   d) 10 times of that required for AM telemetry

2) Digital Instruments have input impedance of the order of
   a) Ω b) KΩ c) MΩ d) mΩ

3) LEDs emit light
   a) Only in red colour
   b) Only in yellow colour
   c) Only in green colour
   d) In red, green, yellow and amber colour

4) An LCD requires power of
   a) 20 W b) 20 mW c) 20 μW d) 20 nW

5) The witching time of LEDs is of the order of
   a) 1 s b) 1 ms c) 1 μs d) 1 ns

6) A resistance potentiometer is a
   a) First order instrument b) Zero order instrument
   c) Second order instrument d) None of these

P.T.O.

7) In a resistance potentiometer, the non-linearity
   a) Increases with increase of load to potentiometer resistance
   b) Decrease with increase of load to potentiometer resistance
   c) Is not dependent upon load to potentiometer resistance
   d) None of these

8) In a resistance potentiometer high value of resistance of POT leads to
   a) High value of sensitivity b) Low value of sensitivity
   c) Low value of non-linearity d) Low value of error

9) For wire wound strain gauges the approximate value of gauge factor is
   a) $1+2\Delta\rho/\rho$ b) $1+2\Delta R/R$ c) $1+2\nu$ d) $1+2\Delta D/D$

   Where ρ, R, ν, D are respectively resistivity, resistance, poisson's constant and diameter.

10) The temperature transducers exhibit nonlinear behaviors. The order in which they exhibit non linearity (highest to lower) is
   a) Thermocouples, RTD, thermistors
   b) Thermistor, thermocouples, RTDs
   c) RTDs, thermocouples, thermistors
   d) Thermistors, RTDs, thermocouples

11) The properties of an ideal OPAMP are
   a) It should have zero input impedance
   b) It should have an infinite output impedance
   c) It should have a zero open loop gain
   d) None of these

12) A buffer amplifier has gain of
   a) Infinity
   b) Zero
   c) Unity
   d) Dependent upon the circuit parameters

13) The gain of 741 OPAMP falls at low frequency of
   a) 10 KHz b) 10 Hz c) 100 Hz d) 1000 Hz

14) A low pass RC filter acts as a pure differentiator when
   a) $\omega\tau = 1$ b) $\omega\tau << 1$ c) $\omega\tau >> 1$ d) $\omega\tau = 0$

   Where ω is applied frequency and τ is the time constant of RC circuit.

SLR-EP – 331

Seat No.	

T.E. (Electrical & Electronics Engg.) (Part – I) (New – CGPA) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Wednesday, 30-11-2016 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) Resolution

2) Accuracy

3) Threshold

4) Static error

b) Explain isolation amplifier.

c) Write a short note on R-2R ADC.

d) What is error ? Explain various types errors in instrumentation system.

e) Explain Data acquisition system.

f) What are types of DACS ? Explain any one in detail.

3. Solve **any two** : **(6×2=12)**

a) Draw and explain block diagram of instrumentation system and function of each block.

b) By using opamp generate sine waveform generation.

c) What is active filters ? Derive the expression of fc for first order low pass filter. Draw the output response graph.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   a) Why ladder diagram is used in PLC ? Support your answer.
   b) What is selection criteria of PLC ?
   c) Explain magnetic tape recorder.
   d) Write a short note on :
      i) LCD display
      ii) LED display.
   e) What is radio telemetry ? Explain Am modulation.
   f) What is modulation ? Explain Amplitude Modulation in detail.

5. Solve **any two** : **(6×2=12)**
   a) Define telemetry system. Explain voltage and current telemetering.
   b) What is application of oscillograph ? Explain with neat diagram.
   c) Explain Harmonic distortion analyzer. Give its applications in industry.

SLR-EP – 332

Seat No.	

Set P

T.E. (Electrical and Electronics) (Part – I) Examination, 2016
MICROPROCESSOR AND ITS APPLICATION (New CGPA Pattern)

Day and Date : Friday, 2-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The 8085 microcontroller is of _____ pin package.
a) 30 b) 20 c) 40 d) 42

2) The 8085 microcontroller is a _____ processor.
a) 12 byte b) 10 byte c) 8 bit d) 8 byte

3) The SP is of _____ wide register.
a) 8 byte b) 8 bit c) 16 bit d) None of these

4) In an Intel 8085 microprocessor, IN 80H instruction is used ?
a) Communicating with a slow peripheral device
b) To slow down a fast peripheral
c) Device so as to communicate at the microprocessor's device
d) Move the data from 80H port address to Accumulator

5) The program counter in a 8085 microprocessor is a
a) 16-bit register b) 8-bit register c) 24-bit register d) 4-bit register

6) The number of counters that are present in the programmable timer device 8254 is
a) 1 b) 2 c) 3 d) 4

7) In 8254 control word register, if SC 1=0 and SC0=1, then the counter selected is
a) counter 0 b) counter 1 c) counter 2 d) none

8) The port that is used for the generation of handshake lines in mode 1 or mode 2 is
a) Port A b) Port B c) Port C Lower d) Port C Upper

P.T.O.

9) All the functions of the ports of 8255 are achieved by programming the bits of an internal register called
   a) Data bus control b) Read logic control
   c) Control word register d) None

10) Which of the following is not a mode of data transmission ?
   a) Simplex b) Duplex c) Semi Duplex d) Half Duplex

11) If the data is transmitted only in one direction over a single communication channel, then it is of
   a) Simplex mode b) Duplex mode
   c) Semi duplex mode d) Half duplex mode

12) In Intel 8085 a microprocessor ALE signal is
   a) Address Live Enable b) Address Latch Enable
   c) Address Lock Enable d) Address Left Enable

13) _____ works at QRS wave.
   a) Cardioverter b) Pacemaker
   c) Defibrillator d) Heart lung machine

14) Carry flag is not affected after the execution of
   a) ADD B b) SBB B c) INR B d) ORA B

_____

SLR-EP – 332

Seat No.	

T.E. (Electrical and Electronics) (Part – I) Examination, 2016
MICROPROCESSOR AND ITS APPLICATION (New CGPA Pattern)

Day and Date : Friday, 2-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** suitable data **if necessary**.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain addressing modes of 8085.
   b) Write ALP for addition of two 8 bit numbers.
   c) Give classification of Interrupts.
   d) Explain types of memory.
   e) Explain SIM instruction.

3. Solve **any two** : **(8×2=16)**
   a) Interface 2K bytes of memory to 8085 with starting address 8000H and draw interfacing diagram.
   b) Explain architecture 8085. (with dig.)
   c) Explain five data transfer and five arithmetic instructions.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   a) Show detailed interfacing of ADC0808 with 8085.
   b) Explain 8251-schematic block diagram.
   c) Explain Synchronous and Asynchronous I/O.
   d) Explain 8259A PIC-BLOCK DIAGRAM.

5. Solve **any two** : **(8×2=16)**
   a) Show detailed interfacing of 8251 with 8085. Assume suitable addresses.
   b) Write a program to generate a square wave.
   c) Explain 8255-Schematic block diagram.

Set P

Set P

SLR-EP – 332

Seat No.	

Set Q

T.E. (Electrical and Electronics) (Part – I) Examination, 2016
MICROPROCESSOR AND ITS APPLICATION (New CGPA Pattern)

Day and Date : Friday, 2-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The port that is used for the generation of handshake lines in mode 1 or mode 2 is
a) Port A b) Port B c) Port C Lower d) Port C Upper

2) All the functions of the ports of 8255 are achieved by programming the bits of an internal register called
a) Data bus control b) Read logic control
c) Control word register d) None

3) Which of the following is not a mode of data transmission ?
a) Simplex b) Duplex c) Semi Duplex d) Half Duplex

4) If the data is transmitted only in one direction over a single communication channel, then it is of
a) Simplex mode b) Duplex mode
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5) In Intel 8085 a microprocessor ALE signal is
a) Address Live Enable b) Address Latch Enable
c) Address Lock Enable d) Address Left Enable

6) _____ works at QRS wave.
a) Cardioverter b) Pacemaker
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7) Carry flag is not affected after the execution of
a) ADD B b) SBB B c) INR B d) ORA B

P.T.O.

8) The 8085 microcontroller is of _____ pin package.
   a) 30 b) 20 c) 40 d) 42

9) The 8085 microcontroller is a _____ processor.
   a) 12 byte b) 10 byte c) 8 bit d) 8 byte

10) The SP is of _____ wide register.
   a) 8 byte b) 8 bit c) 16 bit d) None of these

11) In an Intel 8085 microprocessor, IN 80H instruction is used ?
   a) Communicating with a slow peripheral device
   b) To slow down a fast peripheral
   c) Device so as to communicate at the microprocessor's device
   d) Move the data from 80H port address to Accumulator

12) The program counter in a 8085 microprocessor is a
   a) 16-bit register b) 8-bit register c) 24-bit register d) 4-bit register

13) The number of counters that are present in the programmable timer device 8254 is
   a) 1 b) 2 c) 3 d) 4

14) In 8254 control word register, if SC 1=0 and SC0=1, then the counter selected is
   a) counter 0 b) counter 1 c) counter 2 d) none

_____

SLR-EP – 332

Seat No.	

T.E. (Electrical and Electronics) (Part – I) Examination, 2016
MICROPROCESSOR AND ITS APPLICATION (New CGPA Pattern)

Day and Date : Friday, 2-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** suitable data **if necessary**.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain addressing modes of 8085.
   b) Write ALP for addition of two 8 bit numbers.
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   d) Explain types of memory.
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3. Solve **any two** : **(8×2=16)**
   a) Interface 2K bytes of memory to 8085 with starting address 8000H and draw interfacing diagram.
   b) Explain architecture 8085. (with dig.)
   c) Explain five data transfer and five arithmetic instructions.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   a) Show detailed interfacing of ADC0808 with 8085.
   b) Explain 8251-schematic block diagram.
   c) Explain Synchronous and Asynchronous I/O.
   d) Explain 8259A PIC-BLOCK DIAGRAM.

5. Solve **any two** : **(8×2=16)**
   a) Show detailed interfacing of 8251 with 8085. Assume suitable addresses.
   b) Write a program to generate a square wave.
   c) Explain 8255-Schematic block diagram.

Set Q

Set Q

SLR-EP – 332

Seat No.	

Set **R**

T.E. (Electrical and Electronics) (Part – I) Examination, 2016
MICROPROCESSOR AND ITS APPLICATION (New CGPA Pattern)

Day and Date : Friday, 2-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The program counter in a 8085 microprocessor is a
a) 16-bit register b) 8-bit register c) 24-bit register d) 4-bit register

2) The number of counters that are present in the programmable timer device 8254 is
a) 1 b) 2 c) 3 d) 4

3) In 8254 control word register, if SC 1=0 and SC0=1, then the counter selected is
a) counter 0 b) counter 1 c) counter 2 d) none

4) The port that is used for the generation of handshake lines in mode 1 or mode 2 is
a) Port A b) Port B c) Port C Lower d) Port C Upper

5) All the functions of the ports of 8255 are achieved by programming the bits of an internal register called
a) Data bus control b) Read logic control
c) Control word register d) None

6) Which of the following is not a mode of data transmission ?
a) Simplex b) Duplex c) Semi Duplex d) Half Duplex

7) If the data is transmitted only in one direction over a single communication channel, then it is of
a) Simplex mode b) Duplex mode
c) Semi duplex mode d) Half duplex mode

8) In Intel 8085 a microprocessor ALE signal is
   a) Address Live Enable
   b) Address Latch Enable
   c) Address Lock Enable
   d) Address Left Enable

9) _____ works at QRS wave.
   a) Cardioverter
   b) Pacemaker
   c) Defibrillator
   d) Heart lung machine

10) Carry flag is not affected after the execution of
   a) ADD B b) SBB B c) INR B d) ORA B

11) The 8085 microcontroller is of _____ pin package.
   a) 30 b) 20 c) 40 d) 42

12) The 8085 microcontroller is a _____ processor.
   a) 12 byte b) 10 byte c) 8 bit d) 8 byte

13) The SP is of _____ wide register.
   a) 8 byte b) 8 bit c) 16 bit d) None of these

14) In an Intel 8085 microprocessor, IN 80H instruction is used ?
   a) Communicating with a slow peripheral device
   b) To slow down a fast peripheral
   c) Device so as to communicate at the microprocessor's device
   d) Move the data from 80H port address to Accumulator

_____

SLR-EP – 332

Seat No.	

T.E. (Electrical and Electronics) (Part – I) Examination, 2016
MICROPROCESSOR AND ITS APPLICATION (New CGPA Pattern)

Day and Date : Friday, 2-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) **Assume** suitable data **if necessary**.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain addressing modes of 8085.
   b) Write ALP for addition of two 8 bit numbers.
   c) Give classification of Interrupts.
   d) Explain types of memory.
   e) Explain SIM instruction.

3. Solve **any two** : **(8×2=16)**
   a) Interface 2K bytes of memory to 8085 with starting address 8000H and draw interfacing diagram.
   b) Explain architecture 8085. (with dig.)
   c) Explain five data transfer and five arithmetic instructions.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   a) Show detailed interfacing of ADC0808 with 8085.
   b) Explain 8251-schematic block diagram.
   c) Explain Synchronous and Asynchronous I/O.
   d) Explain 8259A PIC-BLOCK DIAGRAM.

5. Solve **any two** : **(8×2=16)**
   a) Show detailed interfacing of 8251 with 8085. Assume suitable addresses.
   b) Write a program to generate a square wave.
   c) Explain 8255-Schematic block diagram.

Set R

Set R

SLR-EP – 332

Seat No.	

Set **S**

T.E. (Electrical and Electronics) (Part – I) Examination, 2016
MICROPROCESSOR AND ITS APPLICATION (New CGPA Pattern)

Day and Date : Friday, 2-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) Which of the following is not a mode of data transmission ?
a) Simplex b) Duplex c) Semi Duplex d) Half Duplex

2) If the data is transmitted only in one direction over a single communication channel, then it is of
a) Simplex mode b) Duplex mode
c) Semi duplex mode d) Half duplex mode

3) In Intel 8085 a microprocessor ALE signal is
a) Address Live Enable b) Address Latch Enable
c) Address Lock Enable d) Address Left Enable

4) _____ works at QRS wave.
a) Cardioverter b) Pacemaker
c) Defibrillator d) Heart lung machine

5) Carry flag is not affected after the execution of
a) ADD B b) SBB B c) INR B d) ORA B

6) The 8085 microcontroller is of _____ pin package.
a) 30 b) 20 c) 40 d) 42

7) The 8085 microcontroller is a _____ processor.
a) 12 byte b) 10 byte c) 8 bit d) 8 byte

8) The SP is of _____ wide register.
a) 8 byte b) 8 bit c) 16 bit d) None of these

P.T.O.

9) In an Intel 8085 microprocessor, IN 80H instruction is used ?
   a) Communicating with a slow peripheral device
   b) To slow down a fast peripheral
   c) Device so as to communicate at the microprocessor's device
   d) Move the data from 80H port address to Accumulator

10) The program counter in a 8085 microprocessor is a
   a) 16-bit register b) 8-bit register c) 24-bit register d) 4-bit register

11) The number of counters that are present in the programmable timer device 8254 is
   a) 1 b) 2 c) 3 d) 4

12) In 8254 control word register, if SC 1=0 and SC0=1, then the counter selected is
   a) counter 0 b) counter 1 c) counter 2 d) none

13) The port that is used for the generation of handshake lines in mode 1 or mode 2 is
   a) Port A b) Port B c) Port C Lower d) Port C Upper

14) All the functions of the ports of 8255 are achieved by programming the bits of an internal register called
   a) Data bus control b) Read logic control
   c) Control word register d) None

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SLR-EP – 332

Seat No.	

T.E. (Electrical and Electronics) (Part – I) Examination, 2016
MICROPROCESSOR AND ITS APPLICATION (New CGPA Pattern)

Day and Date : Friday, 2-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) ***Assume*** *suitable data* ***if necessary****.*

SECTION – I

2. Solve **any three** : **(4×3=12)**
   a) Explain addressing modes of 8085.
   b) Write ALP for addition of two 8 bit numbers.
   c) Give classification of Interrupts.
   d) Explain types of memory.
   e) Explain SIM instruction.

3. Solve **any two** : **(8×2=16)**
   a) Interface 2K bytes of memory to 8085 with starting address 8000H and draw interfacing diagram.
   b) Explain architecture 8085. (with dig.)
   c) Explain five data transfer and five arithmetic instructions.

SECTION – II

4. Solve **any three** : **(4×3=12)**
   a) Show detailed interfacing of ADC0808 with 8085.
   b) Explain 8251-schematic block diagram.
   c) Explain Synchronous and Asynchronous I/O.
   d) Explain 8259A PIC-BLOCK DIAGRAM.

5. Solve **any two** : **(8×2=16)**
   a) Show detailed interfacing of 8251 with 8085. Assume suitable addresses.
   b) Write a program to generate a square wave.
   c) Explain 8255-Schematic block diagram.

Set S

Set S

SLR-EP – 333

Seat No.	

Set **P**

T.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA) Examination, 2016
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 5-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figure 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 answer : **(14×1=14)**

1) Self GMD is used in the calculation of
   a) Inductance only
   b) Inductance and capacitance
   c) Capacitance only
   d) None

2) Skin effect is proportional to
   a) Diameter of conductor
   b) $(\text{Diameter of conductor})^{1/2}$
   c) $(\text{Diameter of conductor})^{2}$
   d) $(\text{Diameter of conductor})^{2}$.

3) Which type of copper wire will have highest tensile strength ?
   a) Soft drawn
   b) Medium drawn
   c) Hard drawn
   d) None

4) Guy wire is used to
   a) Support the pole
   b) Provide protection against surges
   c) Provide emergency earth route
   d) Protect conductors against short circuiting

5) For increasing the capacity of a transmission line to transmit power which of the following must be decreased ?
   a) Voltage b) Capacitance
   c) Line inductance d) All of the above

6) If the height of transmission towers is increased, which of the following parameters is likely to change.
   a) Resistance b) Inductance
   c) Capacitance d) None of the above

7) The current drawn by the line due to corona losses is
   a) Sinusoidal b) Square c) Non-sinusoidal d) None

8) Presence of ozone as a result of corona is harmful because
   a) It gives bad odor b) It corrodes the material
   c) It transfers energy to the ground d) Reduces power factor

9) Neglecting losses in a transmission system, if the voltage is doubled, for the same power transmission, the weight of conductor material required will be
   a) Four times b) Double
   c) Half d) One fourth

10) Which of the following regulation is considered to be the best
   a) 2% b) 30% c) 70% d) 98%

11) The characteristic impedance of a transmission line depends upon
   a) Shape of the conductor
   b) Surface treatment of the conductors
   c) Conductivity of the material
   d) Geometrical configuration of the conductors

12) Which of the following statements is true regarding corona-
   a) Corona takes place at a voltage lower than breakdown voltage
   b) Corona takes place at a voltage higher than breakdown voltage
   c) Corona is a current phenomenon
   d) Corona increases the transmission line efficiency

13) The disadvantage of constant voltage transmission is
   a) Short circuit current of the system is increased
   b) Load power factor in heavy loads
   c) Large conductor area is required for same power transmission
   d) All of the above

14) Oil filled cables are used up to _____ kV.
   a) 100 kV b) 11 kV c) 230 kV d) 25 kV

_____

SLR-EP – 333

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA) Examination, 2016
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 5-12-2016 Marks : 56

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

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

2) Figure to the ***right*** *indicate* ***maximum*** *marks.*

3) ***Assume*** *the suitable data* ***wherever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Criteria for choosing conductor material. Describe ACSR conductors.

2) Explain effect of transposition in transmission line

3) Explain the concept of self GMD.

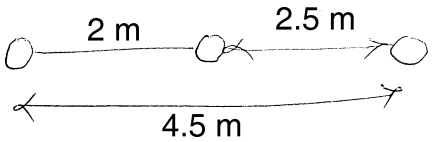
4) Draw and describe suspension type insulators along with its advantages.

5) Explain stock bridge damper with neat diagram.

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 line the length is 100 km, calculate

i) Capacitance per phase

ii) Charging current per phase.



3. Solve **any two** : **(6×2=12)**

1) Explain disruptive critical voltage, visual critical voltage and power loss due to corona in detail.

2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively calculate :
   i) The ratio of capacitance between pin and earth to the self capacitance of each unit.
   ii) The line voltage.
   iii) String efficiency.
3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Derive an expression for voltage regulation and efficiency of medium transmission line consider end condenser method along with the equivalent circuit and phasor diagram.
   2) Explain classification of cables.
   3) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.
   4) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same ; find the voltages on the intersheath.
   5) Determine the generalized constants for medium line using nominal Π method.
   6) Explain economics of power factor improvement.

5. Solve **any two** : **(6×2=12)**
   1) What is grading of cables ? Explain intersheath grading methods.
   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 $0.2\,\Omega$ and $0.4\,\Omega$ 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) Explain the capacitance of 3-core belted type cables.

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SLR-EP – 333

Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA) Examination, 2016
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 5-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figure 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 answer : **(14×1=14)**

1) Presence of ozone as a result of corona is harmful because
   a) It gives bad odor b) It corrodes the material
   c) It transfers energy to the ground d) Reduces power factor

2) Neglecting losses in a transmission system, if the voltage is doubled, for the same power transmission, the weight of conductor material required will be
   a) Four times b) Double c) Half d) One fourth

3) Which of the following regulation is considered to be the best
   a) 2% b) 30% c) 70% d) 98%

4) The characteristic impedance of a transmission line depends upon
   a) Shape of the conductor
   b) Surface treatment of the conductors
   c) Conductivity of the material
   d) Geometrical configuration of the conductors

5) Which of the following statements is true regarding corona-
   a) Corona takes place at a voltage lower than breakdown voltage
   b) Corona takes place at a voltage higher than breakdown voltage
   c) Corona is a current phenomenon
   d) Corona increases the transmission line efficiency

P.T.O.

6) The disadvantage of constant voltage transmission is
   a) Short circuit current of the system is increased
   b) Load power factor in heavy loads
   c) Large conductor area is required for same power transmission
   d) All of the above

7) Oil filled cables are used up to _____ kV.
   a) 100 kV b) 11 kV c) 230 kV d) 25 kV

8) Self GMD is used in the calculation of
   a) Inductance only
   b) Inductance and capacitance
   c) Capacitance only
   d) None

9) Skin effect is proportional to
   a) Diameter of conductor
   b) $(\text{Diameter of conductor})^{1/2}$
   c) $(\text{Diameter of conductor})^2$
   d) $(\text{Diameter of conductor})^{2.}$

10) Which type of copper wire will have highest tensile strength ?
   a) Soft drawn
   b) Medium drawn
   c) Hard drawn
   d) None

11) Guy wire is used to
   a) Support the pole
   b) Provide protection against surges
   c) Provide emergency earth route
   d) Protect conductors against short circuiting

12) For increasing the capacity of a transmission line to transmit power which of the following must be decreased ?
   a) Voltage
   b) Capacitance
   c) Line inductance
   d) All of the above

13) If the height of transmission towers is increased, which of the following parameters is likely to change.
   a) Resistance
   b) Inductance
   c) Capacitance
   d) None of the above

14) The current drawn by the line due to corona losses is
   a) Sinusoidal b) Square c) Non-sinusoidal d) None

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SLR-EP – 333

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA) Examination, 2016
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 5-12-2016 Marks : 56

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

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

2) Figure to the ***right*** *indicate* ***maximum*** *marks.*

3) ***Assume*** *the suitable data* ***wherever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Criteria for choosing conductor material. Describe ACSR conductors.

2) Explain effect of transposition in transmission line

3) Explain the concept of self GMD.

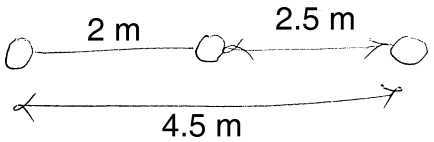
4) Draw and describe suspension type insulators along with its advantages.

5) Explain stock bridge damper with neat diagram.

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 line the length is 100 km, calculate

i) Capacitance per phase

ii) Charging current per phase.



3. Solve **any two** : **(6×2=12)**

1) Explain disruptive critical voltage, visual critical voltage and power loss due to corona in detail.

2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively calculate :
   i) The ratio of capacitance between pin and earth to the self capacitance of each unit.
   ii) The line voltage.
   iii) String efficiency.
3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Derive an expression for voltage regulation and efficiency of medium transmission line consider end condenser method along with the equivalent circuit and phasor diagram.
   2) Explain classification of cables.
   3) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.
   4) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same ; find the voltages on the intersheath.
   5) Determine the generalized constants for medium line using nominal Π method.
   6) Explain economics of power factor improvement.

5. Solve **any two** : **(6×2=12)**
   1) What is grading of cables ? Explain intersheath grading methods.
   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 $0.2\,\Omega$ and $0.4\,\Omega$ 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) Explain the capacitance of 3-core belted type cables.

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SLR-EP – 333

Seat No.	

Set R

T.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA) Examination, 2016
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 5-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

Instructions *: 1)* ***All*** *questions are* ***compulsory****.*
2) Figure 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 answer : **(14×1=14)**

1) For increasing the capacity of a transmission line to transmit power which of the following must be decreased ?
   a) Voltage b) Capacitance
   c) Line inductance d) All of the above

2) If the height of transmission towers is increased, which of the following parameters is likely to change.
   a) Resistance b) Inductance
   c) Capacitance d) None of the above

3) The current drawn by the line due to corona losses is
   a) Sinusoidal b) Square c) Non-sinusoidal d) None

4) Presence of ozone as a result of corona is harmful because
   a) It gives bad odor b) It corrodes the material
   c) It transfers energy to the ground d) Reduces power factor

5) Neglecting losses in a transmission system, if the voltage is doubled, for the same power transmission, the weight of conductor material required will be
   a) Four times b) Double c) Half d) One fourth

P.T.O.

6) Which of the following regulation is considered to be the best
   a) 2% b) 30% c) 70% d) 98%

7) The characteristic impedance of a transmission line depends upon
   a) Shape of the conductor
   b) Surface treatment of the conductors
   c) Conductivity of the material
   d) Geometrical configuration of the conductors

8) Which of the following statements is true regarding corona-
   a) Corona takes place at a voltage lower than breakdown voltage
   b) Corona takes place at a voltage higher than breakdown voltage
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   d) Corona increases the transmission line efficiency

9) The disadvantage of constant voltage transmission is
   a) Short circuit current of the system is increased
   b) Load power factor in heavy loads
   c) Large conductor area is required for same power transmission
   d) All of the above

10) Oil filled cables are used up to _____ kV.
   a) 100 kV b) 11 kV c) 230 kV d) 25 kV

11) Self GMD is used in the calculation of
   a) Inductance only
   b) Inductance and capacitance
   c) Capacitance only
   d) None

12) Skin effect is proportional to
   a) Diameter of conductor b) $(\text{Diameter of conductor})^{1/2}$
   c) $(\text{Diameter of conductor})^{2}$ d) $(\text{Diameter of conductor})^{2}$.

13) Which type of copper wire will have highest tensile strength ?
   a) Soft drawn b) Medium drawn
   c) Hard drawn d) None

14) Guy wire is used to
   a) Support the pole
   b) Provide protection against surges
   c) Provide emergency earth route
   d) Protect conductors against short circuiting

_____

SLR-EP – 333

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA) Examination, 2016
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 5-12-2016 Marks : 56

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

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

2) Figure to the ***right*** *indicate* ***maximum*** *marks.*

3) ***Assume*** *the suitable data* ***wherever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Criteria for choosing conductor material. Describe ACSR conductors.

2) Explain effect of transposition in transmission line

3) Explain the concept of self GMD.

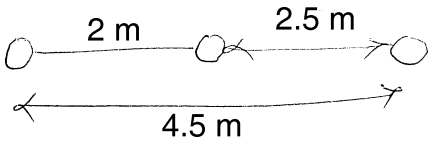
4) Draw and describe suspension type insulators along with its advantages.

5) Explain stock bridge damper with neat diagram.

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 line the length is 100 km, calculate

i) Capacitance per phase

ii) Charging current per phase.



3. Solve **any two** : **(6×2=12)**

1) Explain disruptive critical voltage, visual critical voltage and power loss due to corona in detail.

2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively calculate :
   i) The ratio of capacitance between pin and earth to the self capacitance of each unit.
   ii) The line voltage.
   iii) String efficiency.
3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Derive an expression for voltage regulation and efficiency of medium transmission line consider end condenser method along with the equivalent circuit and phasor diagram.
   2) Explain classification of cables.
   3) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.
   4) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same ; find the voltages on the intersheath.
   5) Determine the generalized constants for medium line using nominal Π method.
   6) Explain economics of power factor improvement.

5. Solve **any two** : **(6×2=12)**
   1) What is grading of cables ? Explain intersheath grading methods.
   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 $0.2\,\Omega$ and $0.4\,\Omega$ 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) Explain the capacitance of 3-core belted type cables.

_____

SLR-EP – 333

Seat No.	

Set S

T.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA) Examination, 2016
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 5-12-2016 Total Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **All** questions are **compulsory**.*
*2) Figure 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 answer : **(14×1=14)**

1) Which of the following regulation is considered to be the best
a) 2% b) 30% c) 70% d) 98%

2) The characteristic impedance of a transmission line depends upon
a) Shape of the conductor
b) Surface treatment of the conductors
c) Conductivity of the material
d) Geometrical configuration of the conductors

3) Which of the following statements is true regarding corona-
a) Corona takes place at a voltage lower than breakdown voltage
b) Corona takes place at a voltage higher than breakdown voltage
c) Corona is a current phenomenon
d) Corona increases the transmission line efficiency

4) The disadvantage of constant voltage transmission is
a) Short circuit current of the system is increased
b) Load power factor in heavy loads
c) Large conductor area is required for same power transmission
d) All of the above

5) Oil filled cables are used up to _____ kV.
   a) 100 kV b) 11 kV c) 230 kV d) 25 kV

6) Self GMD is used in the calculation of
   a) Inductance only
   b) Inductance and capacitance
   c) Capacitance only
   d) None

7) Skin effect is proportional to
   a) Diameter of conductor
   b) (Diameter of conductor)$^{1/2}$
   c) (Diameter of conductor)^2
   d) (Diameter of conductor)$^{2.}$

8) Which type of copper wire will have highest tensile strength ?
   a) Soft drawn
   b) Medium drawn
   c) Hard drawn
   d) None

9) Guy wire is used to
   a) Support the pole
   b) Provide protection against surges
   c) Provide emergency earth route
   d) Protect conductors against short circuiting

10) For increasing the capacity of a transmission line to transmit power which of the following must be decreased ?
   a) Voltage
   b) Capacitance
   c) Line inductance
   d) All of the above

11) If the height of transmission towers is increased, which of the following parameters is likely to change.
   a) Resistance
   b) Inductance
   c) Capacitance
   d) None of the above

12) The current drawn by the line due to corona losses is
   a) Sinusoidal b) Square c) Non-sinusoidal d) None

13) Presence of ozone as a result of corona is harmful because
   a) It gives bad odor
   b) It corrodes the material
   c) It transfers energy to the ground
   d) Reduces power factor

14) Neglecting losses in a transmission system, if the voltage is doubled, for the same power transmission, the weight of conductor material required will be
   a) Four times
   b) Double
   c) Half
   d) One fourth

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SLR-EP – 333

Seat No.	

T.E. (Electrical and Electronics Engg.) (Part – I) (New CGPA) Examination, 2016
ELEMENTS OF POWER SYSTEM

Day and Date : Monday, 5-12-2016 Marks : 56

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

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

2) Figure to the ***right*** *indicate* ***maximum*** *marks.*

3) ***Assume*** *the suitable data* ***wherever*** *necessary.*

SECTION – I

2. Solve **any four** : **(4×4=16)**

1) Criteria for choosing conductor material. Describe ACSR conductors.

2) Explain effect of transposition in transmission line

3) Explain the concept of self GMD.

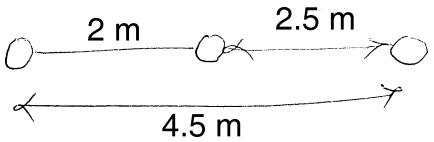
4) Draw and describe suspension type insulators along with its advantages.

5) Explain stock bridge damper with neat diagram.

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 line the length is 100 km, calculate

i) Capacitance per phase

ii) Charging current per phase.



3. Solve **any two** : **(6×2=12)**

1) Explain disruptive critical voltage, visual critical voltage and power loss due to corona in detail.

2) A 3-phase transmission line is being supported by three disc insulators. The potential across top unit (i.e. near to tower) and middle unit are 8 KV and 11 KV respectively calculate :
   i) The ratio of capacitance between pin and earth to the self capacitance of each unit.
   ii) The line voltage.
   iii) String efficiency.
3) Derive the expression for inductance of 3-phase overhead line for un-symmetrical spacing.

SECTION – II

4. Solve **any four** : **(4×4=16)**
   1) Derive an expression for voltage regulation and efficiency of medium transmission line consider end condenser method along with the equivalent circuit and phasor diagram.
   2) Explain classification of cables.
   3) Draw and explain the dielectric strength in a single core underground cable with the ratio of maximum and minimum value of potential gradient.
   4) A single core cable of conductor diameter 2 cm and lead sheath of diameter 5.3 cm is to be used on a 66 KV 3-phase system. Two intersheath of diameter 3.1 cm and 4.2 cm are introduced between the core and lead sheath. If maximum stress in the layers is same ; find the voltages on the intersheath.
   5) Determine the generalized constants for medium line using nominal Π method.
   6) Explain economics of power factor improvement.

5. Solve **any two** : **(6×2=12)**
   1) What is grading of cables ? Explain intersheath grading methods.
   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 $0.2\,\Omega$ and $0.4\,\Omega$ 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) Explain the capacitance of 3-core belted type cables.

_____

SLR-EP – 334

Seat No.	

Set P

T.E. (E & E) (Part – I) (New CGPA) Examination, 2016
CONTROL SYSTEM – I

Day and Date : Wednesday, 7-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) A phase lag lead network introduces _____ in the output.
   a) lag at all frequencies
   b) lag at high frequencies and lead at low frequencies
   c) lag at low frequencies and lead at high frequencies
   d) none of the above

2) The state transition matrix for the system X = A X with initial state X (0) is
   a) $(sI - A)^{-1}$ b) e^{At} X (0)
   c) Laplace inverse of $[(sI - A)^{-1}]$ d) Laplace inverse of $[(sI - A)^{-1} X(0)]$

3) The eigen values of a linear system are the location of
   a) poles of the system b) zeros of the system
   c) both a and b d) finite pole and zero

4) _____ is used for improving transient response.
   a) Integrator b) Comparator
   c) Lag compensator d) Lead compensator

5) In lag compensation network _____ is dominant.
   a) pole b) zero
   c) both a) and b) d) none of the above

6) Addition of zeros in transfer function causes _____ compensation.
   a) lag b) lead c) lag-lead d) none of these

P.T.O.

7) Slope of factor K in plotting BODE magnitude plot is
   a) 0° b) ∞ c) 90° d) none of these
8) The time required for the response to reach half the final value for the first time is called the
   a) Rise time b) Decay time c) Delay time d) Settling time
9) The steady state error of a control system can be reduced by increasing
   a) Gain constant of the system b) Time constant of the system
   c) Both a and b d) None of the above
10) _____ has some roots with real parts equal to zero but none with positive real parts.
   a) Marginally stable b) Absolutely stable
   c) Absolutely unstable d) Stable
11) Root loci terminates at
   a) Open loop poles b) Closed loop poles
   c) Open loop zeros d) Closed loop zeros
12) A signal other than the reference input that tends to affect the value of controlled variable is termed as
   a) command b) error signal
   c) disturbance d) actuating signal
13) In force-voltage analogy, velocity is analogous to
   a) current b) charge c) inductance d) capacitance
14) The TYPE 0 system has _____ pole at origin.
   a) no pole b) net pole c) simple pole d) two poles

_____

SLR-EP – 334

Seat No.	

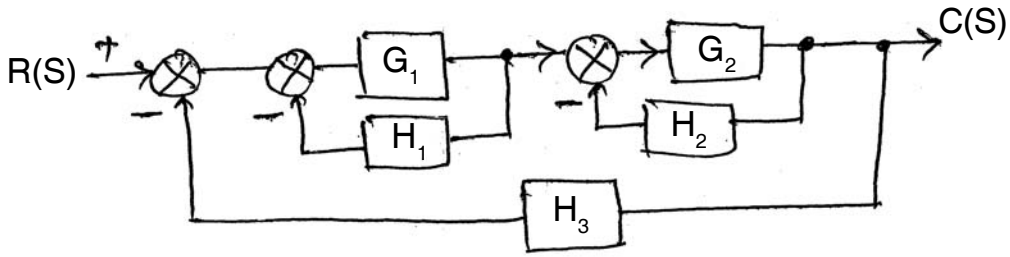
T.E. (E & E) (Part – I) (New CGPA) Examination, 2016
CONTROL SYSTEM – I

Day and Date : Wednesday, 7-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four**. **(4×4=16)**

a) Using block diagram reduction technique, find the T/F.



b) Derive the expression for transfer function of field controlled DC servo motors.

c) Write down the SFG terminologies.

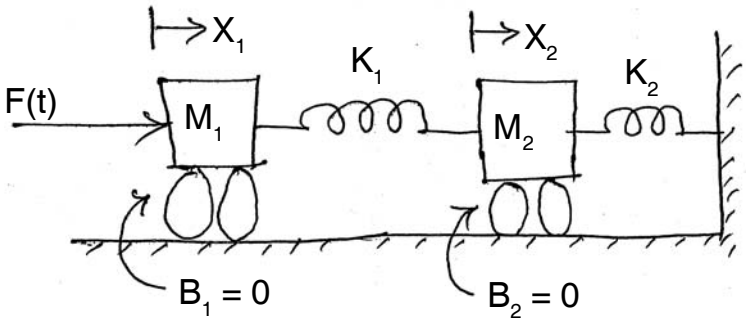
d) Determine the stability of a system having characteristic equation $s^6 + 5s^5 + 10s^4 + 24s^3 + 20s^2 + 15s + 10 = 0$ by using Routh's criteria.

e) Explain the correlation between transient response and frequency response.

f) The forward path transfer function of a unity feedback control system is given by $G(S) = 5(S^2 + 2S + 100)/S^2(S + 5)(S^2 + 3S + 10)$. Determine the step, ramp, parabolic error coefficient. Also determine the type of the system.

3. Solve **any two** : **(2×6=12)**

a) Find the transfer function of the system below.



Set P

b) The transfer function of a unity feedback control system is given by G(S) = K/S (S + 4)(S + 5). Draw Root Locus.

c) Derive the time response of second order system.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain correlation between time and frequency domain.

b) Explain PI controller.

c) Explain phase lead compensator.

d) Check the observability of the system below.

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}-0.5 & 0\\ 0 & -2\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u(t)$$

$$Y(t) = \begin{bmatrix}0 & 1\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$$

e) Explain the procedure to sketch polar plot.

f) Derive the expression for transfer function from state model for continuous time system.

5. Solve **any two** : **(2×6=12)**

a) Draw the bode plot for the system having $G(s) = \dfrac{2000}{s(s+1)(s+100)}$ and H(s) = 1. Determine a) gain crossover frequency b) the phase crossover frequency c) gain margin d) phase margin.

b) Obtain the state transition matrix for the state model whose matrix A is given by $A = \begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}X$.

c) Check the observability and controllability of the system, described by following differential equation.

$\dfrac{d3y}{dt3}$ = u(t) where y(t) is the output and u(t) is input.

SLR-EP – 334

Seat No.	

Set **Q**

T.E. (E & E) (Part – I) (New CGPA) Examination, 2016
CONTROL SYSTEM – I

Day and Date : Wednesday, 7-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) The time required for the response to reach half the final value for the first time is called the
   a) Rise time b) Decay time c) Delay time d) Settling time

2) The steady state error of a control system can be reduced by increasing
   a) Gain constant of the system b) Time constant of the system
   c) Both a and b d) None of the above

3) _____ has some roots with real parts equal to zero but none with positive real parts.
   a) Marginally stable b) Absolutely stable
   c) Absolutely unstable d) Stable

4) Root loci terminates at
   a) Open loop poles b) Closed loop poles
   c) Open loop zeros d) Closed loop zeros

5) A signal other than the reference input that tends to affect the value of controlled variable is termed as
   a) command b) error signal
   c) disturbance d) actuating signal

6) In force-voltage analogy, velocity is analogous to
   a) current b) charge c) inductance d) capacitance
7) The TYPE 0 system has _____ pole at origin.
   a) no pole b) net pole c) simple pole d) two poles
8) A phase lag lead network introduces _____ in the output.
   a) lag at all frequencies
   b) lag at high frequencies and lead at low frequencies
   c) lag at low frequencies and lead at high frequencies
   d) none of the above
9) The state transition matrix for the system $\dot{X} = A X$ with initial state X (0) is
   a) $(sI - A)^{-1}$ b) $e^{At} X(0)$
   c) Laplace inverse of $[(sI - A)^{-1}]$ d) Laplace inverse of $[(sI - A)^{-1} X(0)]$
10) The eigen values of a linear system are the location of
   a) poles of the system b) zeros of the system
   c) both a and b d) finite pole and zero
11) _____ is used for improving transient response.
   a) Integrator b) Comparator
   c) Lag compensator d) Lead compensator
12) In lag compensation network _____ is dominant.
   a) pole b) zero
   c) both a) and b) d) none of the above
13) Addition of zeros in transfer function causes _____ compensation.
   a) lag b) lead c) lag-lead d) none of these
14) Slope of factor K in plotting BODE magnitude plot is
   a) 0° b) ∞ c) 90° d) none of these

_____

SLR-EP – 334

Seat No.	

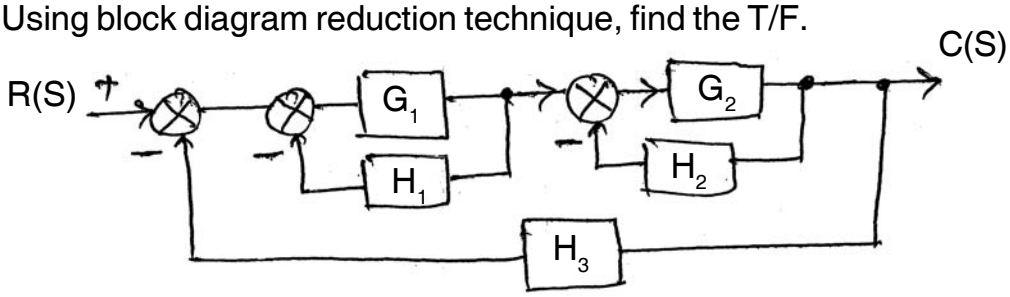
T.E. (E & E) (Part – I) (New CGPA) Examination, 2016
CONTROL SYSTEM – I

Day and Date : Wednesday, 7-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four**. **(4×4=16)**

a) Using block diagram reduction technique, find the T/F.



b) Derive the expression for transfer function of field controlled DC servo motors.

c) Write down the SFG terminologies.

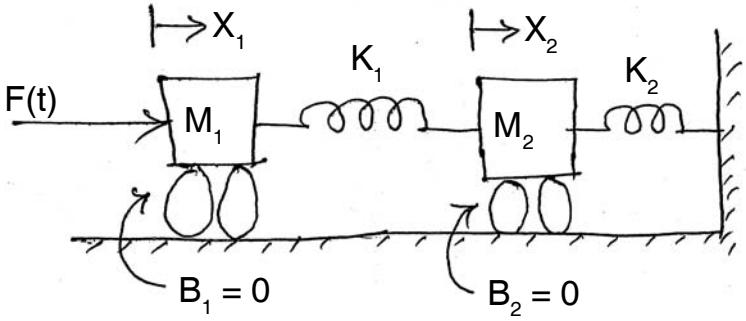
d) Determine the stability of a system having characteristic equation $s^6 + 5s^5 + 10s^4 + 24s^3 + 20s^2 + 15s + 10 = 0$ by using Routh's criteria.

e) Explain the correlation between transient response and frequency response.

f) The forward path transfer function of a unity feedback control system is given by $G(S) = 5(S^2 + 2S + 100)/S^2(S + 5)(S^2 + 3S + 10)$. Determine the step, ramp, parabolic error coefficient. Also determine the type of the system.

3. Solve **any two** : **(2×6=12)**

a) Find the transfer function of the system below.



Set Q

b) The transfer function of a unity feedback control system is given by G(S) = K/S (S + 4)(S + 5). Draw Root Locus.

c) Derive the time response of second order system.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain correlation between time and frequency domain.

b) Explain PI controller.

c) Explain phase lead compensator.

d) Check the observability of the system below.

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}-0.5 & 0\\ 0 & -2\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u(t)$$

$$Y(t) = \begin{bmatrix}0 & 1\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$$

e) Explain the procedure to sketch polar plot.

f) Derive the expression for transfer function from state model for continuous time system.

5. Solve **any two** : **(2×6=12)**

a) Draw the bode plot for the system having $G(s) = \dfrac{2000}{s(s+1)(s+100)}$ and H(s) = 1. Determine a) gain crossover frequency b) the phase crossover frequency c) gain margin d) phase margin.

b) Obtain the state transition matrix for the state model whose matrix A is given by $A = \begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}X$.

c) Check the observability and controllability of the system, described by following differential equation.

$\dfrac{d3y}{dt3}$ = u(t) where y(t) is the output and u(t) is input.

SLR-EP – 334

Seat No.	

Set **R**

T.E. (E & E) (Part – I) (New CGPA) Examination, 2016
CONTROL SYSTEM – I

Day and Date : Wednesday, 7-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 14

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

1) In lag compensation network _____ is dominant.
   a) pole b) zero
   c) both a) and b) d) none of the above

2) Addition of zeros in transfer function causes _____ compensation.
   a) lag b) lead c) lag-lead d) none of these

3) Slope of factor K in plotting BODE magnitude plot is
   a) 0° b) ∞ c) 90° d) none of these

4) The time required for the response to reach half the final value for the first time is called the
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   a) Gain constant of the system b) Time constant of the system
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6) _____ has some roots with real parts equal to zero but none with positive real parts.
   a) Marginally stable b) Absolutely stable
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7) Root loci terminates at
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P.T.O.

8) A signal other than the reference input that tends to affect the value of controlled variable is termed as
   a) command b) error signal
   c) disturbance d) actuating signal

9) In force-voltage analogy, velocity is analogous to
   a) current b) charge c) inductance d) capacitance

10) The TYPE 0 system has _____ pole at origin.
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11) A phase lag lead network introduces _____ in the output.
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12) The state transition matrix for the system $X = A X$ with initial state $X(0)$ is
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13) The eigen values of a linear system are the location of
   a) poles of the system b) zeros of the system
   c) both a and b d) finite pole and zero

14) _____ is used for improving transient response.
   a) Integrator b) Comparator
   c) Lag compensator d) Lead compensator

_____

SLR-EP – 334

Seat No.	

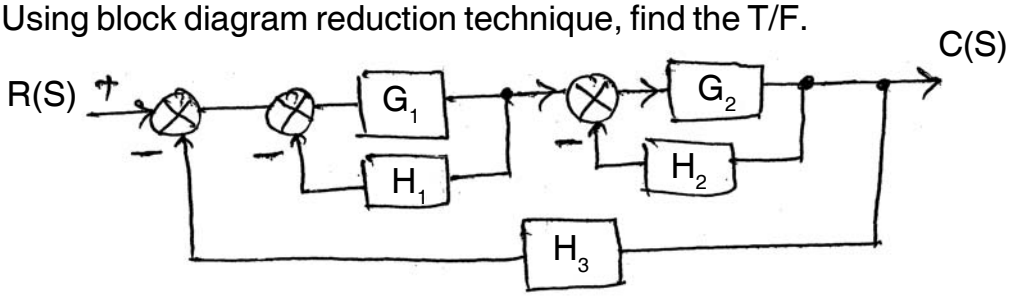
T.E. (E & E) (Part – I) (New CGPA) Examination, 2016
CONTROL SYSTEM – I

Day and Date : Wednesday, 7-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four**. **(4×4=16)**

a) Using block diagram reduction technique, find the T/F.



b) Derive the expression for transfer function of field controlled DC servo motors.

c) Write down the SFG terminologies.

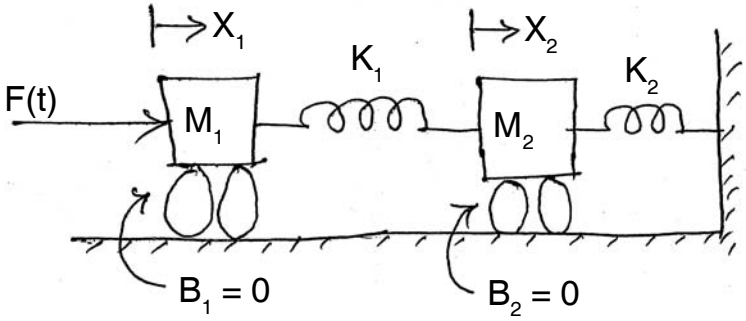
d) Determine the stability of a system having characteristic equation $s^6 + 5s^5 + 10s^4 + 24s^3 + 20s^2 + 15s + 10 = 0$ by using Routh's criteria.

e) Explain the correlation between transient response and frequency response.

f) The forward path transfer function of a unity feedback control system is given by $G(S) = 5(S^2 + 2S + 100)/S^2(S + 5)(S^2 + 3S + 10)$. Determine the step, ramp, parabolic error coefficient. Also determine the type of the system.

3. Solve **any two** : **(2×6=12)**

a) Find the transfer function of the system below.



Set R

b) The transfer function of a unity feedback control system is given by G(S) = K/S (S + 4)(S + 5). Draw Root Locus.

c) Derive the time response of second order system.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain correlation between time and frequency domain.

b) Explain PI controller.

c) Explain phase lead compensator.

d) Check the observability of the system below.

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}-0.5 & 0\\ 0 & -2\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u(t)$$

$$Y(t) = \begin{bmatrix}0 & 1\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$$

e) Explain the procedure to sketch polar plot.

f) Derive the expression for transfer function from state model for continuous time system.

5. Solve **any two** : **(2×6=12)**

a) Draw the bode plot for the system having $G(s) = \dfrac{2000}{s(s+1)(s+100)}$ and H(s) = 1. Determine a) gain crossover frequency b) the phase crossover frequency c) gain margin d) phase margin.

b) Obtain the state transition matrix for the state model whose matrix A is given by $A = \begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}X$.

c) Check the observability and controllability of the system, described by following differential equation.

$\dfrac{d3y}{dt3}$ = u(t) where y(t) is the output and u(t) is input.

SLR-EP – 334

Seat No.	

Set S

T.E. (E & E) (Part – I) (New CGPA) Examination, 2016
CONTROL SYSTEM – I

Day and Date : Wednesday, 7-12-2016 Max. Marks : 70
Time : 10.00 a.m. to 1.00 p.m.

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

Duration : 30 Minutes Marks : 14

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

1) _____ has some roots with real parts equal to zero but none with positive real parts.
   a) Marginally stable b) Absolutely stable
   c) Absolutely unstable d) Stable

2) Root loci terminates at
   a) Open loop poles b) Closed loop poles
   c) Open loop zeros d) Closed loop zeros

3) A signal other than the reference input that tends to affect the value of controlled variable is termed as
   a) command b) error signal
   c) disturbance d) actuating signal

4) In force-voltage analogy, velocity is analogous to
   a) current b) charge c) inductance d) capacitance

5) The TYPE 0 system has _____ pole at origin.
   a) no pole b) net pole c) simple pole d) two poles

6) A phase lag lead network introduces _____ in the output.
   a) lag at all frequencies
   b) lag at high frequencies and lead at low frequencies
   c) lag at low frequencies and lead at high frequencies
   d) none of the above

P.T.O.

7) The state transition matrix for the system $X = A X$ with initial state $X(0)$ is
   a) $(sI - A)^{-1}$ b) $e^{At} X(0)$
   c) Laplace inverse of $[(sI - A)^{-1}]$ d) Laplace inverse of $[(sI - A)^{-1} X(0)]$
8) The eigen values of a linear system are the location of
   a) poles of the system b) zeros of the system
   c) both a and b d) finite pole and zero
9) _____ is used for improving transient response.
   a) Integrator b) Comparator
   c) Lag compensator d) Lead compensator
10) In lag compensation network _____ is dominant.
   a) pole b) zero
   c) both a) and b) d) none of the above
11) Addition of zeros in transfer function causes _____ compensation.
   a) lag b) lead c) lag-lead d) none of these
12) Slope of factor K in plotting BODE magnitude plot is
   a) 0° b) ∞ c) 90° d) none of these
13) The time required for the response to reach half the final value for the first time is called the
   a) Rise time b) Decay time c) Delay time d) Settling time
14) The steady state error of a control system can be reduced by increasing
   a) Gain constant of the system b) Time constant of the system
   c) Both a and b d) None of the above

_____

SLR-EP – 334

Seat No.	

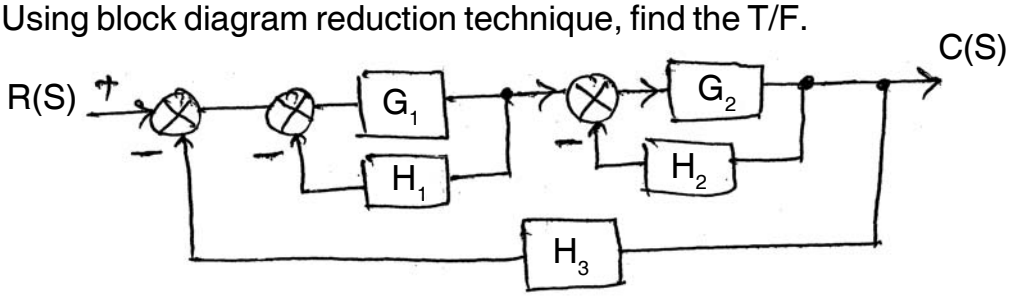
T.E. (E & E) (Part – I) (New CGPA) Examination, 2016
CONTROL SYSTEM – I

Day and Date : Wednesday, 7-12-2016 Marks : 56
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four**. **(4×4=16)**

a) Using block diagram reduction technique, find the T/F.



b) Derive the expression for transfer function of field controlled DC servo motors.

c) Write down the SFG terminologies.

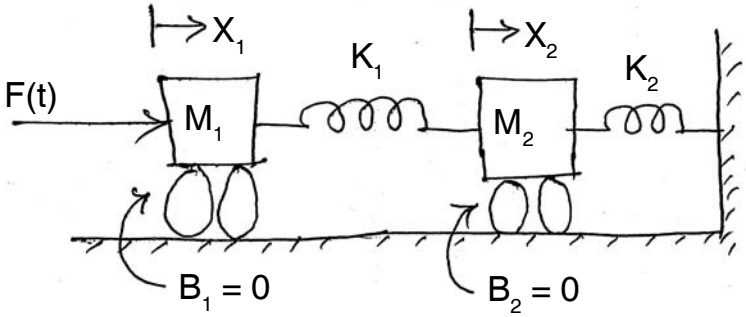
d) Determine the stability of a system having characteristic equation $s^6 + 5s^5 + 10s^4 + 24s^3 + 20s^2 + 15s + 10 = 0$ by using Routh's criteria.

e) Explain the correlation between transient response and frequency response.

f) The forward path transfer function of a unity feedback control system is given by $G(S) = 5(S^2 + 2S + 100)/S^2(S + 5)(S^2 + 3S + 10)$. Determine the step, ramp, parabolic error coefficient. Also determine the type of the system.

3. Solve **any two** : **(2×6=12)**

a) Find the transfer function of the system below.



Set S

b) The transfer function of a unity feedback control system is given by G(S) = K/S (S + 4)(S + 5). Draw Root Locus.

c) Derive the time response of second order system.

SECTION – II

4. Solve **any four** : **(4×4=16)**

a) Explain correlation between time and frequency domain.

b) Explain PI controller.

c) Explain phase lead compensator.

d) Check the observability of the system below.

$$\begin{bmatrix}\dot{x}_1\\ \dot{x}_2\end{bmatrix}=\begin{bmatrix}-0.5 & 0\\ 0 & -2\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}+\begin{bmatrix}0\\ 1\end{bmatrix}u(t)$$

$$Y(t) = \begin{bmatrix}0 & 1\end{bmatrix}\begin{bmatrix}x_1\\ x_2\end{bmatrix}$$

e) Explain the procedure to sketch polar plot.

f) Derive the expression for transfer function from state model for continuous time system.

5. Solve **any two** : **(2×6=12)**

a) Draw the bode plot for the system having $G(s) = \dfrac{2000}{s(s+1)(s+100)}$ and H(s) = 1. Determine a) gain crossover frequency b) the phase crossover frequency c) gain margin d) phase margin.

b) Obtain the state transition matrix for the state model whose matrix A is given by $A = \begin{bmatrix}0 & 1\\ -2 & -3\end{bmatrix}X$.

c) Check the observability and controllability of the system, described by following differential equation.

$\dfrac{d3y}{dt3}$ = u(t) where y(t) is the output and u(t) is input.

SLR-EP – 336

Seat No.	

Set **P**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER ELECTRONICS

Day and Date : Monday, 21-11-2016 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) Figures to the ***right*** *indicate* ***full*** *marks.*
4) ***Assume*** *data,* ***if necessary****.*
5) ***All*** *questions are* ***compulsory****.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The ratio of latching current to holding current SCR is
A) 0.5 B) 1.0 C) 1.5 D) 2.5

2) During forward blocking state, the SCR has
A) Low current, medium voltage B) Low current, large voltage
C) Medium current, large voltage D) Large current, low voltage

3) UPS is used in
A) Computers B) Communication links
C) Essential instrumentation D) All of the above

4) A TRIAC
A) Conducts when not triggered
B) Conducts when not triggered in both directions
C) Conducts when triggered in one
D) None of the above

5) A sine voltage of 200 V_{rms}, 50 Hz is applied to an SCR through 100 ohm resistor. The firing angle is 60°. The output voltage in rms is
A) 89.7 V B) 126.7 V C) 166.7 V D) $200\sqrt{2}$ V

6) A modern power semiconductor device that combines the characteristic of BJT and MOSFET is
A) IGBT B) TRIAC C) SIT D) GTO

7) In a three-phase full converter, 6 SCRs are fired at an interval of
A) 0° B) 60° C) 120° D) 180°

8) Which of the following transistors can be used in E-mode ?
A) JFET B) MOSFET C) NPN D) UJT

9) In a single phase full converter, if output voltage has peak and average values of 325 V and 133 V respectively, firing angle is
A) 40° B) 73.40° C) 80° D) 130°

P.T.O.

10) UJT when used for triggering an SCR, has a waveform
A) Sine wave B) Square wave C) Saw tooth wave D) Trapezoidal

11) A chopper cannot be line commutated
A) True B) False

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) The efficiency of a chopper can be expected in the range
A) 50% to 55% B) 65% to 72% C) 82% to 87% D) 92% to 99%

14) A single phase cycloconverter feeds a resistance heating load. The heating power is provided by
A) Only the fundamental component of output wave
B) Only higher harmonics in the output wave
C) Both fundamental and higher harmonics in the output wave
D) Either (A) or (B)

15) A d.c. to d.c. chopper operates from a 48 V battery source into a resistive load of 24 Ohm. The frequency of the chopper is set to 250 Hz. When chopper on-time is 1 ms the load power is
A) 6 W B) 12 W C) 24 W D) 48 W

16) In a 3 phase bridge inverter with 180° mode of operation the numbers of thyristors conducting at one time are
A) 1 B) 3 C) 2 D) 4

17) 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

18) When a line commutated converter operates in the inverter mode
A) It draws both real power and reactive power from the AC supply
B) It delivers both real power and reactive power to the AC supply
C) It draws real power from the AC supply
D) It draws reactive power from the AC supply

19) A voltage source inverter is normally employed when
A) Source inductance is large and load inductance is small
B) Source inductance is small and load inductance is large
C) Both source and load inductance are small
D) Both source and load inductance are large

20) A single phase full bridge inverter can operate in load commutation mode in case of load consist of
A) RLC over damped B) RLC under damped
C) RLC critically damped D) None of these

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SLR-EP – 336

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER ELECTRONICS

Day and Date : Monday, 21-11-2016 Marks : 80

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

Instructions : *1) Figures to the **right** indicate **full** marks.*

*2) **Assume** data, **if necessary**.*

*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×6=24)**

a) What is a GTO ? Describe the turn-on and turn-off characteristics of a GTO.

b) i) State and explain protection schemes of thyristors.

ii) What are dv/dt and di/dt ratings of SCRs. What happens if these ratings are exceeded ? Explain.

c) With the necessary circuit diagrams and relevant waveforms, discuss class D commutation of thyristors.

d) What is SMPS ? Explain.

e) A single phase bridge converter feeds a highly inductive load of RLE, where R = 1 ohm, Eg = 80 V and L is sufficient large for perfect smoothening. The source voltage 120 V at 50 Hz. The source inductance is 1 mH. For a firing angle of 110°, determine overlap angle.

f) i) Explain different modes of operation of TRIAC with neat schematic diagram.

ii) Give few applications of TRIAC.

3. Attempt **any two** of the following : **(2×8=16)**

a) What is free-wheeling diode ? Draw the circuit diagram of an SCR full wave rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.

b) How many structures are there for power MOSFETs and describe any one of them with their advantages and disadvantages ?

c) What is hybrid type UPS ? What is difference between the hybrid type and on-line UPS ? Draw the block diagram of the hybrid types UPS and explain its operation.

SECTION – II

4. Attempt **any four** of the following : **(4×6=24)**

   a) A single phase sequential commutated CSI is fed from 220 V dc source. The load is $R = 10\,\Omega$. Thyristor have turn-off time of 20 μ sec. and inverter output frequency is 50 Hz. Take a factor of safety of 2. Determine value of source inductance assuming a maximum current change of 0.5 A in one cycle. Find also the values of commutating capacitors.

   b) Describe 3-phase to 3-phase cycloconverter with relevant circuit arrangements using 18 SCRs.

   c) State why the output frequency of a cycloconverter is significantly lower than the input frequency ? How are the firing angles or pulses arranged to get the low frequency output voltage nearly sinusoidal ?

   d) A dc chopper feeds power to an RLE load with $R = 2\,\Omega$, L = 10 mH and E = 6 V. If this chopper is operating at a chopper frequency of 1 kHz and with duty cycle of 10% from a 220 V dc source, compute the maximum and minimum currents taken by the load.

   e) Discuss the working of a Morgan's chopper circuit and its commutation procedure with the help of neat circuit diagram.

   f) Discuss the working of a single phase parallel inverter and its commutation process with neat circuit diagram and necessary waveforms.

5. Attempt **any two** of the following : **(2×8=16)**

   a) Explain the working of single phase bridge type cycloconverter with RL load for
      i) Continuous conduction and
      ii) Discontinuous conduction with the help of neat circuit diagram and relevant output waveforms.

   b) Explain the operation of single phase half bridge inverter for RL loads with the help of neat circuit diagram and necessary waveforms. What is its main drawback ?

   c) Explain the operation of Jones chopper with neat waveforms and mention the advantages of Jones chopper circuit over the other chopper circuits. Give the applications of this chopper.

SLR-EP – 336

Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER ELECTRONICS

Day and Date : Monday, 21-11-2016 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) Figures to the **right** indicate **full** marks.*
*4) **Assume** data, **if necessary**.*
*5) **All** questions are **compulsory**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In a 3 phase bridge inverter with 180° mode of operation the numbers of thyristors conducting at one time are
A) 1 B) 3 C) 2 D) 4

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) When a line commutated converter operates in the inverter mode
A) It draws both real power and reactive power from the AC supply
B) It delivers both real power and reactive power to the AC supply
C) It draws real power from the AC supply
D) It draws reactive power from the AC supply

4) A voltage source inverter is normally employed when
A) Source inductance is large and load inductance is small
B) Source inductance is small and load inductance is large
C) Both source and load inductance are small
D) Both source and load inductance are large

5) A single phase full bridge inverter can operate in load commutation mode in case of load consist of
A) RLC over damped B) RLC under damped
C) RLC critically damped D) None of these

6) The ratio of latching current to holding current SCR is
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A) Low current, medium voltage B) Low current, large voltage
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P.T.O.

8) UPS is used in
   A) Computers
   B) Communication links
   C) Essential instrumentation
   D) All of the above

9) A TRIAC
   A) Conducts when not triggered
   B) Conducts when not triggered in both directions
   C) Conducts when triggered in one
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10) A sine voltage of 200 V_{rms}, 50 Hz is applied to an SCR through 100 ohm resistor. The firing angle is 60°. The output voltage in rms is
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14) In a single phase full converter, if output voltage has peak and average values of 325 V and 133 V respectively, firing angle is
   A) 40° B) 73.40° C) 80° D) 130°

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16) A chopper cannot be line commutated
   A) True
   B) False

17) 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
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SLR-EP – 336

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER ELECTRONICS

Day and Date : Monday, 21-11-2016 Marks : 80

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

Instructions : *1) Figures to the **right** indicate **full** marks.*

*2) **Assume** data, **if necessary**.*

*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×6=24)**

a) What is a GTO ? Describe the turn-on and turn-off characteristics of a GTO.

b) i) State and explain protection schemes of thyristors.

ii) What are dv/dt and di/dt ratings of SCRs. What happens if these ratings are exceeded ? Explain.

c) With the necessary circuit diagrams and relevant waveforms, discuss class D commutation of thyristors.

d) What is SMPS ? Explain.

e) A single phase bridge converter feeds a highly inductive load of RLE, where R = 1 ohm, Eg = 80 V and L is sufficient large for perfect smoothening. The source voltage 120 V at 50 Hz. The source inductance is 1 mH. For a firing angle of 110°, determine overlap angle.

f) i) Explain different modes of operation of TRIAC with neat schematic diagram.

ii) Give few applications of TRIAC.

3. Attempt **any two** of the following : **(2×8=16)**

a) What is free-wheeling diode ? Draw the circuit diagram of an SCR full wave rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.

b) How many structures are there for power MOSFETs and describe any one of them with their advantages and disadvantages ?

c) What is hybrid type UPS ? What is difference between the hybrid type and on-line UPS ? Draw the block diagram of the hybrid types UPS and explain its operation.

SECTION – II

4. Attempt **any four** of the following : **(4×6=24)**

   a) A single phase sequential commutated CSI is fed from 220 V dc source. The load is $R = 10\,\Omega$. Thyristor have turn-off time of 20 μ sec. and inverter output frequency is 50 Hz. Take a factor of safety of 2. Determine value of source inductance assuming a maximum current change of 0.5 A in one cycle. Find also the values of commutating capacitors.

   b) Describe 3-phase to 3-phase cycloconverter with relevant circuit arrangements using 18 SCRs.

   c) State why the output frequency of a cycloconverter is significantly lower than the input frequency ? How are the firing angles or pulses arranged to get the low frequency output voltage nearly sinusoidal ?

   d) A dc chopper feeds power to an RLE load with $R = 2\,\Omega$, L = 10 mH and E = 6 V. If this chopper is operating at a chopper frequency of 1 kHz and with duty cycle of 10% from a 220 V dc source, compute the maximum and minimum currents taken by the load.

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      i) Continuous conduction and
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   c) Explain the operation of Jones chopper with neat waveforms and mention the advantages of Jones chopper circuit over the other chopper circuits. Give the applications of this chopper.

SLR-EP – 336

Seat No.	

Set **R**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER ELECTRONICS

Day and Date : Monday, 21-11-2016 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) Figures to the **right** indicate **full** marks.*
*4) **Assume** data, **if necessary**.*
*5) **All** questions are **compulsory**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) A chopper cannot be line commutated
A) True B) False

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
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P.T.O.

8) When a line commutated converter operates in the inverter mode
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   A) 40° B) 73.40° C) 80° D) 130°

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   A) Sine wave B) Square wave C) Saw tooth wave D) Trapezoidal

———————

SLR-EP – 336

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER ELECTRONICS

Day and Date : Monday, 21-11-2016 Marks : 80

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

Instructions : *1) Figures to the **right** indicate **full** marks.*

*2) **Assume** data, **if necessary**.*

*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×6=24)**

a) What is a GTO ? Describe the turn-on and turn-off characteristics of a GTO.

b) i) State and explain protection schemes of thyristors.

ii) What are dv/dt and di/dt ratings of SCRs. What happens if these ratings are exceeded ? Explain.

c) With the necessary circuit diagrams and relevant waveforms, discuss class D commutation of thyristors.

d) What is SMPS ? Explain.

e) A single phase bridge converter feeds a highly inductive load of RLE, where R = 1 ohm, Eg = 80 V and L is sufficient large for perfect smoothening. The source voltage 120 V at 50 Hz. The source inductance is 1 mH. For a firing angle of 110°, determine overlap angle.

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ii) Give few applications of TRIAC.

3. Attempt **any two** of the following : **(2×8=16)**

a) What is free-wheeling diode ? Draw the circuit diagram of an SCR full wave rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.

b) How many structures are there for power MOSFETs and describe any one of them with their advantages and disadvantages ?

c) What is hybrid type UPS ? What is difference between the hybrid type and on-line UPS ? Draw the block diagram of the hybrid types UPS and explain its operation.

SECTION – II

4. Attempt **any four** of the following : **(4×6=24)**

   a) A single phase sequential commutated CSI is fed from 220 V dc source. The load is $R = 10\,\Omega$. Thyristor have turn-off time of 20 μ sec. and inverter output frequency is 50 Hz. Take a factor of safety of 2. Determine value of source inductance assuming a maximum current change of 0.5 A in one cycle. Find also the values of commutating capacitors.

   b) Describe 3-phase to 3-phase cycloconverter with relevant circuit arrangements using 18 SCRs.

   c) State why the output frequency of a cycloconverter is significantly lower than the input frequency ? How are the firing angles or pulses arranged to get the low frequency output voltage nearly sinusoidal ?

   d) A dc chopper feeds power to an RLE load with $R = 2\,\Omega$, L = 10 mH and E = 6 V. If this chopper is operating at a chopper frequency of 1 kHz and with duty cycle of 10% from a 220 V dc source, compute the maximum and minimum currents taken by the load.

   e) Discuss the working of a Morgan's chopper circuit and its commutation procedure with the help of neat circuit diagram.

   f) Discuss the working of a single phase parallel inverter and its commutation process with neat circuit diagram and necessary waveforms.

5. Attempt **any two** of the following : **(2×8=16)**

   a) Explain the working of single phase bridge type cycloconverter with RL load for
      i) Continuous conduction and
      ii) Discontinuous conduction with the help of neat circuit diagram and relevant output waveforms.

   b) Explain the operation of single phase half bridge inverter for RL loads with the help of neat circuit diagram and necessary waveforms. What is its main drawback ?

   c) Explain the operation of Jones chopper with neat waveforms and mention the advantages of Jones chopper circuit over the other chopper circuits. Give the applications of this chopper.

SLR-EP – 336

Seat No.	

Set **S**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER ELECTRONICS

Day and Date : Monday, 21-11-2016 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) Figures to the **right** indicate **full** marks.*
*4) **Assume** data, **if necessary**.*
*5) **All** questions are **compulsory**.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) A modern power semiconductor device that combines the characteristic of BJT and MOSFET is
A) IGBT B) TRIAC C) SIT D) GTO

2) In a three-phase full converter, 6 SCRs are fired at an interval of
A) 0° B) 60° C) 120° D) 180°

3) Which of the following transistors can be used in E-mode ?
A) JFET B) MOSFET C) NPN D) UJT

4) In a single phase full converter, if output voltage has peak and average values of 325 V and 133 V respectively, firing angle is
A) 40° B) 73.40° C) 80° D) 130°

5) UJT when used for triggering an SCR, has a waveform
A) Sine wave B) Square wave C) Saw tooth wave D) Trapezoidal

6) A chopper cannot be line commutated
A) True B) False

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) The efficiency of a chopper can be expected in the range
A) 50% to 55% B) 65% to 72% C) 82% to 87% D) 92% to 99%

9) A single phase cycloconverter feeds a resistance heating load. The heating power is provided by
A) Only the fundamental component of output wave
B) Only higher harmonics in the output wave
C) Both fundamental and higher harmonics in the output wave
D) Either (A) or (B)

P.T.O.

10) A d.c. to d.c. chopper operates from a 48 V battery source into a resistive load of 24 Ohm. The frequency of the chopper is set to 250 Hz. When chopper on-time is 1 ms the load power is
A) 6 W B) 12 W C) 24 W D) 48 W

11) In a 3 phase bridge inverter with 180° mode of operation the numbers of thyristors conducting at one time are
A) 1 B) 3 C) 2 D) 4

12) The cycloconverter require natural or forced commutation as under
A) Natural commutation in both step-up and step down cycloconverter
B) Forced commutation in both step-up and step-down cycloconverter
C) Forced commutation in step-up cycloconverter
D) Forced commutation in step-down cycloconverter

13) When a line commutated converter operates in the inverter mode
A) It draws both real power and reactive power from the AC supply
B) It delivers both real power and reactive power to the AC supply
C) It draws real power from the AC supply
D) It draws reactive power from the AC supply

14) A voltage source inverter is normally employed when
A) Source inductance is large and load inductance is small
B) Source inductance is small and load inductance is large
C) Both source and load inductance are small
D) Both source and load inductance are large

15) A single phase full bridge inverter can operate in load commutation mode in case of load consist of
A) RLC over damped B) RLC under damped
C) RLC critically damped D) None of these

16) The ratio of latching current to holding current SCR is
A) 0.5 B) 1.0 C) 1.5 D) 2.5

17) During forward blocking state, the SCR has
A) Low current, medium voltage B) Low current, large voltage
C) Medium current, large voltage D) Large current, low voltage

18) UPS is used in
A) Computers B) Communication links
C) Essential instrumentation D) All of the above

19) A TRIAC
A) Conducts when not triggered
B) Conducts when not triggered in both directions
C) Conducts when triggered in one
D) None of the above

20) A sine voltage of 200 V_{rms}, 50 Hz is applied to an SCR through 100 ohm resistor. The firing angle is 60°. The output voltage in rms is
A) 89.7 V B) 126.7 V C) 166.7 V D) $200\sqrt{2}$ V

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SLR-EP – 336

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER ELECTRONICS

Day and Date : Monday, 21-11-2016 Marks : 80

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

Instructions : *1) Figures to the **right** indicate **full** marks.*

*2) **Assume** data, **if necessary**.*

*3) **All** questions are **compulsory**.*

SECTION – I

2. Attempt **any four** of the following : **(4×6=24)**

a) What is a GTO ? Describe the turn-on and turn-off characteristics of a GTO.

b) i) State and explain protection schemes of thyristors.

ii) What are dv/dt and di/dt ratings of SCRs. What happens if these ratings are exceeded ? Explain.

c) With the necessary circuit diagrams and relevant waveforms, discuss class D commutation of thyristors.

d) What is SMPS ? Explain.

e) A single phase bridge converter feeds a highly inductive load of RLE, where R = 1 ohm, Eg = 80 V and L is sufficient large for perfect smoothening. The source voltage 120 V at 50 Hz. The source inductance is 1 mH. For a firing angle of 110°, determine overlap angle.

f) i) Explain different modes of operation of TRIAC with neat schematic diagram.

ii) Give few applications of TRIAC.

3. Attempt **any two** of the following : **(2×8=16)**

a) What is free-wheeling diode ? Draw the circuit diagram of an SCR full wave rectifier with and without free-wheeling diode and explain the operation of the circuit with the help of necessary waveforms.

b) How many structures are there for power MOSFETs and describe any one of them with their advantages and disadvantages ?

c) What is hybrid type UPS ? What is difference between the hybrid type and on-line UPS ? Draw the block diagram of the hybrid types UPS and explain its operation.

SECTION – II

4. Attempt **any four** of the following : **(4×6=24)**

   a) A single phase sequential commutated CSI is fed from 220 V dc source. The load is $R = 10\,\Omega$. Thyristor have turn-off time of 20 μ sec. and inverter output frequency is 50 Hz. Take a factor of safety of 2. Determine value of source inductance assuming a maximum current change of 0.5 A in one cycle. Find also the values of commutating capacitors.

   b) Describe 3-phase to 3-phase cycloconverter with relevant circuit arrangements using 18 SCRs.

   c) State why the output frequency of a cycloconverter is significantly lower than the input frequency ? How are the firing angles or pulses arranged to get the low frequency output voltage nearly sinusoidal ?

   d) A dc chopper feeds power to an RLE load with $R = 2\,\Omega$, L = 10 mH and E = 6 V. If this chopper is operating at a chopper frequency of 1 kHz and with duty cycle of 10% from a 220 V dc source, compute the maximum and minimum currents taken by the load.

   e) Discuss the working of a Morgan's chopper circuit and its commutation procedure with the help of neat circuit diagram.

   f) Discuss the working of a single phase parallel inverter and its commutation process with neat circuit diagram and necessary waveforms.

5. Attempt **any two** of the following : **(2×8=16)**

   a) Explain the working of single phase bridge type cycloconverter with RL load for
      i) Continuous conduction and
      ii) Discontinuous conduction with the help of neat circuit diagram and relevant output waveforms.

   b) Explain the operation of single phase half bridge inverter for RL loads with the help of neat circuit diagram and necessary waveforms. What is its main drawback ?

   c) Explain the operation of Jones chopper with neat waveforms and mention the advantages of Jones chopper circuit over the other chopper circuits. Give the applications of this chopper.

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SLR-EP – 337

Seat No.	

Set **P**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Tuesday, 22-11-2016 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) Make suitable assumptions **only** if necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) A receiver that uses a mixer to convert the received signal at a lower frequency is called as _____ receiver.
   a) Super heterodyne b) TRF
   c) Ratio d) Armstong

2) In FM information is stored in _____ of carrier.
   a) Amplitude b) Frequency
   c) Phase d) None of the above

3) Bandwidth in FM is given by _____ (where n = number of sidebands).
   a) $2f_m+n$ b) $2\delta / n$ c) $2m_f/n$ d) $2nf_m$

4) The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
   a) unchanged b) halved
   c) doubled d) increase by 50 percent

5) The biggest disadvantage of FM is its excessive use of
   a) Amplitude b) Spectrum space
   c) Low pass filter d) None of these

6) To boost high frequencies _____ circuit is used.
   a) Amplifier b) De-emphasis c) Pre-emphasis d) Filters

7) Balanced modulator is used in _____ generation.
   a) AM b) DSBSC c) SSB d) b and c

8) A carrier voltage of unmodulated carrier power 10 kW on being amplitude modulated by an audio sinusoidal voltage to a depth of 70% has total modulated carrier power of
   a) 12.45 kW b) 10 kW c) 2.45 kW d) 4 kW

P.T.O.

9) Which of the system is free from noise ?
   a) FM b) AM
   c) Both FM and AM d) None of these

10) In an AM transmission the frequency which is not transmitted is
   a) USB Frequency b) LSB Frequency
   c) Carrier Frequency d) Audio Frequency

11) The nyquist rate is given by
   a) $f_s = 2 f_m$ b) $f_s \geq 2 f_m$ c) $f_s \leq 2 f_m$ d) $f_s \neq 2 f_m$

12) In ADM the step size is
   a) adjustable b) fixed c) 1 always d) 0.5 always

13) In PCM one of the major source of noise is depends on
   a) flicker noise b) quantization noise
   c) shot noise d) audio noise

14) If each of the 2^k code words of a systematic code can be expressed as linear combinations of 2^k linearly independent code vectors, the code is called as,
   a) Parity Code b) Hamming Code
   c) Linear Block Code d) Cyclic Code

15) UNRZ code represents
   a) '1' by '+ve' pulse and '0' by '–ve' pulse
   b) '1' by 'no' pulse and '0' by '+ve' pulse
   c) '1' by '+ve' pulse and '0' by 'no' pulse
   d) '1' by '–ve' pulse and '0' by '+ve' pulse

16) If A is an event which can occur in s different ways out of a total n equally likely ways, then the probability P of an event A is given by
   a) P(A) = s/n b) P(A) = 1/sn c) P(A) = n/s d) P(A) = sn

17) In a _____ handoff, a mobile station only communicates with one base station.
   a) hard b) soft c) medium d) none of these

18) Which of the following is/are the main part(s) of basic cellular system ?
   a) A mobile Unit
   b) A cell Site
   c) A mobile telephone switching office
   d) All of the above

19) DM has one of the advantages over PCM as
   a) DM circuit is complex
   b) Bit rate in DM is high
   c) Signal to Quantization noise ratio is less in DM than PCM
   d) Signal to Quantization noise ratio is more in DM than PCM

20) The main advantage of PCM is
   a) possibility of multiplexing
   b) less bandwidth
   c) better performance in presence of noise
   d) less power

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SLR-EP – 337

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. a) Solve **any three** questions : **(4×3=12)**
   i) Write a short note on need of modulation.
   ii) Derive the equation of AM wave.
   iii) Differentiate DSBFC, DSBSC and SSBSC with the help of waveform (in time domain and frequency domain) and bandwidth requirement.
   iv) Briefly explain the concept of Pre-emphasis and De-emphasis.

   b) With the help of block diagram explain super heterodyne receiver. **8**

3. a) Solve **any two** questions : **(6×2=12)**
   i) An audio frequency signal 10 sin $(2\pi \times 500\ t)$ is used to amplitude modulate the carrier of 50 sin $(2\pi \times 10^5\ t)$. Calculate : i) M.I., ii) Sideband frequency, iii) Amplitude of each sideband and iv) Bandwidth required.
   ii) Explain VSB transmission.
   iii) What is the frequency modulation ? State the advantages and disadvantages of FM.

   b) An FM wave is represented by the voltage equation : **8**

   $V = 10\text{Sin}[2 \times 10^8\ t + 5 \sin 2000t]$ volt. Find the carrier and modulating frequencies, the modulating index in FM. Calculate the power dissipated by this FM wave in 10 w resistor.

SECTION – II

4. a) Solve **any three** questions : **(4×3=12)**
   i) With the help of block diagram explain Pulse Code Modulation.
   ii) Draw the block diagram of ADM. Write the advantages of ADM over DM.
   iii) Define : i) Probability, ii) Random variables, iii) Mean, iv) Moments
   iv) Write a short note on frequency re-use concepts.

   b) Elaborate linear block code and hamming code with example. **8**

5. a) Solve **any two** questions : **(6×2=12)**
   i) State sampling theorem. Explain the concept of aliasing.
   ii) Explain Scrambler in detail.
   iii) Briefly explain mobile communication with the aid of block diagram.

   b) Explain modulator and demodulator of DM. **8**

Set P

Set P

SLR-EP – 337

Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Tuesday, 22-11-2016 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.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) If A is an event which can occur in s different ways out of a total n equally likely ways, then the probability P of an event A is given by
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19) If each of the 2^k code words of a systematic code can be expressed as linear combinations of 2^k linearly independent code vectors, the code is called as,
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20) UNRZ code represents
   a) '1' by '+ve' pulse and '0' by '–ve' pulse b) '1' by 'no' pulse and '0' by '+ve' pulse
   c) '1' by '+ve' pulse and '0' by 'no' pulse d) '1' by '–ve' pulse and '0' by '+ve' pulse

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SLR-EP – 337

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. a) Solve **any three** questions : **(4×3=12)**
   i) Write a short note on need of modulation.
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   iv) Briefly explain the concept of Pre-emphasis and De-emphasis.

   b) With the help of block diagram explain super heterodyne receiver. **8**

3. a) Solve **any two** questions : **(6×2=12)**
   i) An audio frequency signal 10 sin $(2\pi \times 500\ t)$ is used to amplitude modulate the carrier of 50 sin $(2\pi \times 10^5\ t)$. Calculate : i) M.I., ii) Sideband frequency, iii) Amplitude of each sideband and iv) Bandwidth required.
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   $V = 10\text{Sin}[2 \times 10^8\ t + 5 \sin 2000t]$ volt. Find the carrier and modulating frequencies, the modulating index in FM. Calculate the power dissipated by this FM wave in 10 w resistor.

SECTION – II

4. a) Solve **any three** questions : **(4×3=12)**
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   iii) Briefly explain mobile communication with the aid of block diagram.

   b) Explain modulator and demodulator of DM. **8**

Set Q

Set Q

SLR-EP – 337

Seat No.	

Set **R**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Tuesday, 22-11-2016 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.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The nyquist rate is given by
a) $f_s = 2 f_m$ b) $f_s \geq 2 f_m$ c) $f_s \leq 2 f_m$ d) $f_s \neq 2 f_m$

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a) '1' by '+ve' pulse and '0' by '–ve' pulse
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P.T.O.

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   a) DM circuit is complex
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12) In FM information is stored in _____ of carrier.
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18) A carrier voltage of unmodulated carrier power 10 kW on being amplitude modulated by an audio sinusoidal voltage to a depth of 70% has total modulated carrier power of
   a) 12.45 kW b) 10 kW c) 2.45 kW d) 4 kW

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   a) FM b) AM
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_____

SLR-EP – 337

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. a) Solve **any three** questions : **(4×3=12)**
   i) Write a short note on need of modulation.
   ii) Derive the equation of AM wave.
   iii) Differentiate DSBFC, DSBSC and SSBSC with the help of waveform (in time domain and frequency domain) and bandwidth requirement.
   iv) Briefly explain the concept of Pre-emphasis and De-emphasis.

   b) With the help of block diagram explain super heterodyne receiver. **8**

3. a) Solve **any two** questions : **(6×2=12)**
   i) An audio frequency signal 10 sin $(2\pi \times 500\ t)$ is used to amplitude modulate the carrier of 50 sin $(2\pi \times 10^5\ t)$. Calculate : i) M.I., ii) Sideband frequency, iii) Amplitude of each sideband and iv) Bandwidth required.
   ii) Explain VSB transmission.
   iii) What is the frequency modulation ? State the advantages and disadvantages of FM.

   b) An FM wave is represented by the voltage equation : **8**

   $V = 10\text{Sin}[2 \times 10^8\ t + 5 \sin 2000t]$ volt. Find the carrier and modulating frequencies, the modulating index in FM. Calculate the power dissipated by this FM wave in 10 w resistor.

SECTION – II

4. a) Solve **any three** questions : **(4×3=12)**
   i) With the help of block diagram explain Pulse Code Modulation.
   ii) Draw the block diagram of ADM. Write the advantages of ADM over DM.
   iii) Define : i) Probability, ii) Random variables, iii) Mean, iv) Moments
   iv) Write a short note on frequency re-use concepts.

   b) Elaborate linear block code and hamming code with example. **8**

5. a) Solve **any two** questions : **(6×2=12)**
   i) State sampling theorem. Explain the concept of aliasing.
   ii) Explain Scrambler in detail.
   iii) Briefly explain mobile communication with the aid of block diagram.

   b) Explain modulator and demodulator of DM. **8**

Set R

Set R

SLR-EP – 337

Seat No.	

Set **S**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Tuesday, 22-11-2016 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) Make suitable assumptions **only** if necessary.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) To boost high frequencies _____ circuit is used.
a) Amplifier b) De-emphasis c) Pre-emphasis d) Filters

2) Balanced modulator is used in _____ generation.
a) AM b) DSBSC c) SSB d) b and c

3) A carrier voltage of unmodulated carrier power 10 kW on being amplitude modulated by an audio sinusoidal voltage to a depth of 70% has total modulated carrier power of
a) 12.45 kW b) 10 kW c) 2.45 kW d) 4 kW

4) Which of the system is free from noise ?
a) FM b) AM
c) Both FM and AM d) None of these

5) In an AM transmission the frequency which is not transmitted is
a) USB Frequency b) LSB Frequency
c) Carrier Frequency d) Audio Frequency

6) The nyquist rate is given by
a) $f_s = 2\,f_m$ b) $f_s \geq 2\,f_m$ c) $f_s \leq 2\,f_m$ d) $f_s \neq 2\,f_m$

7) In ADM the step size is
a) adjustable b) fixed c) 1 always d) 0.5 always

8) In PCM one of the major source of noise is depends on
a) flicker noise b) quantization noise
c) shot noise d) audio noise

9) If each of the 2^k code words of a systematic code can be expressed as linear combinations of 2^k linearly independent code vectors, the code is called as,
a) Parity Code b) Hamming Code
c) Linear Block Code d) Cyclic Code

P.T.O.

10) UNRZ code represents
a) '1' by '+ve' pulse and '0' by '–ve' pulse
b) '1' by 'no' pulse and '0' by '+ve' pulse
c) '1' by '+ve' pulse and '0' by 'no' pulse
d) '1' by '–ve' pulse and '0' by '+ve' pulse

11) If A is an event which can occur in s different ways out of a total n equally likely ways, then the probability P of an event A is given by
a) P(A) = s/n b) P(A) = 1/sn c) P(A) = n/s d) P(A) = sn

12) In a _____ handoff, a mobile station only communicates with one base station.
a) hard b) soft c) medium d) none of these

13) Which of the following is/are the main part(s) of basic cellular system ?
a) A mobile Unit
b) A cell Site
c) A mobile telephone switching office
d) All of the above

14) DM has one of the advantages over PCM as
a) DM circuit is complex
b) Bit rate in DM is high
c) Signal to Quantization noise ratio is less in DM than PCM
d) Signal to Quantization noise ratio is more in DM than PCM

15) The main advantage of PCM is
a) possibility of multiplexing
b) less bandwidth
c) better performance in presence of noise
d) less power

16) A receiver that uses a mixer to convert the received signal at a lower frequency is called as _____ receiver.
a) Super heterodyne b) TRF
c) Ratio d) Armstong

17) In FM information is stored in _____ of carrier.
a) Amplitude b) Frequency
c) Phase d) None of the above

18) Bandwidth in FM is given by _____ (where n = number of sidebands).
a) $2f_m+n$ b) $2\delta / n$ c) $2m_f/n$ d) $2nf_m$

19) The modulation index of an AM wave is changed from 0 to 1. The transmitted power is
a) unchanged b) halved
c) doubled d) increase by 50 percent

20) The biggest disadvantage of FM is its excessive use of
a) Amplitude b) Spectrum space
c) Low pass filter d) None of these

_____

SLR-EP – 337

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
ELECTRONIC COMMUNICATION ENGINEERING

Day and Date : Tuesday, 22-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. a) Solve **any three** questions : **(4×3=12)**
   i) Write a short note on need of modulation.
   ii) Derive the equation of AM wave.
   iii) Differentiate DSBFC, DSBSC and SSBSC with the help of waveform (in time domain and frequency domain) and bandwidth requirement.
   iv) Briefly explain the concept of Pre-emphasis and De-emphasis.

   b) With the help of block diagram explain super heterodyne receiver. **8**

3. a) Solve **any two** questions : **(6×2=12)**
   i) An audio frequency signal 10 sin $(2\pi \times 500\ t)$ is used to amplitude modulate the carrier of 50 sin $(2\pi \times 10^5\ t)$. Calculate : i) M.I., ii) Sideband frequency, iii) Amplitude of each sideband and iv) Bandwidth required.
   ii) Explain VSB transmission.
   iii) What is the frequency modulation ? State the advantages and disadvantages of FM.

   b) An FM wave is represented by the voltage equation : **8**

   V = 10Sin [2 × 10^8 t + 5 sin 2000t] volt. Find the carrier and modulating frequencies, the modulating index in FM. Calculate the power dissipated by this FM wave in 10 w resistor.

SECTION – II

4. a) Solve **any three** questions : **(4×3=12)**
   i) With the help of block diagram explain Pulse Code Modulation.
   ii) Draw the block diagram of ADM. Write the advantages of ADM over DM.
   iii) Define : i) Probability, ii) Random variables, iii) Mean, iv) Moments
   iv) Write a short note on frequency re-use concepts.

   b) Elaborate linear block code and hamming code with example. **8**

5. a) Solve **any two** questions : **(6×2=12)**
   i) State sampling theorem. Explain the concept of aliasing.
   ii) Explain Scrambler in detail.
   iii) Briefly explain mobile communication with the aid of block diagram.

   b) Explain modulator and demodulator of DM. **8**

Set S

Set S

SLR-EP – 338

Seat No.	

Set **P**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 23-11-2016 Max. 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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Objective questions : **20**

1) If the new base MVA is twice the old base MVA, then the new p.u. impedance will be _____ times old p.u. impedance.

a) Four b) Half c) Two d) Three

2) Base impedance of a power system is given as _____

a) $\frac{(\text{Base KV})}{(\text{Base MVA})}$ b) $\frac{\text{Base KV}}{(\text{Base MVA})}$ c) $\frac{\text{Base MVA}}{(\text{Base KV})^2}$ d) $\frac{(\text{Base MVA})^2}{(\text{Base KV})}$

3) The power delivered by a synchronous generator to an infinite bus is given by

a) $P = \frac{|V_t||E_f|}{R_a}\sin\delta$ b) $P = \frac{|V_t||E_f|}{X_s}\sin\delta$ c) $P = \frac{|V_t||E_f|^2}{X_s}\sin\delta$ d) $P = \frac{|V_t||E_f|}{X_s}\cos\delta$

4) Normally Z_{bus} Matrix is a

a) Null matrix b) Sparse matrix c) Full matrix d) Unity matrix

5) Load flow study carried out for

a) Load frequency control b) Stability studies

c) System planning d) Fault calculations

6) At slack bus, which one of the following combinations of variables is specified ?

a) $|V|, \delta$ b) P, Q c) $P, |V|$ d) $Q, |V|$

7) For a load flow solution, the quantities normally specified at a voltage controlled bus are

a) P and Q b) P and $|V|$ c) Q and $|V|$ d) P and δ

P.T.O.

8) The angle δ in the swing equation of a synchronous generator is the
   a) Angle between stator voltage and current
   b) Angular displacement of the rotor w.r.t. stator
   c) Angular displacement of the stator mmf w.r.t. a synchronously rotating axis
   d) Angular displacement of an axis fixed to the rotor w.r.t. a synchronously rotating axis

9) For stability reasons, the transmission line is operated with power angle in the range
   a) 10 to 25 degree b) 30 to 45 degree c) 60 to 75 degree d) 65 to 90 degree

10) Which one of the following is correct ?
   a) $X_d'' = X_d' = X_d$ b) $X_d'' < X_d' < X_d$ c) $X_d'' = \frac{X_d}{2}$ d) $X_d' = \frac{X_d}{2}$

11) In case of balanced three phase system, negative and zero sequence currents are
   a) Absent b) Equal c) Infinite d) Present

12) Fault level means
   a) Voltage at the point of fault b) Fault power factor
   c) Fault current d) Fault MVA

13) The magnitude of fault current depends upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both a) and b)

14) Which three-phase connection can be used in a transformer to introduce a phase difference of 30° between its output and corresponding input line voltages
   a) Star-Star b) Star-Delta c) Delta-Delta d) Delta-Zigzag

15) In which type of faults given below, all the three components I_{a0}, I_{a1} and I_{a2} are equal
   a) LG b) LL c) LLG d) None of above

16) The most frequently occurring fault in a power system is
   a) LG b) LL c) LLG d) LLL

17) Which of the following network gets affected by the method of neutral grounding ?
   a) Zero sequence network b) Negative sequence network
   c) Positive sequence network d) None of above

18) For a single line to ground fault the zero sequence current is given by j3.0 p.u. The current carried by the neutral during fault is
   a) j1.0 p.u. b) j 9.0 p.u. c) j 6.0 p.u. d) None of these

19) For a fault at the terminals of a synchronous generator, the fault current is maximum for a _____ fault.
   a) LLL b) LL c) LLG d) LG

20) When a fault occurs in a power system the zero sequence component of current becomes zero. The type of fault is
   a) LLLG b) LL c) LLG d) LG

SLR-EP – 338

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 23-11-2016 Max. Marks : 80

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

SECTION – I

2. Solve **any four** questions : **(4×5=20)**

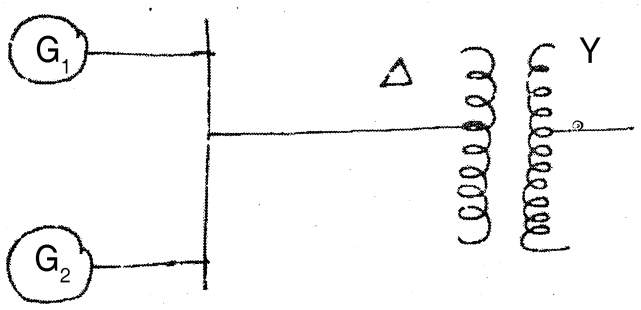
1) Discuss various types of buses and explain their significance in detail.

2) What is per unit system ? What are the advantages of using per unit system ?

3) Assuming 25 MVA as base MVA, calculate the through impedance between the generator and output terminal of the transformer for the system shown below :

The specifications of the components are given below :

Generator G_1	Generator G_2	Transformer
30 MVA	25 MVA	60 MVA
11 KV	11 KV	11 KVΔ /66 KV
X" = 0.20 p.u.	X" = 0.25 p.u.	X = 0.10 p.u.

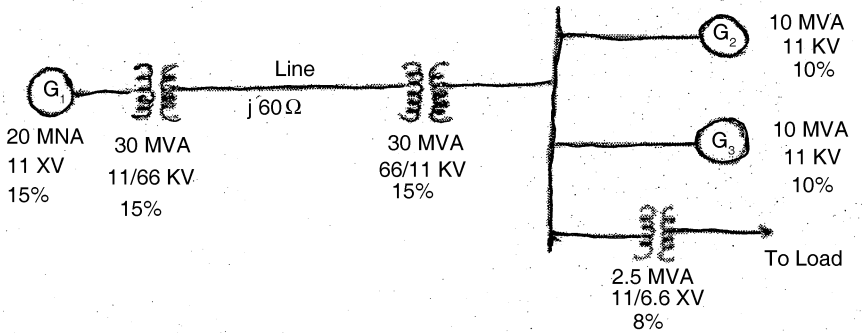


4) State and derive the equal area criterion of stability.

5) A 230 kV transmission line has a series impedance of $(4 + j\,60)\ \Omega$ and a shunt admittance of $j\,2\times 10^{-3}$ S. Using 100 MVA and line voltage as base values, calculate p.u. impedance and p.u. admittance of line.

3. Solve **any two** questions : **(2×10=20)**

   1) Draw a p.u. reactance diagram for the three phase system shown in below fig. Choose 20 MVA as base MVA and 66 KV as base voltage in transmission line.



   2) Explain different types of stability in case of a power system.

   3) Explain the Gauss-Seidal method for solution of non-linear algebraic equations.

SECTION – II

4. Solve **any four** questions : **(4×5=20)**

   1) Describe the transients occurring in a transmission line on occurrence of a short circuit.

   2) Explain different faults taking place in a power system.

   3) In a three phase, four wire system the currents in lines a, b and c under abnormal conditions of loading are as follows :

      $I_a = 100 \text{ L } 30°$, $I_b = 50 \text{ L } 300°$, $I_c = 30 \text{ L } 180°$

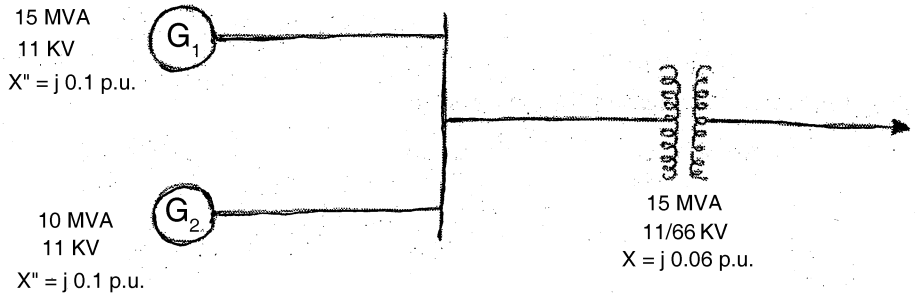
      Calculate the zero, positive and negative phase sequence currents in line a.

   4) Derive an expression for symmetrical components in terms of phase components.

   5) A double lone to ground fault occurs on the terminals of generator. Determine the symmetrical subtransient current for $X_1 = X_2 = j\ 0.2$ p.u. and $X_0 = j\ 0.05$ p.u. Assume generator neutral to be solidly grounded.

5. Solve **any two** questions : **(2×10=20)**

   1) Two generators G_1 and G_2 are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high volatge side of the transformer.

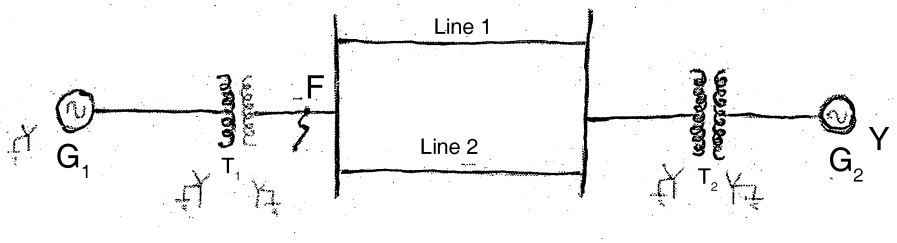


Set P

2) Develop an equivalent network howing the interconnection of sequence networks to stimulate :
   a) Single line to ground fault
   b) Double line fault.

3) Draw the positive, negative and zero sequence networks for the system shown below. Also determine the fault current when LL fault occurs at point F. The p.u. reactances all referred to same base as follows :

	X_0	X_1	X_2
Generator G_1	0.05	0.3	0.2
Generator G_2	0.03	0.25	0.15
Line 1	0.70	0.3	0.3
Line 2	0.70	0.3	0.3
Transformer T_1	0.12	0.12	0.12
Transformer T_2	0.10	0.10	0.10



Set P

SLR-EP – 338

Seat No.	

Set **Q**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100

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

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Objective questions : **20**

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a) LG b) LL c) LLG d) LLL

2) Which of the following network gets affected by the method of neutral grounding ?

a) Zero sequence network b) Negative sequence network

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3) For a single line to ground fault the zero sequence current is given by j3.0 p.u. The current carried by the neutral during fault is

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4) For a fault at the terminals of a synchronous generator, the fault current is maximum for a _____ fault.

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SLR-EP – 338

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 23-11-2016 Max. Marks : 80

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SECTION – I

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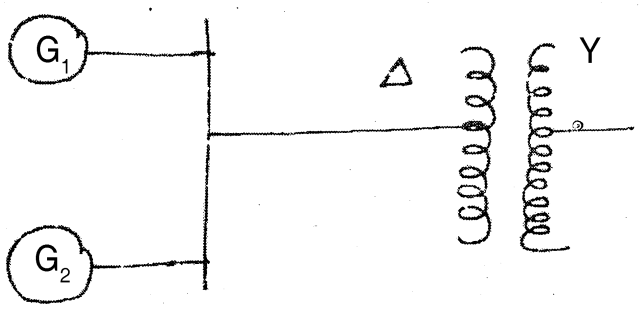

4) State and derive the equal area criterion of stability.

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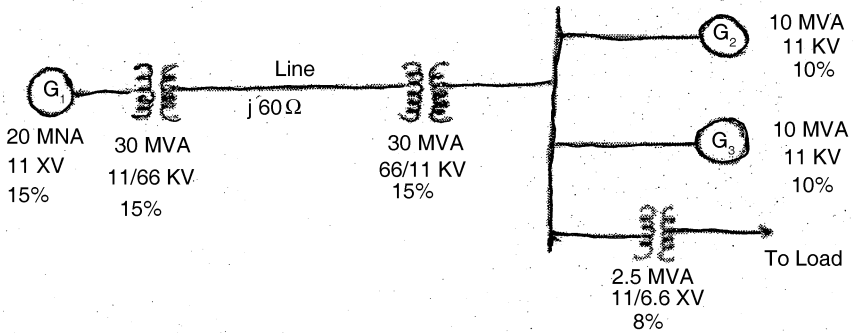

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SECTION – II

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1) Describe the transients occurring in a transmission line on occurrence of a short circuit.

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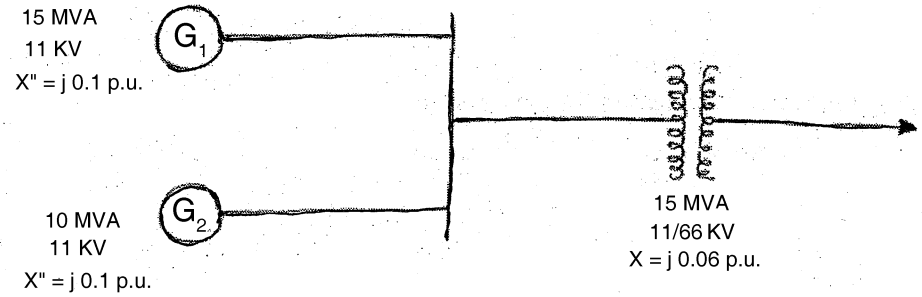

Set Q

2) Develop an equivalent network howing the interconnection of sequence networks to stimulate :
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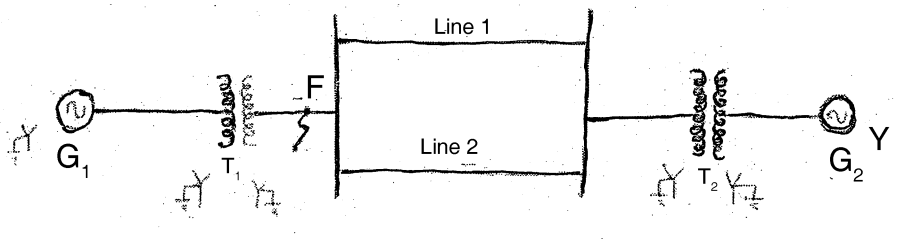


Set Q

SLR-EP – 338

Seat No.	

Set **R**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 23-11-2016 Max. 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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Objective questions : **20**

1) In case of balanced three phase system, negative and zero sequence currents are
   a) Absent b) Equal c) Infinite d) Present

2) Fault level means
   a) Voltage at the point of fault b) Fault power factor
   c) Fault current d) Fault MVA

3) The magnitude of fault current depends upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both a) and b)

4) Which three-phase connection can be used in a transformer to introduce a phase difference of 30° between its output and corresponding input line voltages
   a) Star-Star b) Star-Delta c) Delta-Delta d) Delta-Zigzag

5) In which type of faults given below, all the three components I_{a0}, I_{a1} and I_{a2} are equal
   a) LG b) LL c) LLG d) None of above

6) The most frequently occurring fault in a power system is
   a) LG b) LL c) LLG d) LLL

7) Which of the following network gets affected by the method of neutral grounding ?
   a) Zero sequence network b) Negative sequence network
   c) Positive sequence network d) None of above

8) For a single line to ground fault the zero sequence current is given by j3.0 p.u. The current carried by the neutral during fault is
   a) j1.0 p.u. b) j 9.0 p.u. c) j 6.0 p.u. d) None of these

P.T.O.

9) For a fault at the terminals of a synchronous generator, the fault current is maximum for a _____ fault.
a) LLL b) LL c) LLG d) LG

10) When a fault occurs in a power system the zero sequence component of current becomes zero. The type of fault is
a) LLLG b) LL c) LLG d) LG

11) If the new base MVA is twice the old base MVA, then the new p.u. impedance will be _____ times old p.u. impedance.
a) Four b) Half c) Two d) Three

12) Base impedance of a power system is given as _____
a) $\frac{(\text{Base KV})}{(\text{Base MVA})}$ b) $\frac{\text{Base KV}}{(\text{Base MVA})}$ c) $\frac{\text{Base MVA}}{(\text{Base KV})^2}$ d) $\frac{(\text{Base MVA})^2}{(\text{Base KV})}$

13) The power delivered by a synchronous generator to an infinite bus is given by
a) $P = \frac{|V_t||E_f|}{R_a}\sin\delta$ b) $P = \frac{|V_t||E_f|}{X_s}\sin\delta$ c) $P = \frac{|V_t||E_f|^2}{X_s}\sin\delta$ d) $P = \frac{|V_t||E_f|}{X_s}\cos\delta$

14) Normally Z_{bus} Matrix is a
a) Null matrix b) Sparse matrix c) Full matrix d) Unity matrix

15) Load flow study carried out for
a) Load frequency control b) Stability studies
c) System planning d) Fault calculations

16) At slack bus, which one of the following combinations of variables is specified ?
a) $|V|, \delta$ b) P, Q c) $P, |V|$ d) $Q, |V|$

17) For a load flow solution, the quantities normally specified at a voltage controlled bus are
a) P and Q b) P and $|V|$ c) Q and $|V|$ d) P and δ

18) The angle δ in the swing equation of a synchronous generator is the
a) Angle between stator voltage and current
b) Angular displacement of the rotor w.r.t. stator
c) Angular displacement of the stator mmf w.r.t. a synchronously rotating axis
d) Angular displacement of an axis fixed to the rotor w.r.t. a synchronously rotating axis

19) For stability reasons, the transmission line is operated with power angle in the range
a) 10 to 25 degree b) 30 to 45 degree c) 60 to 75 degree d) 65 to 90 degree

20) Which one of the following is correct ?
a) $X_d'' = X_d' = X_d$ b) $X_d'' < X_d' < X_d$ c) $X_d'' = \frac{X_d}{2}$ d) $X_d' = \frac{X_d}{2}$

SLR-EP – 338

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 23-11-2016 Max. Marks : 80

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

SECTION – I

2. Solve **any four** questions : **(4×5=20)**

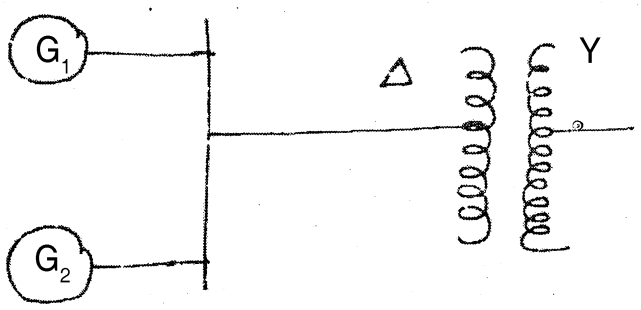
1) Discuss various types of buses and explain their significance in detail.

2) What is per unit system ? What are the advantages of using per unit system ?

3) Assuming 25 MVA as base MVA, calculate the through impedance between the generator and output terminal of the transformer for the system shown below :

The specifications of the components are given below :

Generator G_1	Generator G_2	Transformer
30 MVA	25 MVA	60 MVA
11 KV	11 KV	11 KVΔ /66 KV
X" = 0.20 p.u.	X" = 0.25 p.u.	X = 0.10 p.u.

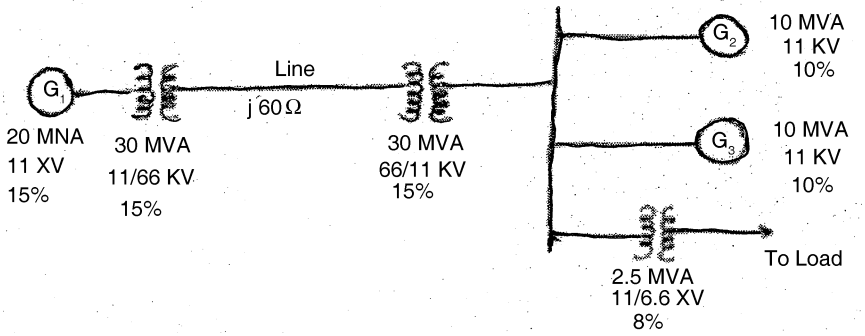


4) State and derive the equal area criterion of stability.

5) A 230 kV transmission line has a series impedance of $(4 + j\,60)\ \Omega$ and a shunt admittance of $j\,2\times 10^{-3}$ S. Using 100 MVA and line voltage as base values, calculate p.u. impedance and p.u. admittance of line.

3. Solve **any two** questions : **(2×10=20)**

   1) Draw a p.u. reactance diagram for the three phase system shown in below fig. Choose 20 MVA as base MVA and 66 KV as base voltage in transmission line.



   2) Explain different types of stability in case of a power system.

   3) Explain the Gauss-Seidal method for solution of non-linear algebraic equations.

SECTION – II

4. Solve **any four** questions : **(4×5=20)**

   1) Describe the transients occurring in a transmission line on occurrence of a short circuit.

   2) Explain different faults taking place in a power system.

   3) In a three phase, four wire system the currents in lines a, b and c under abnormal conditions of loading are as follows :

      $I_a = 100 \text{ L } 30°$, $I_b = 50 \text{ L } 300°$, $I_c = 30 \text{ L } 180°$

      Calculate the zero, positive and negative phase sequence currents in line a.

   4) Derive an expression for symmetrical components in terms of phase components.

   5) A double lone to ground fault occurs on the terminals of generator. Determine the symmetrical subtransient current for $X_1 = X_2 = j\ 0.2$ p.u. and $X_0 = j\ 0.05$ p.u. Assume generator neutral to be solidly grounded.

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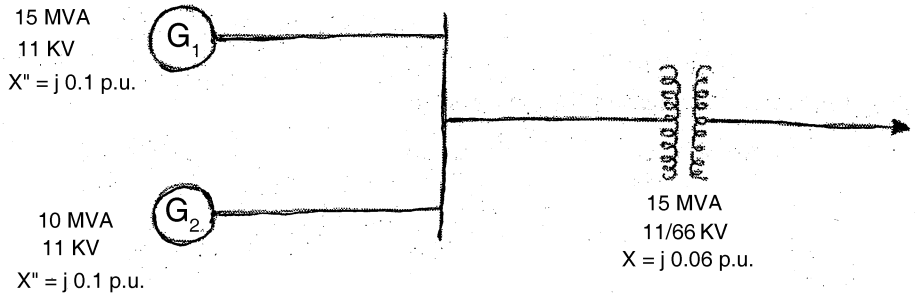
   1) Two generators G_1 and G_2 are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high volatge side of the transformer.



Set R

2) Develop an equivalent network howing the interconnection of sequence networks to stimulate :
   a) Single line to ground fault
   b) Double line fault.

3) Draw the positive, negative and zero sequence networks for the system shown below. Also determine the fault current when LL fault occurs at point F. The p.u. reactances all referred to same base as follows :

	X_0	X_1	X_2
Generator G_1	0.05	0.3	0.2
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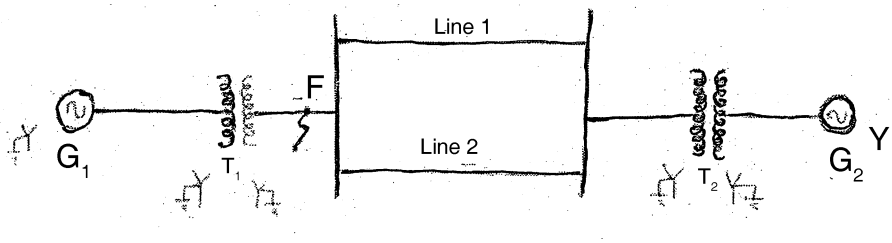
Line 1	0.70	0.3	0.3
Line 2	0.70	0.3	0.3
Transformer T_1	0.12	0.12	0.12
Transformer T_2	0.10	0.10	0.10



Set R

SLR-EP – 338

Seat No.	

Set **S**

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 23-11-2016 Max. 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.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Objective questions : **20**

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3) The angle δ in the swing equation of a synchronous generator is the
a) Angle between stator voltage and current
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4) For stability reasons, the transmission line is operated with power angle in the range
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P.T.O.

9) Which three-phase connection can be used in a transformer to introduce a phase difference of 30° between its output and corresponding input line voltages
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_____

SLR-EP – 338

Seat No.	

T.E. (Electrical and Electronics Engineering) (Part – II) Examination, 2016
POWER SYSTEM ANALYSIS

Day and Date : Wednesday, 23-11-2016 Max. Marks : 80

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

SECTION – I

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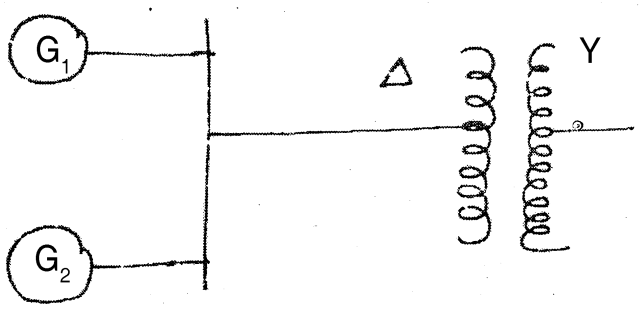

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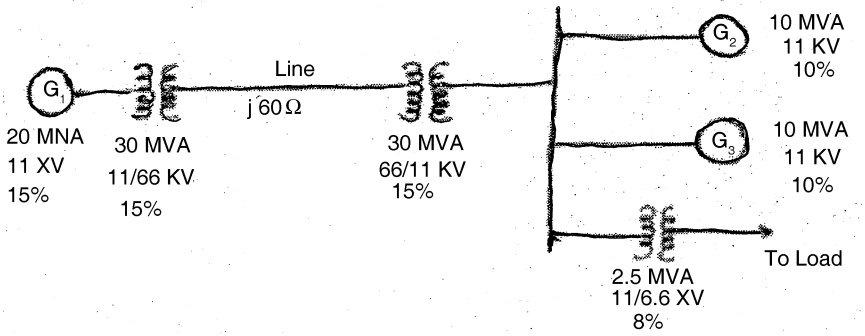

2) Explain different types of stability in case of a power system.

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SECTION – II

4. Solve **any four** questions : **(4×5=20)**

1) Describe the transients occurring in a transmission line on occurrence of a short circuit.

2) Explain different faults taking place in a power system.

3) In a three phase, four wire system the currents in lines a, b and c under abnormal conditions of loading are as follows :

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Calculate the zero, positive and negative phase sequence currents in line a.

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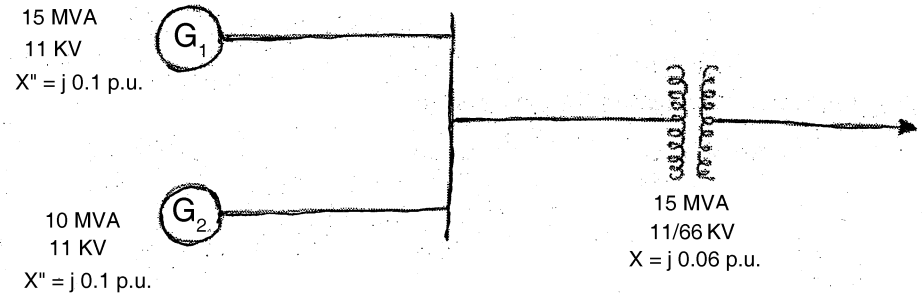
5. Solve **any two** questions : **(2×10=20)**

1) Two generators G_1 and G_2 are connected in parallel having rating of 15 MVA, 11 KV and 10 MVA, 11 KV resp. The generators are connected to transformer as shown in fig. Calculate the subtransient current in each generator when a three phase fault occurs on the high volatge side of the transformer.



Set S

2) Develop an equivalent network howing the interconnection of sequence networks to stimulate :
   a) Single line to ground fault
   b) Double line fault.

3) Draw the positive, negative and zero sequence networks for the system shown below. Also determine the fault current when LL fault occurs at point F. The p.u. reactances all referred to same base as follows :

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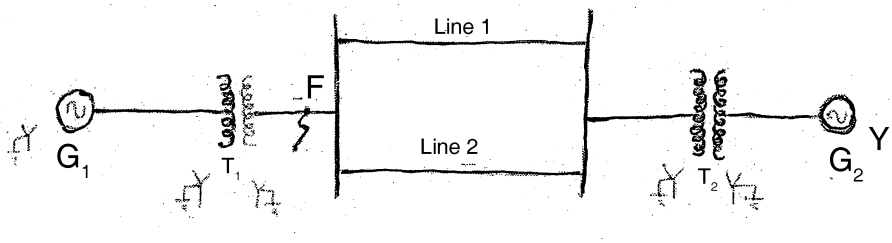


Set S

SLR-EP – 339

Seat No.	

Set **P**

T.E. (E&E) (Part – II) Examination, 2016
CONTROL SYSTEM – II

Day and Date : Thursday, 24-11-2016 Max. 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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) Which of the following should be done to make an unstable system stable ?
   a) The gain of the system should be decreased
   b) The gain of the system should be increased
   c) The number of poles to the loop transfer function should be increased
   d) The number of zeros to the loop transfer function should be increased

2) _____ increases the steady state accuracy.
   a) Integrator b) Differentiator
   c) Phase lead compensator d) Phase lag compensator

3) A phase lag lead network introduces _____ in the output.
   a) Lag at all frequencies
   b) Lag at high frequencies and lead at low frequencies
   c) Lag at low frequencies and lead at high frequencies
   d) None of the above

4) Gain margin is the factor by which the gain of the system is increased to make it
   a) Stable b) Unstable
   c) Oscillatory d) Exponential

5) The state transition matrix for the system $\dot{X} = AX$ with initial state X (0) is
   a) $(sI - A)^{-1}$ b) $e^{At} X(0)$
   c) Laplace inverse of $[(sI - A)^{-1}]$ d) Laplace inverse of $[(sI - A)^{-1} X(0)]$

6) A state variable approach can be applied to _____ systems.
   a) Time variant b) Non-Linear
   c) Linear and time invariant d) All of the above

P.T.O.

7) Lag compensation network normally consists of
   a) R and L element b) C and L element
   c) R and C element d) All of the above

8) The eigen values of a linear system are the location of
   a) Poles of the system b) Zeros of the system
   c) Both a) and b) d) Finite pole and zero

9) Leading compensator network is
   a) Equiliser b) High pass filter
   c) Low pass filter d) None of the above

10) _____ is used for improving transient response.
   a) Integrator b) Comparator
   c) Lag compensator d) Lead compensator

11) In lag compensation network _____ is dominant.
   a) Pole b) Zero c) Both a) and b) d) None of the above

12) For a given gain constant K, the phase-lead compensator
   a) Reduce the slope of the magnitude curve in the entire range of frequency
   b) Decreases the gain cross-over frequency
   c) Reduce the phase margin
   d) Reduce the resonance peak Mp

13) Addition of zeros in transfer function causes _____ compensation.
   a) Lag b) Lead c) Lag-Lead d) None of these

14) Slope of factor K in plotting BODE magnitude plot is
   a) 0° b) ∞ c) 90° d) None of these

15) In a feedback system, lead compensator
   a) Increase the margin of stability
   b) Increase the system error constant to some extent
   c) Speed up the transient response
   d) All of these

16) A differentiator is usually not a part of a control system because it
   a) Reduces damping b) Reduces the gain margin
   c) Increases input noise d) Increases error

17) Which of the following is used to increase the bandwidth of a control system ?
   a) Phase lag compensator b) Phase lead compensator
   c) Phase lag-lead compensator d) All of these

18) In a non-linear control system, limit cycle is self sustained oscillations of
   a) Variable amplitude b) Variable frequency
   c) Fixed frequency d) Fixed frequency and amplitude

19) The transfer function of the zero order hold is
   a) $1 - e^{TS}$ b) $(1 - e^{TS})/s$ c) $1 - e^{-TS}$ d) $(1 - e^{-TS})/s$

20) Addition of pole to the open loop transfer function has the effect of pulling root locus to
   a) Left b) Right c) Up d) Down

_____

SLR-EP – 339

Seat No.	

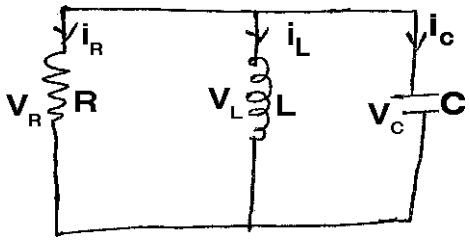
T.E. (E&E) (Part – II) Examination, 2016
CONTROL SYSTEM – II

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

a) Obtain the state equations for the zero input network shown below :



b) Draw the electrical equivalent of lead compensator and obtain its T/F.

c) Find Eigen vectors of the matrix $A = \begin{bmatrix} 0 & 1 \\ -2 & 3 \end{bmatrix}$.

d) Explain procedure to design lag compensator using frequency response.

e) Write the steps to design lead-lag compensator using Root Locus technique.

3. a) Consider a unity feedback system with open loop transfer function $G(s) = K/s(s + 8)$. Design a lead compensator to meet the following specifications **20**

i) Percentage peak overshoot = 9.5%

ii) Natural frequency of oscillations ω_n = 12 rad/sec.

iii) Velocity error constant $K_v \geq 10$.

b) Obtain State Transition Matrix (STM) for the state model whose matrix A is given by $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$

OR

b) A linear time invariant system is described by the following differential equations

$$\frac{dx_1(t)}{dt} = -2x_1(t) + 4x_2(t)$$

$$\frac{dx_2(t)}{dt} = -2x_1(t) - x_2(t) + u(t)$$

Comment on controllability and stability of the system.

SECTION – II

4. Solve **any four** : **(4×5=20)**

a) State and explain different types of non linearities.

b) Explain in short about limit cycle.

c) Explain mapping between S-plane and Z-plane.

d) Explain block diagram of discrete control system.

e) Explain singular points in non linear control system.

5. Solve **any two** : **(2×10=20)**

a) Explain in detail the impulse sampling and data hold circuit.

b) Derive pulse T/F of cascaded elements.

c) Explain constructions of phase trajectories by isoclines method.

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SLR-EP – 339

Seat No.	

Set Q

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CONTROL SYSTEM – II

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Duration : 30 Minutes Marks : 20

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   c) Phase lead compensator d) Phase lag compensator

P.T.O.

8) A phase lag lead network introduces _____ in the output.
   a) Lag at all frequencies
   b) Lag at high frequencies and lead at low frequencies
   c) Lag at low frequencies and lead at high frequencies
   d) None of the above

9) Gain margin is the factor by which the gain of the system is increased to make it
   a) Stable b) Unstable
   c) Oscillatory d) Exponential

10) The state transition matrix for the system $\dot{X} = AX$ with initial state X (0) is
   a) $(sI - A)^{-1}$ b) $e^{At} X(0)$
   c) Laplace inverse of $[(sI - A)^{-1}]$ d) Laplace inverse of $[(sI - A)^{-1} X(0)]$

11) A state variable approach can be applied to _____ systems.
   a) Time variant b) Non-Linear
   c) Linear and time invariant d) All of the above

12) Lag compensation network normally consists of
   a) R and L element b) C and L element
   c) R and C element d) All of the above

13) The eigen values of a linear system are the location of
   a) Poles of the system b) Zeros of the system
   c) Both a) and b) d) Finite pole and zero

14) Leading compensator network is
   a) Equiliser b) High pass filter
   c) Low pass filter d) None of the above

15) _____ is used for improving transient response.
   a) Integrator b) Comparator
   c) Lag compensator d) Lead compensator

16) In lag compensation network _____ is dominant.
   a) Pole b) Zero c) Both a) and b) d) None of the above

17) For a given gain constant K, the phase-lead compensator
   a) Reduce the slope of the magnitude curve in the entire range of frequency
   b) Decreases the gain cross-over frequency
   c) Reduce the phase margin
   d) Reduce the resonance peak Mp

18) Addition of zeros in transfer function causes _____ compensation.
   a) Lag b) Lead c) Lag-Lead d) None of these

19) Slope of factor K in plotting BODE magnitude plot is
   a) 0° b) ∞ c) 90° d) None of these

20) In a feedback system, lead compensator
   a) Increase the margin of stability
   b) Increase the system error constant to some extent
   c) Speed up the transient response
   d) All of these

_____

SLR-EP – 339

Seat No.	

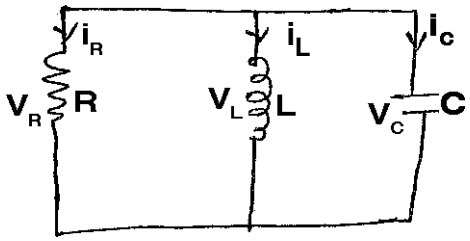
T.E. (E&E) (Part – II) Examination, 2016
CONTROL SYSTEM – II

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

a) Obtain the state equations for the zero input network shown below :



b) Draw the electrical equivalent of lead compensator and obtain its T/F.

c) Find Eigen vectors of the matrix $A = \begin{bmatrix} 0 & 1 \\ -2 & 3 \end{bmatrix}$.

d) Explain procedure to design lag compensator using frequency response.

e) Write the steps to design lead-lag compensator using Root Locus technique.

3. a) Consider a unity feedback system with open loop transfer function G(s) = K/s(s + 8). Design a lead compensator to meet the following specifications **20**

i) Percentage peak overshoot = 9.5%

ii) Natural frequency of oscillations ω_n = 12 rad/sec.

iii) Velocity error constant $K_v \geq 10$.

b) Obtain State Transition Matrix (STM) for the state model whose matrix A is given by $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$

OR

b) A linear time invariant system is described by the following differential equations

$$\frac{dx_1(t)}{dt} = -2x_1(t) + 4x_2(t)$$

$$\frac{dx_2(t)}{dt} = -2x_1(t) - x_2(t) + u(t)$$

Comment on controllability and stability of the system.

SECTION – II

4. Solve **any four** : **(4×5=20)**

a) State and explain different types of non linearities.

b) Explain in short about limit cycle.

c) Explain mapping between S-plane and Z-plane.

d) Explain block diagram of discrete control system.

e) Explain singular points in non linear control system.

5. Solve **any two** : **(2×10=20)**

a) Explain in detail the impulse sampling and data hold circuit.

b) Derive pulse T/F of cascaded elements.

c) Explain constructions of phase trajectories by isoclines method.

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SLR-EP – 339

Seat No.	

Set R

T.E. (E&E) (Part – II) Examination, 2016
CONTROL SYSTEM – II

Day and Date : Thursday, 24-11-2016 Max. 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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In lag compensation network _____ is dominant.
a) Pole b) Zero c) Both a) and b) d) None of the above

2) For a given gain constant K, the phase-lead compensator
a) Reduce the slope of the magnitude curve in the entire range of frequency
b) Decreases the gain cross-over frequency
c) Reduce the phase margin
d) Reduce the resonance peak Mp

3) Addition of zeros in transfer function causes _____ compensation.
a) Lag b) Lead c) Lag-Lead d) None of these

4) Slope of factor K in plotting BODE magnitude plot is
a) 0° b) ∞ c) 90° d) None of these

5) In a feedback system, lead compensator
a) Increase the margin of stability
b) Increase the system error constant to some extent
c) Speed up the transient response
d) All of these

6) A differentiator is usually not a part of a control system because it
a) Reduces damping b) Reduces the gain margin
c) Increases input noise d) Increases error

7) Which of the following is used to increase the bandwidth of a control system ?
a) Phase lag compensator b) Phase lead compensator
c) Phase lag-lead compensator d) All of these

P.T.O.

8) In a non-linear control system, limit cycle is self sustained oscillations of
   a) Variable amplitude b) Variable frequency
   c) Fixed frequency d) Fixed frequency and amplitude

9) The transfer function of the zero order hold is
   a) $1 - e^{TS}$ b) $(1 - e^{TS})/s$ c) $1 - e^{-TS}$ d) $(1 - e^{-TS})/s$

10) Addition of pole to the open loop transfer function has the effect of pulling root locus to
   a) Left b) Right c) Up d) Down

11) Which of the following should be done to make an unstable system stable ?
   a) The gain of the system should be decreased
   b) The gain of the system should be increased
   c) The number of poles to the loop transfer function should be increased
   d) The number of zeros to the loop transfer function should be increased

12) _____ increases the steady state accuracy.
   a) Integrator b) Differentiator
   c) Phase lead compensator d) Phase lag compensator

13) A phase lag lead network introduces _____ in the output.
   a) Lag at all frequencies
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14) Gain margin is the factor by which the gain of the system is increased to make it
   a) Stable b) Unstable
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15) The state transition matrix for the system $\dot{X} = AX$ with initial state X (0) is
   a) $(sI - A)^{-1}$ b) $e^{At} X(0)$
   c) Laplace inverse of $[(sI - A)^{-1}]$ d) Laplace inverse of $[(sI - A)^{-1} X(0)]$

16) A state variable approach can be applied to _____ systems.
   a) Time variant b) Non-Linear
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17) Lag compensation network normally consists of
   a) R and L element b) C and L element
   c) R and C element d) All of the above

18) The eigen values of a linear system are the location of
   a) Poles of the system b) Zeros of the system
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19) Leading compensator network is
   a) Equiliser b) High pass filter
   c) Low pass filter d) None of the above

20) _____ is used for improving transient response.
   a) Integrator b) Comparator
   c) Lag compensator d) Lead compensator

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SLR-EP – 339

Seat No.	

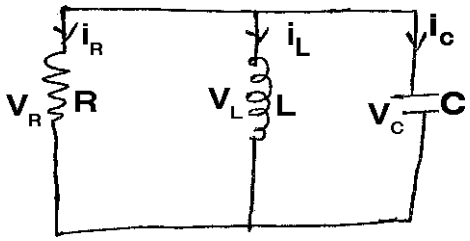
T.E. (E&E) (Part – II) Examination, 2016
CONTROL SYSTEM – II

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

a) Obtain the state equations for the zero input network shown below :



b) Draw the electrical equivalent of lead compensator and obtain its T/F.

c) Find Eigen vectors of the matrix $A = \begin{bmatrix} 0 & 1 \\ -2 & 3 \end{bmatrix}$.

d) Explain procedure to design lag compensator using frequency response.

e) Write the steps to design lead-lag compensator using Root Locus technique.

3. a) Consider a unity feedback system with open loop transfer function G(s) = K/s(s + 8). Design a lead compensator to meet the following specifications **20**

i) Percentage peak overshoot = 9.5%

ii) Natural frequency of oscillations ω_n = 12 rad/sec.

iii) Velocity error constant $K_v \geq 10$.

b) Obtain State Transition Matrix (STM) for the state model whose matrix A is given by $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$

OR

b) A linear time invariant system is described by the following differential equations

$$\frac{dx_1(t)}{dt} = -2x_1(t) + 4x_2(t)$$

$$\frac{dx_2(t)}{dt} = -2x_1(t) - x_2(t) + u(t)$$

Comment on controllability and stability of the system.

SECTION – II

4. Solve **any four** : **(4×5=20)**

a) State and explain different types of non linearities.

b) Explain in short about limit cycle.

c) Explain mapping between S-plane and Z-plane.

d) Explain block diagram of discrete control system.

e) Explain singular points in non linear control system.

5. Solve **any two** : **(2×10=20)**

a) Explain in detail the impulse sampling and data hold circuit.

b) Derive pulse T/F of cascaded elements.

c) Explain constructions of phase trajectories by isoclines method.

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SLR-EP – 339

Seat No.	

Set S

T.E. (E&E) (Part – II) Examination, 2016
CONTROL SYSTEM – II

Day and Date : Thursday, 24-11-2016 Max. 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.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) A state variable approach can be applied to _____ systems.
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   c) Linear and time invariant d) All of the above

2) Lag compensation network normally consists of
   a) R and L element b) C and L element
   c) R and C element d) All of the above

3) The eigen values of a linear system are the location of
   a) Poles of the system b) Zeros of the system
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4) Leading compensator network is
   a) Equiliser b) High pass filter
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5) _____ is used for improving transient response.
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   c) Lag compensator d) Lead compensator

6) In lag compensation network _____ is dominant.
   a) Pole b) Zero c) Both a) and b) d) None of the above

7) For a given gain constant K, the phase-lead compensator
   a) Reduce the slope of the magnitude curve in the entire range of frequency
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   c) Reduce the phase margin
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P.T.O.

8) Addition of zeros in transfer function causes _____ compensation.
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9) Slope of factor K in plotting BODE magnitude plot is
   a) 0° b) ∞ c) 90° d) None of these

10) In a feedback system, lead compensator
   a) Increase the margin of stability
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   d) All of these

11) A differentiator is usually not a part of a control system because it
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13) In a non-linear control system, limit cycle is self sustained oscillations of
   a) Variable amplitude b) Variable frequency
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   a) $1 - e^{TS}$ b) $(1 - e^{TS})/s$ c) $1 - e^{-TS}$ d) $(1 - e^{-TS})/s$

15) Addition of pole to the open loop transfer function has the effect of pulling root locus to
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   b) The gain of the system should be increased
   c) The number of poles to the loop transfer function should be increased
   d) The number of zeros to the loop transfer function should be increased

17) _____ increases the steady state accuracy.
   a) Integrator b) Differentiator
   c) Phase lead compensator d) Phase lag compensator

18) A phase lag lead network introduces _____ in the output.
   a) Lag at all frequencies
   b) Lag at high frequencies and lead at low frequencies
   c) Lag at low frequencies and lead at high frequencies
   d) None of the above

19) Gain margin is the factor by which the gain of the system is increased to make it
   a) Stable b) Unstable
   c) Oscillatory d) Exponential

20) The state transition matrix for the system $X^{\circ} = AX$ with initial state X (0) is
   a) $(sI - A)^{-1}$ b) $e^{At} X(0)$
   c) Laplace inverse of $[(sI - A)^{-1}]$ d) Laplace inverse of $[(sI - A)^{-1} X(0)]$

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SLR-EP – 339

Seat No.	

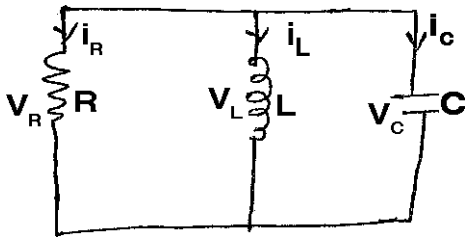
T.E. (E&E) (Part – II) Examination, 2016
CONTROL SYSTEM – II

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

SECTION – I

2. Solve **any four** : **(4×5=20)**

a) Obtain the state equations for the zero input network shown below :



b) Draw the electrical equivalent of lead compensator and obtain its T/F.

c) Find Eigen vectors of the matrix $A = \begin{bmatrix} 0 & 1 \\ -2 & 3 \end{bmatrix}$.

d) Explain procedure to design lag compensator using frequency response.

e) Write the steps to design lead-lag compensator using Root Locus technique.

3. a) Consider a unity feedback system with open loop transfer function $G(s) = K/s(s + 8)$. Design a lead compensator to meet the following specifications **20**

i) Percentage peak overshoot = 9.5%

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iii) Velocity error constant $K_v \geq 10$.

b) Obtain State Transition Matrix (STM) for the state model whose matrix A is given by $A = \begin{bmatrix} 0 & 1 \\ -2 & -3 \end{bmatrix}$

OR

b) A linear time invariant system is described by the following differential equations

$$\frac{dx_1(t)}{dt} = -2x_1(t) + 4x_2(t)$$

$$\frac{dx_2(t)}{dt} = -2x_1(t) - x_2(t) + u(t)$$

Comment on controllability and stability of the system.

SECTION – II

4. Solve **any four** : **(4×5=20)**

a) State and explain different types of non linearities.

b) Explain in short about limit cycle.

c) Explain mapping between S-plane and Z-plane.

d) Explain block diagram of discrete control system.

e) Explain singular points in non linear control system.

5. Solve **any two** : **(2×10=20)**

a) Explain in detail the impulse sampling and data hold circuit.

b) Derive pulse T/F of cascaded elements.

c) Explain constructions of phase trajectories by isoclines method.

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SLR-EP – 340

Seat No.	

Set **P**

T.E. (Part – II) (Electrical and Electronics Engg.) Examination, 2016
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Friday, 25-11-2016 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The length of LCALL instruction is _____ byte.
a) 2 b) 3 c) 4 d) 1

2) The address of DPH and DPL are _____ H and _____ H.
a) 83, 82 b) 16, 17 c) 84, 85 d) 64, 65

3) Which pin of port 3 is has an alternative function as read control signal for external data memory ?
a) P3.8 b) P3.3 c) P3.6 d) P3.7

4) The contents of the accumulator after execution of following instructions will be
MOV A,#2BH
ORL A,00H
a) 1B H b) 2B H c) 3B H d) 4B H

5) While interfacing PROM to 8051, if EA pin is kept high, then it access _____ on chip memory and _____ off chip memory.
a) 0000-0FFF and 1000-FFFF b) 0000-1FFF and 1FFF-FFFF
c) 0000-FFFF and 1111-FFFF d) None of these

6) What is the function of watchdog timer ?
a) The watchdog Timer is an external timer that resets the system if the software fails to operate properly
b) The watchdog Timer is an internal timer that sets the system if the software fails to operate properly
c) The watchdog Timer is an internal timer that resets the system if the software fails to operate properly
d) None of these

7) On power up the 8051 selects bank _____
   a) 0 b) 1 c) 2 d) 3
8) The total external data memory that can be interfaced to the 8051 is
   a) 32K b) 64K c) 128K d) 256K
9) SP of 8051 is of _____ wide and it is loaded with the default value of _____ after reset.
   a) 2 byte, 08H b) 8 bit, 07H c) 1 byte, 09H d) 8 bit, 06H
10) To access the data from on chip ROM the instruction used is _____
   a) MOV b) MOVX c) MOVC d) None of these
11) Which of the following statements will add the accumulator and Register 3 ?
   a) ADD @R3,@A b) ADD @R3,A
   c) ADD R3,A d) ADD A,R3
12) An alternate function of port pin P3.4 in the 8051 is
   a) Timer 1 b) Timer 0 c) Interrupt 0 d) Interrupt 1
13) I^2C is a standard designed by
   a) Intel b) Darras semiconductor
   c) NXP d) Atmel
14) In 8255, only bits of port C can be programmed in _____ mode.
   a) Mode 0 b) Mode 1 c) Mode 2 d) BSR
15) To select command register _____
   a) R/W = 0 b) R/W=1 c) RS=0 d) RS=1
16) To latch information presented to LCD's data pin is _____
   a) H-L pulse to R/W b) L-H pulse to R/W
   c) H-L pulse to E d) L-H pulse to E
17) MOV A, #56H
   MOV R1, #50H
   MOV 50H, #45H
   XCHD A, @R1
   What is the result at A, R1 ?
   a) 56H, 45H b) 45H, 50H c) 50H, 56H d) 45H, 56H
18) To clear LCD, _____ is moved to LCD.
   a) 06H b) 01H c) 30H d) 80H
19) Step size in ADC depends on
   a) V_{ref} b) V_{ref} and input channels
   c) Input channels only d) V_{ref}, V_{in}
20) In power factor control relay Power Factor (P.F.) is improved due to compensation of
   a) Reactive power b) Active power
   c) Apparent power d) None of these

_____

SLR-EP – 340

Seat No.	

T.E. (Part – II) (Electrical and Electronics Engg.) Examination, 2016
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Friday, 25-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Explain the functional pin diagram of 8051 Microcontroller.
   2) Explain the IE and IP register of 8051.
   3) How the program memory is organized in 8051 based system ?
   4) Describe the following instructions :
      a) SUBB A,# 124
      b) MOV @R0, #data
      c) DJNZ R1,800A
      d) INC DPTR.
   5) List out features of 8051 microcontroller.

3. Solve **any two** : **(2×10=20)**
   1) Explain all ports of 8051 with their internal structures.
   2) Draw and explain the architecture of 8051.
   3) Draw the 8051 connection to the 8255 and write a program to get data from PA and send it to both ports B and C.

SECTION – II

4. Write a short note on the following **(any four)** : **(4×5=20)**
   1) Microcontroller based real time clock DS 1307.
   2) Interfacing of 8255 with 8051.

Set P

3) 8 bit format of SCON register.
4) ADC interfacing with 8051.
5) SPI and I^2C interfacing with 8051.

5. Solve **any two** : **(2×10=20)**

1) Draw interfacing diagram of following :
   a) Seven segment LED to 8051.
   b) Microcontroller based power factor control relay.
2) Explain in detail pin description of LCD with neat diagram and write a program to display "WELCOME".
3) Interface DAC 0808 to 8051. Explain interfacing circuit and write a program to Generate i) Sine wave ii) Sawtooth.

SLR-EP – 340

Seat No.	

Set Q

T.E. (Part – II) (Electrical and Electronics Engg.) Examination, 2016
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Friday, 25-11-2016 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

***Instructions** : 1) **Assume** the suitable data **whenever** necessary.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) To latch information presented to LCD's data pin is _____
   a) H-L pulse to R/W b) L-H pulse to R/W
   c) H-L pulse to E d) L-H pulse to E

2) MOV A, #56H
   MOV R1, #50H
   MOV 50H, #45H
   XCHD A, @R1
   What is the result at A, R1 ?
   a) 56H, 45H b) 45H, 50H c) 50H, 56H d) 45H, 56H

3) To clear LCD, _____ is moved to LCD.
   a) 06H b) 01H c) 30H d) 80H

4) Step size in ADC depends on
   a) V_{ref} b) V_{ref} and input channels
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P.T.O.

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   d) None of these

12) On power up the 8051 selects bank _____
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14) SP of 8051 is of _____ wide and it is loaded with the default value of _____ after reset.
   a) 2 byte, 08H b) 8 bit, 07H c) 1 byte, 09H d) 8 bit, 06H

15) To access the data from on chip ROM the instruction used is _____
   a) MOV b) MOVX c) MOVC d) None of these

16) Which of the following statements will add the accumulator and Register 3 ?
   a) ADD @R3,@A b) ADD @R3,A
   c) ADD R3,A d) ADD A,R3

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18) I^2C is a standard designed by
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   a) Mode 0 b) Mode 1 c) Mode 2 d) BSR

20) To select command register _____
   a) R/W = 0 b) R/W=1 c) RS=0 d) RS=1

_____

SLR-EP – 340

Seat No.	

T.E. (Part – II) (Electrical and Electronics Engg.) Examination, 2016
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Friday, 25-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Explain the functional pin diagram of 8051 Microcontroller.
   2) Explain the IE and IP register of 8051.
   3) How the program memory is organized in 8051 based system ?
   4) Describe the following instructions :
      a) SUBB A,# 124
      b) MOV @R0, #data
      c) DJNZ R1,800A
      d) INC DPTR.
   5) List out features of 8051 microcontroller.

3. Solve **any two** : **(2×10=20)**
   1) Explain all ports of 8051 with their internal structures.
   2) Draw and explain the architecture of 8051.
   3) Draw the 8051 connection to the 8255 and write a program to get data from PA and send it to both ports B and C.

SECTION – II

4. Write a short note on the following **(any four)** : **(4×5=20)**
   1) Microcontroller based real time clock DS 1307.
   2) Interfacing of 8255 with 8051.

Set Q

3) 8 bit format of SCON register.
4) ADC interfacing with 8051.
5) SPI and I^2C interfacing with 8051.

5. Solve **any two** : **(2×10=20)**
   1) Draw interfacing diagram of following :
      a) Seven segment LED to 8051.
      b) Microcontroller based power factor control relay.
   2) Explain in detail pin description of LCD with neat diagram and write a program to display "WELCOME".
   3) Interface DAC 0808 to 8051. Explain interfacing circuit and write a program to Generate i) Sine wave ii) Sawtooth.

SLR-EP – 340

Seat No.	

Set **R**

T.E. (Part – II) (Electrical and Electronics Engg.) Examination, 2016
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Friday, 25-11-2016 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) Which of the following statements will add the accumulator and Register 3 ?
   a) ADD @R3,@A b) ADD @R3,A
   c) ADD R3,A d) ADD A,R3

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

3) I^2C is a standard designed by
   a) Intel b) Darras semiconductor
   c) NXP d) Atmel

4) In 8255, only bits of port C can be programmed in _____ mode.
   a) Mode 0 b) Mode 1 c) Mode 2 d) BSR

5) To select command register _____
   a) R/W = 0 b) R/W=1 c) RS=0 d) RS=1

6) To latch information presented to LCD's data pin is _____
   a) H-L pulse to R/W b) L-H pulse to R/W
   c) H-L pulse to E d) L-H pulse to E

7) MOV A, #56H
   MOV R1, #50H
   MOV 50H, #45H
   XCHD A, @R1
   What is the result at A, R1 ?
   a) 56H, 45H b) 45H, 50H c) 50H, 56H d) 45H, 56H

P.T.O.

8) To clear LCD, _____ is moved to LCD.
   a) 06H b) 01H c) 30H d) 80H

9) Step size in ADC depends on
   a) V_{ref} b) V_{ref} and input channels
   c) Input channels only d) V_{ref}, V_{in}

10) In power factor control relay Power Factor (P.F.) is improved due to compensation of
   a) Reactive power b) Active power
   c) Apparent power d) None of these

11) The length of LCALL instruction is _____ byte.
   a) 2 b) 3 c) 4 d) 1

12) The address of DPH and DPL are _____ H and _____ H.
   a) 83, 82 b) 16, 17 c) 84, 85 d) 64, 65

13) Which pin of port 3 is has an alternative function as read control signal for external data memory ?
   a) P3.8 b) P3.3 c) P3.6 d) P3.7

14) The contents of the accumulator after execution of following instructions will be
   MOV A,#2BH
   ORL A,00H
   a) 1B H b) 2B H c) 3B H d) 4B H

15) While interfacing PROM to 8051, if EA pin is kept high, then it access _____ on chip memory and _____ off chip memory.
   a) 0000-0FFF and 1000-FFFF b) 0000-1FFF and 1FFF-FFFF
   c) 0000-FFFF and 1111-FFFF d) None of these

16) What is the function of watchdog timer ?
   a) The watchdog Timer is an external timer that resets the system if the software fails to operate properly
   b) The watchdog Timer is an internal timer that sets the system if the software fails to operate properly
   c) The watchdog Timer is an internal timer that resets the system if the software fails to operate properly
   d) None of these

17) On power up the 8051 selects bank _____
   a) 0 b) 1 c) 2 d) 3

18) The total external data memory that can be interfaced to the 8051 is
   a) 32K b) 64K c) 128K d) 256K

19) SP of 8051 is of _____ wide and it is loaded with the default value of _____ after reset.
   a) 2 byte, 08H b) 8 bit, 07H c) 1 byte, 09H d) 8 bit, 06H

20) To access the data from on chip ROM the instruction used is _____
   a) MOV b) MOVX c) MOVC d) None of these

_____

SLR-EP – 340

Seat No.	

T.E. (Part – II) (Electrical and Electronics Engg.) Examination, 2016
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Friday, 25-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×5=20)**
   1) Explain the functional pin diagram of 8051 Microcontroller.
   2) Explain the IE and IP register of 8051.
   3) How the program memory is organized in 8051 based system ?
   4) Describe the following instructions :
      a) SUBB A,# 124
      b) MOV @R0, #data
      c) DJNZ R1,800A
      d) INC DPTR.
   5) List out features of 8051 microcontroller.

3. Solve **any two** : **(2×10=20)**
   1) Explain all ports of 8051 with their internal structures.
   2) Draw and explain the architecture of 8051.
   3) Draw the 8051 connection to the 8255 and write a program to get data from PA and send it to both ports B and C.

SECTION – II

4. Write a short note on the following **(any four)** : **(4×5=20)**
   1) Microcontroller based real time clock DS 1307.
   2) Interfacing of 8255 with 8051.

Set R

3) 8 bit format of SCON register.
4) ADC interfacing with 8051.
5) SPI and I^2C interfacing with 8051.

5. Solve **any two** : **(2×10=20)**
   1) Draw interfacing diagram of following :
      a) Seven segment LED to 8051.
      b) Microcontroller based power factor control relay.
   2) Explain in detail pin description of LCD with neat diagram and write a program to display "WELCOME".
   3) Interface DAC 0808 to 8051. Explain interfacing circuit and write a program to Generate i) Sine wave ii) Sawtooth.

SLR-EP – 340

Seat No.	

Set **S**

T.E. (Part – II) (Electrical and Electronics Engg.) Examination, 2016
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Friday, 25-11-2016 Total Marks : 100
Time : 10.00 a.m. to 1.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) What is the function of watchdog timer ?
   a) The watchdog Timer is an external timer that resets the system if the software fails to operate properly
   b) The watchdog Timer is an internal timer that sets the system if the software fails to operate properly
   c) The watchdog Timer is an internal timer that resets the system if the software fails to operate properly
   d) None of these

2) On power up the 8051 selects bank _____
   a) 0 b) 1 c) 2 d) 3

3) The total external data memory that can be interfaced to the 8051 is
   a) 32K b) 64K c) 128K d) 256K

4) SP of 8051 is of _____ wide and it is loaded with the default value of _____ after reset.
   a) 2 byte, 08H b) 8 bit, 07H c) 1 byte, 09H d) 8 bit, 06H

5) To access the data from on chip ROM the instruction used is _____
   a) MOV b) MOVX c) MOVC d) None of these

6) Which of the following statements will add the accumulator and Register 3 ?
   a) ADD @R3,@A b) ADD @R3,A
   c) ADD R3,A d) ADD A,R3

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

8) I^2C is a standard designed by
   a) Intel b) Darras semiconductor
   c) NXP d) Atmel

9) In 8255, only bits of port C can be programmed in _____ mode.
   a) Mode 0 b) Mode 1 c) Mode 2 d) BSR

10) To select command register _____
   a) R/W = 0 b) R/W=1 c) RS=0 d) RS=1

11) To latch information presented to LCD's data pin is _____
   a) H-L pulse to R/W b) L-H pulse to R/W
   c) H-L pulse to E d) L-H pulse to E

12) MOV A, #56H
   MOV R1, #50H
   MOV 50H, #45H
   XCHD A, @R1
   What is the result at A, R1 ?
   a) 56H, 45H b) 45H, 50H c) 50H, 56H d) 45H, 56H

13) To clear LCD, _____ is moved to LCD.
   a) 06H b) 01H c) 30H d) 80H

14) Step size in ADC depends on
   a) V_{ref} b) V_{ref} and input channels
   c) Input channels only d) V_{ref}, V_{in}

15) In power factor control relay Power Factor (P.F.) is improved due to compensation of
   a) Reactive power b) Active power
   c) Apparent power d) None of these

16) The length of LCALL instruction is _____ byte.
   a) 2 b) 3 c) 4 d) 1

17) The address of DPH and DPL are _____ H and _____ H.
   a) 83, 82 b) 16, 17 c) 84, 85 d) 64, 65

18) Which pin of port 3 is has an alternative function as read control signal for external data memory ?
   a) P3.8 b) P3.3 c) P3.6 d) P3.7

19) The contents of the accumulator after execution of following instructions will be
   MOV A,#2BH
   ORL A,00H
   a) 1B H b) 2B H c) 3B H d) 4B H

20) While interfacing PROM to 8051, if EA pin is kept high, then it access _____ on chip memory and _____ off chip memory.
   a) 0000-0FFF and 1000-FFFF b) 0000-1FFF and 1FFF-FFFF
   c) 0000-FFFF and 1111-FFFF d) None of these

_____

SLR-EP – 340

Seat No.	

T.E. (Part – II) (Electrical and Electronics Engg.) Examination, 2016
MICROCONTROLLER AND ITS APPLICATIONS

Day and Date : Friday, 25-11-2016 Marks : 80
Time : 10.00 a.m. to 1.00 p.m.

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

SECTION – I

2. Solve **any four** : **(4×5=20)**

   1) Explain the functional pin diagram of 8051 Microcontroller.
   2) Explain the IE and IP register of 8051.
   3) How the program memory is organized in 8051 based system ?
   4) Describe the following instructions :
      a) SUBB A,# 124
      b) MOV @R0, #data
      c) DJNZ R1,800A
      d) INC DPTR.
   5) List out features of 8051 microcontroller.

3. Solve **any two** : **(2×10=20)**

   1) Explain all ports of 8051 with their internal structures.
   2) Draw and explain the architecture of 8051.
   3) Draw the 8051 connection to the 8255 and write a program to get data from PA and send it to both ports B and C.

SECTION – II

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

   1) Microcontroller based real time clock DS 1307.
   2) Interfacing of 8255 with 8051.

Set S

3) 8 bit format of SCON register.
4) ADC interfacing with 8051.
5) SPI and I^2C interfacing with 8051.

5. Solve **any two** : **(2×10=20)**
   1) Draw interfacing diagram of following :
      a) Seven segment LED to 8051.
      b) Microcontroller based power factor control relay.
   2) Explain in detail pin description of LCD with neat diagram and write a program to display "WELCOME".
   3) Interface DAC 0808 to 8051. Explain interfacing circuit and write a program to Generate i) Sine wave ii) Sawtooth.

SLR-EP – 341

Seat No.	

Set P

T.E. (Part – II) (Electrical & Electronics Engg.) Examination, 2016
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 26-11-2016 Total Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***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 :

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 process by which goods and services are created.
   a) Marketing b) Production
   c) Advertising d) Selling

3) _____ communication can occurs in a face to face meeting of two people or in managers in meeting.
   a) Oral b) Written
   c) Downward d) Upward

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

5) _____ is the greatest importance at the supervisory level.
   a) Technical skill b) Human skill
   c) Analytical skill d) None of these

6) In _____ concept product enjoys the supreme importance.
   a) Selling b) Marketing
   c) Advertising d) Distribution

P.T.O.

7) _____ 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

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) _____ 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) The art of getting work done through people is called as
   a) Business
   b) Management
   c) Industry
   d) Ownership

_____

SLR-EP – 341

Seat No.	

T.E. (Part – II) (Electrical & Electronics Engg.) Examination, 2016
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Solve **any four** from Q.No. 2 to Q.No. 6.

2. a) Explain the evolution of scientific management. **5**

   b) Explain various types of production system. **5**

3. a) What is financial management ? What are the function of financial management ? Explain briefly. **5**

   b) Explain the rate of return in accounting. **5**

4. a) Explain the significance of Human resource, what are the duties of HR manager. **5**

   b) Explain the impact of liberalization and globalization. **5**

5. a) What are the factors to be considered in selecting plant location ? **5**

   b) Explain the performance appraisal in Human resource. **5**

6. Write short note on **any two** : **(2×5=10)**

   a) Demand and product value in marketing

   b) Payback period

   c) Taxation-principles.

Set P

SLR-EP – 341

Seat No.	

Set Q

T.E. (Part – II) (Electrical & Electronics Engg.) Examination, 2016
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 26-11-2016 Total Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***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 :

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) The art of getting work done through people is called as
   a) Business b) Management
   c) Industry d) Ownership

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) _____ 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

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

P.T.O.

6) _____ is the process by which goods and services are created.
   a) Marketing b) Production
   c) Advertising d) Selling

7) _____ communication can occurs in a face to face meeting of two people or in managers in meeting.
   a) Oral b) Written
   c) Downward d) Upward

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 greatest importance at the supervisory level.
   a) Technical skill b) Human skill
   c) Analytical skill d) None of these

10) In _____ concept product enjoys the supreme importance.
   a) Selling b) Marketing
   c) Advertising d) Distribution

_____

SLR-EP – 341

Seat No.	

T.E. (Part – II) (Electrical & Electronics Engg.) Examination, 2016
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Solve **any four** from Q.No. 2 to Q.No. 6.

2. a) Explain the evolution of scientific management. **5**

   b) Explain various types of production system. **5**

3. a) What is financial management ? What are the function of financial management ? Explain briefly. **5**

   b) Explain the rate of return in accounting. **5**

4. a) Explain the significance of Human resource, what are the duties of HR manager. **5**

   b) Explain the impact of liberalization and globalization. **5**

5. a) What are the factors to be considered in selecting plant location ? **5**

   b) Explain the performance appraisal in Human resource. **5**

6. Write short note on **any two** : **(2×5=10)**

   a) Demand and product value in marketing

   b) Payback period

   c) Taxation-principles.

Set Q

Set Q

SLR-EP – 341

Seat No.	

Set R

T.E. (Part – II) (Electrical & Electronics Engg.) Examination, 2016
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 26-11-2016 Total Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***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 :

1) _____ is the greatest importance at the supervisory level.
   a) Technical skill b) Human skill
   c) Analytical skill d) None of these

2) In _____ concept product enjoys the supreme importance.
   a) Selling b) Marketing
   c) Advertising d) Distribution

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) The art of getting work done through people is called as
   a) Business b) Management
   c) Industry d) Ownership

5) _____ communication can occurs in a face to face meeting of two people or in managers in meeting.
   a) Oral b) Written
   c) Downward d) Upward

P.T.O.

6) _____ 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

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 process by which goods and services are created.
   a) Marketing b) Production
   c) Advertising d) Selling

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) _____ 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-EP – 341

Seat No.	

T.E. (Part – II) (Electrical & Electronics Engg.) Examination, 2016
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Solve **any four** from Q.No. 2 to Q.No. 6.

2. a) Explain the evolution of scientific management. **5**

   b) Explain various types of production system. **5**

3. a) What is financial management ? What are the function of financial management ? Explain briefly. **5**

   b) Explain the rate of return in accounting. **5**

4. a) Explain the significance of Human resource, what are the duties of HR manager. **5**

   b) Explain the impact of liberalization and globalization. **5**

5. a) What are the factors to be considered in selecting plant location ? **5**

   b) Explain the performance appraisal in Human resource. **5**

6. Write short note on **any two** : **(2×5=10)**

   a) Demand and product value in marketing

   b) Payback period

   c) Taxation-principles.

Set R

Set R

SLR-EP – 341

Seat No.	

Set S

T.E. (Part – II) (Electrical & Electronics Engg.) Examination, 2016
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 26-11-2016 Total Marks : 50
Time : 10.00 a.m. to 12.00 Noon

***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 :

1) _____ communication can occurs in a face to face meeting of two people or in managers in meeting.
   a) Oral b) Written
   c) Downward d) Upward

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) _____ is the greatest importance at the supervisory level.
   a) Technical skill b) Human skill
   c) Analytical skill d) None of these

4) In _____ concept product enjoys the supreme importance.
   a) Selling b) Marketing
   c) Advertising d) Distribution

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

P.T.O.

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) _____ 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) The art of getting work done through people is called as
   a) Business b) Management
   c) Industry d) Ownership

9) 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

10) _____ is the process by which goods and services are created.
   a) Marketing b) Production
   c) Advertising d) Selling

_____

SLR-EP – 341

Seat No.	

T.E. (Part – II) (Electrical & Electronics Engg.) Examination, 2016
Self Learning (Technical)
INDUSTRIAL MANAGEMENT

Day and Date : Saturday, 26-11-2016 Marks : 40
Time : 10.00 a.m. to 12.00 Noon

Solve **any four** from Q.No. 2 to Q.No. 6.

2. a) Explain the evolution of scientific management. **5**

   b) Explain various types of production system. **5**

3. a) What is financial management ? What are the function of financial management ? Explain briefly. **5**

   b) Explain the rate of return in accounting. **5**

4. a) Explain the significance of Human resource, what are the duties of HR manager. **5**

   b) Explain the impact of liberalization and globalization. **5**

5. a) What are the factors to be considered in selecting plant location ? **5**

   b) Explain the performance appraisal in Human resource. **5**

6. Write short note on **any two** : **(2×5=10)**

   a) Demand and product value in marketing

   b) Payback period

   c) Taxation-principles.

Set S

Set S

SLR-EP – 342

Seat No.	

Set **P**

B.E. (Electrical & Electronics Engg.) (Part – I) (New) Examination, 2016
INDUSTRIAL DRIVES & CONTROL

Day and Date : Tuesday, 29-11-2016 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) Which braking is not possible in series motor ?
A) Regenerative braking B) Dynamic braking
C) Counter current braking D) Rheostat braking

2) In industries which electrical braking is preferred ?
A) Regenerative braking B) Plugging
C) Dynamic braking D) None of the above

3) The slip of an induction motor during DC rheostatic braking is
A) 2 – s B) 1 – s C) 2 + s D) s

4) Speed control by variation of field flux results in
A) Constant power drive B) Constant torque drive
C) Variable power drive D) None of the above

5) For an IM to operate in braking region slip should be always
A) less than zero B) greater than 1
C) is equal to 1 D) none of these

6) The power input to a 3- Φ induction motor is 60 kW and stator loss is 1 kW the rotor cu loss per phase is
A) Slip × 50/3 B) Slip × 59/3 C) Slip × 69/3 D) 1

7) Power factor in case of reluctance motor is
A) nearly unity B) always leading
C) 0.8 D) 0.3 to 0.4

8) A reluctance motor on over-load runs as
A) Synchronous motor B) Induction motor
C) Either of the two D) None of these

9) For high frequency choppers the device that is preferred is
A) Thyristor B) TRIAC C) Transistor D) GTO

10) A 3-phase full converter is
A) Single quadrant converter B) 4 quadrant converter
C) 3-pulse converter D) 6 pulse converter

11) A chopper can be used on
A) PWM only B) FM only
C) AM only D) Both PWM and FM

12) A chooper 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 2Ns D) –2Ns to 2Ns

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

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SLR-EP – 342

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (New) Examination, 2016
INDUSTRIAL DRIVES & CONTROL

Day and Date : Tuesday, 29-11-2016 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, 10.5A, 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
      a) Speed load characteristics.
      b) Speed torque characteristics.
   d) What are the different methods of speed control of D.C. Motors and explain any one.
   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) Draw and explain speed torque curves of single phase half controlled rectifier fed separately excited D.C. motor.

   b) Explain the induction motor torque slip characteristics.

   c) Explain the operation of solar and battery operated drive.

   d) Explain the operation of VSI fed IM speed control.

   e) Explain the operation of stepper 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 variable frequency control of multiple synchronous motors.

   c) Explain the operation switched reluctance motor drive circuit in motoring and regenerative braking operation.

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SLR-EP – 342

Seat No.	

Set **Q**

B.E. (Electrical & Electronics Engg.) (Part – I) (New) Examination, 2016
INDUSTRIAL DRIVES & CONTROL

Day and Date : Tuesday, 29-11-2016 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) 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 2Ns D) –2Ns to 2Ns

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) Which braking is not possible in series motor ?
A) Regenerative braking B) Dynamic braking
C) Counter current braking D) Rheostat braking

7) In industries which electrical braking is preferred ?
A) Regenerative braking B) Plugging
C) Dynamic braking D) None of the above

P.T.O.

8) The slip of an induction motor during DC rheostatic braking is
A) 2 – s B) 1 – s C) 2 + s D) s

9) Speed control by variation of field flux results in
A) Constant power drive B) Constant torque drive
C) Variable power drive D) None of the above

10) For an IM to operate in braking region slip should be always
A) less than zero B) greater than 1
C) is equal to 1 D) none of these

11) The power input to a 3- Φ induction motor is 60 kW and stator loss is 1 kW the rotor cu loss per phase is
A) Slip × 50/3 B) Slip × 59/3 C) Slip × 69/3 D) 1

12) Power factor in case of reluctance motor is
A) nearly unity B) always leading
C) 0.8 D) 0.3 to 0.4

13) A reluctance motor on over-load runs as
A) Synchronous motor B) Induction motor
C) Either of the two D) None of these

14) For high frequency choppers the device that is preferred is
A) Thyristor B) TRIAC C) Transistor D) GTO

15) A 3-phase full converter is
A) Single quadrant converter B) 4 quadrant converter
C) 3-pulse converter D) 6 pulse converter

16) A chopper can be used on
A) PWM only B) FM only
C) AM only D) Both PWM and FM

17) A chooper 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

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SLR-EP – 342

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (New) Examination, 2016
INDUSTRIAL DRIVES & CONTROL

Day and Date : Tuesday, 29-11-2016 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, 10.5A, 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
      a) Speed load characteristics.
      b) Speed torque characteristics.
   d) What are the different methods of speed control of D.C. Motors and explain any one.
   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) Draw and explain speed torque curves of single phase half controlled rectifier fed separately excited D.C. motor.

   b) Explain the induction motor torque slip characteristics.

   c) Explain the operation of solar and battery operated drive.

   d) Explain the operation of VSI fed IM speed control.

   e) Explain the operation of stepper 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 variable frequency control of multiple synchronous motors.

   c) Explain the operation switched reluctance motor drive circuit in motoring and regenerative braking operation.

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SLR-EP – 342

Seat No.	

Set **R**

B.E. (Electrical & Electronics Engg.) (Part – I) (New) Examination, 2016
INDUSTRIAL DRIVES & CONTROL

Day and Date : Tuesday, 29-11-2016 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) A chopper can be used on
A) PWM only B) FM only
C) AM only D) Both PWM and FM

2) A chooper 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 2Ns D) –2Ns to 2Ns

8) Damper winding is required in a
A) Self control mode B) Separate control mode
C) Both A and B D) None of these

P.T.O.

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) Which braking is not possible in series motor ?
   A) Regenerative braking B) Dynamic braking
   C) Counter current braking D) Rheostat braking

12) In industries which electrical braking is preferred ?
   A) Regenerative braking B) Plugging
   C) Dynamic braking D) None of the above

13) The slip of an induction motor during DC rheostatic braking is
   A) 2 – s B) 1 – s C) 2 + s D) s

14) Speed control by variation of field flux results in
   A) Constant power drive B) Constant torque drive
   C) Variable power drive D) None of the above

15) For an IM to operate in braking region slip should be always
   A) less than zero B) greater than 1
   C) is equal to 1 D) none of these

16) The power input to a 3- Φ induction motor is 60 kW and stator loss is 1 kW the rotor cu loss per phase is
   A) Slip × 50/3 B) Slip × 59/3 C) Slip × 69/3 D) 1

17) Power factor in case of reluctance motor is
   A) nearly unity B) always leading
   C) 0.8 D) 0.3 to 0.4

18) A reluctance motor on over-load runs as
   A) Synchronous motor B) Induction motor
   C) Either of the two D) None of these

19) For high frequency choppers the device that is preferred is
   A) Thyristor B) TRIAC C) Transistor D) GTO

20) A 3-phase full converter is
   A) Single quadrant converter B) 4 quadrant converter
   C) 3-pulse converter D) 6 pulse converter

SLR-EP – 342

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (New) Examination, 2016
INDUSTRIAL DRIVES & CONTROL

Day and Date : Tuesday, 29-11-2016 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, 10.5A, 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
      a) Speed load characteristics.
      b) Speed torque characteristics.
   d) What are the different methods of speed control of D.C. Motors and explain any one.
   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) Draw and explain speed torque curves of single phase half controlled rectifier fed separately excited D.C. motor.

   b) Explain the induction motor torque slip characteristics.

   c) Explain the operation of solar and battery operated drive.

   d) Explain the operation of VSI fed IM speed control.

   e) Explain the operation of stepper 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 variable frequency control of multiple synchronous motors.

   c) Explain the operation switched reluctance motor drive circuit in motoring and regenerative braking operation.

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SLR-EP – 342

Seat No.	

Set **S**

B.E. (Electrical & Electronics Engg.) (Part – I) (New) Examination, 2016
INDUSTRIAL DRIVES & CONTROL

Day and Date : Tuesday, 29-11-2016 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 power input to a 3- Φ induction motor is 60 kW and stator loss is 1 kW the rotor cu loss per phase is
A) Slip × 50/3 B) Slip × 59/3 C) Slip × 69/3 D) 1

2) Power factor in case of reluctance motor is
A) nearly unity B) always leading
C) 0.8 D) 0.3 to 0.4

3) A reluctance motor on over-load runs as
A) Synchronous motor B) Induction motor
C) Either of the two D) None of these

4) For high frequency choppers the device that is preferred is
A) Thyristor B) TRIAC C) Transistor D) GTO

5) A 3-phase full converter is
A) Single quadrant converter B) 4 quadrant converter
C) 3-pulse converter D) 6 pulse converter

6) A chopper can be used on
A) PWM only B) FM only
C) AM only D) Both PWM and FM

7) A chooper where voltage as well as current remain positive is known as
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8) The maximum torque does not depends on the
A) Voltage B) Stator resistance
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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
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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
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13) Damper winding is required in a
A) Self control mode B) Separate control mode
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14) A drive consisting of load side converter and S.M is known as
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15) In case belt conveyors
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18) The slip of an induction motor during DC rheostatic braking is
A) 2 – s B) 1 – s C) 2 + s D) s

19) Speed control by variation of field flux results in
A) Constant power drive B) Constant torque drive
C) Variable power drive D) None of the above

20) For an IM to operate in braking region slip should be always
A) less than zero B) greater than 1
C) is equal to 1 D) none of these

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SLR-EP – 342

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (New) Examination, 2016
INDUSTRIAL DRIVES & CONTROL

Day and Date : Tuesday, 29-11-2016 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, 10.5A, 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
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      Draw and explain
      a) Speed load characteristics.
      b) Speed torque characteristics.
   d) What are the different methods of speed control of D.C. Motors and explain any one.
   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) Draw and explain speed torque curves of single phase half controlled rectifier fed separately excited D.C. motor.

   b) Explain the induction motor torque slip characteristics.

   c) Explain the operation of solar and battery operated drive.

   d) Explain the operation of VSI fed IM speed control.

   e) Explain the operation of stepper 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 variable frequency control of multiple synchronous motors.

   c) Explain the operation switched reluctance motor drive circuit in motoring and regenerative braking operation.

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SLR-EP – 343

Seat No.	

Set P

B.E. (Part – I) (Electrical & Electronics Engineering) Examination, 2016
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Thursday, 1-12-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) Cooling water is required for following equipment in ammonia absorption plant
A) Condenser B) Evaporator
C) Absorber D) Condenser, absorber and separator

2) The bank of tubes at the back of domestic refrigerator is
A) Condenser tubes B) Evaporator tubes
C) Refrigerant cooling tubes D) Capillary tubes

3) A train has a schedule speed of 36 km per hour on a level track. If the distance between the stations is 2 km and the stoppage is 30 seconds the actual time of run will be
A) 260 seconds B) 230 seconds C) 200 seconds D) 170 seconds

4) Melting temperature of tungsten is
A) 2000°K B) 2500°K C) 3655°K D) 2655°K

5) In an electric room heat convector the method of heating used is
A) Arc heating B) Resistance heating
C) Induction heating D) Dielectric heating

6) For the same wastage which lamp is cheapest ?
A) Sodium vapor lamp B) Mercury vapor lamp
C) Fluorescent tube D) GLS lamps

7) A vapour absorption refrigerator uses _____ as a refrigerant.
A) Water B) Aqua-ammonia
C) Freon D) Ammonia

8) The temperature inside a furnace is usually measured by which of the following ?
A) Optical pyrometer B) Mercury thermometer
C) Alcohol thermometer D) None of the above

9) In a vapour compression system, the condition of refrigerant before entering the expansion or throttle valve is
   A) High pressure saturated liquid B) Wet vapour
   C) Very wet vapour D) Dry vapour

10) Maintenance requirements are least in case of
   A) steam locomotives B) diesel locomotives
   C) electric locomotives D) equal maintenance

11) Which of the following lamp gives nearly monochromatic light ?
   A) Sodium vapor lamp B) GLS lamp
   C) Tube light D) Mercury vapor lamp

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) If the coefficient of adhesion on dry rails 0.25. Which of the following could be the value for wet rails ?
   A) 0.32 B) 0.25 C) 0.245 D) 0.15

14) Area under the curve represents
   A) distance traveled B) average acceleration
   C) net acceleration D) average speed

15) Which of the following factor affects specific energy consumption ?
   A) Distance between stops
   B) Gradient
   C) Retardation and acceleration values
   D) All of the above

16) Free running and coasting periods arc generally long in ease if
   A) urban service B) sub-urban service
   C) main-line service D) all of the above

17) In Kando system
   A) single phase supply is converted into three phase system
   B) single phase ac is converted into dc
   C) three phase ac is converted into dc
   D) dc supply is due to run dc motors

18) In induction heating _____ is abnormally high.
   A) phase angle B) frequency C) current D) voltage

19) Unit of luminous flux is
   A) lux B) lumens C) candela D) voltage

20) A composite system consists of
   A) a combination of diesel engine and dc series motor
   B) a combination of diesel engine and ac single phase motor
   C) single phase power received is converted into dc or three phase power ac system
   D) use of combination of dc and ac motors on the same locomotive

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SLR-EP – 343

Seat No.	

B.E. (Part – I) (Electrical & Electronics Engineering) Examination, 2016
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Thursday, 1-12-2016 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) Explain vapour absorption refrigeration system.
   2) With neat sketches explain seam welding.
   3) With neat sketch draw following lamps,
      Sodium vapour lamp, fluorescent tube.
   4) Explain the following terms,
      Candle power, space height ratio, utilization factor, maintenance factor, waste light factor.
   5) Draw and explain Ajax Watt furnace.

3. Solve **any two** : **20**
   1) Write short note on Photometry and Radiometry.
   2) With neat sketch describe the electric circuit of refrigerator.
   3) Explain the transformer used in an electric heating and derive the condition for maximum output.

SECTION – II

4. Solve **any four** : **20**
   1) Draw and explain discharging operation of Battery in EV.
   2) Explain suitability of DC series motor for traction work.
   3) Explain speed time curve in an Electric traction.
   4) What are advantages and disadvantages of Electric traction ?
   5) Explain different system of track electrification.

Set P

5. Solve **any two** : **20**

   1) Explain series parallel control of traction motor.

   2) An electric train is weighing 100 tonnes has a rotational interia 10%. Distance between two stop is 2.5 km and trains have an average speed of 50 kmph. The acceleration and retardation are 1 kmphps and 2 kmphps respectively. Track has an up gradient of 1%, train resistance is 40 N/tonne and efficiency of gearing and motor system is 60%.

      Determine :

      i) maximum power at driving axle,
      ii) total energy consumption,
      iii) specific energy consumption.

      Assume Trapezoidal speed-time curve.

   3) Derive specific energy output from speed-time curve.

SLR-EP – 343

Seat No.	

Set **Q**

B.E. (Part – I) (Electrical & Electronics Engineering) Examination, 2016
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Thursday, 1-12-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) Free running and coasting periods arc generally long in ease if
A) urban service B) sub-urban service
C) main-line service D) all of the above

2) In Kando system
A) single phase supply is converted into three phase system
B) single phase ac is converted into dc
C) three phase ac is converted into dc
D) dc supply is due to run dc motors

3) In induction heating _____ is abnormally high.
A) phase angle B) frequency C) current D) voltage

4) Unit of luminous flux is
A) lux B) lumens C) candela D) voltage

5) A composite system consists of
A) a combination of diesel engine and dc series motor
B) a combination of diesel engine and ac single phase motor
C) single phase power received is converted into dc or three phase power ac system
D) use of combination of dc and ac motors on the same locomotive

6) Cooling water is required for following equipment in ammonia absorption plant
A) Condenser B) Evaporator
C) Absorber D) Condenser, absorber and separator

7) The bank of tubes at the back of domestic refrigerator is
A) Condenser tubes B) Evaporator tubes
C) Refrigerant cooling tubes D) Capillary tubes

8) A train has a schedule speed of 36 km per hour on a level track. If the distance between the stations is 2 km and the stoppage is 30 seconds the actual time of run will be
A) 260 seconds B) 230 seconds C) 200 seconds D) 170 seconds

9) Melting temperature of tungsten is
A) 2000°K B) 2500°K C) 3655°K D) 2655°K

10) In an electric room heat convector the method of heating used is
A) Arc heating B) Resistance heating
C) Induction heating D) Dielectric heating

11) For the same wastage which lamp is cheapest ?
A) Sodium vapor lamp B) Mercury vapor lamp
C) Fluorescent tube D) GLS lamps

12) A vapour absorption refrigerator uses _____ as a refrigerant.
A) Water B) Aqua-ammonia
C) Freon D) Ammonia

13) The temperature inside a furnace is usually measured by which of the following ?
A) Optical pyrometer B) Mercury thermometer
C) Alcohol thermometer D) None of the above

14) In a vapour compression system, the condition of refrigerant before entering the expansion or throttle valve is
A) High pressure saturated liquid B) Wet vapour
C) Very wet vapour D) Dry vapour

15) Maintenance requirements are least in case of
A) steam locomotives B) diesel locomotives
C) electric locomotives D) equal maintenance

16) Which of the following lamp gives nearly monochromatic light ?
A) Sodium vapor lamp B) GLS lamp
C) Tube light D) Mercury vapor lamp

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) If the coefficient of adhesion on dry rails 0.25. Which of the following could be the value for wet rails ?
A) 0.32 B) 0.25 C) 0.245 D) 0.15

19) Area under the curve represents
A) distance traveled B) average acceleration
C) net acceleration D) average speed

20) Which of the following factor affects specific energy consumption ?
A) Distance between stops
B) Gradient
C) Retardation and acceleration values
D) All of the above

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SLR-EP – 343

Seat No.	

B.E. (Part – I) (Electrical & Electronics Engineering) Examination, 2016
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Thursday, 1-12-2016 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) Explain vapour absorption refrigeration system.
   2) With neat sketches explain seam welding.
   3) With neat sketch draw following lamps,
      Sodium vapour lamp, fluorescent tube.
   4) Explain the following terms,
      Candle power, space height ratio, utilization factor, maintenance factor, waste light factor.
   5) Draw and explain Ajax Watt furnace.

3. Solve **any two** : **20**
   1) Write short note on Photometry and Radiometry.
   2) With neat sketch describe the electric circuit of refrigerator.
   3) Explain the transformer used in an electric heating and derive the condition for maximum output.

SECTION – II

4. Solve **any four** : **20**
   1) Draw and explain discharging operation of Battery in EV.
   2) Explain suitability of DC series motor for traction work.
   3) Explain speed time curve in an Electric traction.
   4) What are advantages and disadvantages of Electric traction ?
   5) Explain different system of track electrification.

Set Q

5. Solve **any two** : **20**

   1) Explain series parallel control of traction motor.

   2) An electric train is weighing 100 tonnes has a rotational interia 10%. Distance between two stop is 2.5 km and trains have an average speed of 50 kmph. The acceleration and retardation are 1 kmphps and 2 kmphps respectively. Track has an up gradient of 1%, train resistance is 40 N/tonne and efficiency of gearing and motor system is 60%.

      Determine :

      i) maximum power at driving axle,
      ii) total energy consumption,
      iii) specific energy consumption.

      Assume Trapezoidal speed-time curve.

   3) Derive specific energy output from speed-time curve.

SLR-EP – 343

Seat No.	

Set **R**

B.E. (Part – I) (Electrical & Electronics Engineering) Examination, 2016
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Thursday, 1-12-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) Which of the following lamp gives nearly monochromatic light ?
A) Sodium vapor lamp B) GLS lamp
C) Tube light D) Mercury vapor lamp

2) 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) If the coefficient of adhesion on dry rails 0.25. Which of the following could be the value for wet rails ?
A) 0.32 B) 0.25 C) 0.245 D) 0.15

4) Area under the curve represents
A) distance traveled B) average acceleration
C) net acceleration D) average speed

5) Which of the following factor affects specific energy consumption ?
A) Distance between stops
B) Gradient
C) Retardation and acceleration values
D) All of the above

6) Free running and coasting periods arc generally long in ease if
A) urban service B) sub-urban service
C) main-line service D) all of the above

7) In Kando system
A) single phase supply is converted into three phase system
B) single phase ac is converted into dc
C) three phase ac is converted into dc
D) dc supply is due to run dc motors

8) In induction heating _____ is abnormally high.
A) phase angle B) frequency C) current D) voltage

9) Unit of luminous flux is
A) lux B) lumens C) candela D) voltage

10) A composite system consists of
A) a combination of diesel engine and dc series motor
B) a combination of diesel engine and ac single phase motor
C) single phase power received is converted into dc or three phase power ac system
D) use of combination of dc and ac motors on the same locomotive

11) Cooling water is required for following equipment in ammonia absorption plant
A) Condenser B) Evaporator
C) Absorber D) Condenser, absorber and separator

12) The bank of tubes at the back of domestic refrigerator is
A) Condenser tubes B) Evaporator tubes
C) Refrigerant cooling tubes D) Capillary tubes

13) A train has a schedule speed of 36 km per hour on a level track. If the distance between the stations is 2 km and the stoppage is 30 seconds the actual time of run will be
A) 260 seconds B) 230 seconds C) 200 seconds D) 170 seconds

14) Melting temperature of tungsten is
A) 2000°K B) 2500°K C) 3655°K D) 2655°K

15) In an electric room heat convector the method of heating used is
A) Arc heating B) Resistance heating
C) Induction heating D) Dielectric heating

16) For the same wastage which lamp is cheapest ?
A) Sodium vapor lamp B) Mercury vapor lamp
C) Fluorescent tube D) GLS lamps

17) A vapour absorption refrigerator uses _____ as a refrigerant.
A) Water B) Aqua-ammonia
C) Freon D) Ammonia

18) The temperature inside a furnace is usually measured by which of the following ?
A) Optical pyrometer B) Mercury thermometer
C) Alcohol thermometer D) None of the above

19) In a vapour compression system, the condition of refrigerant before entering the expansion or throttle valve is
A) High pressure saturated liquid B) Wet vapour
C) Very wet vapour D) Dry vapour

20) Maintenance requirements are least in case of
A) steam locomotives B) diesel locomotives
C) electric locomotives D) equal maintenance

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SLR-EP – 343

Seat No.	

B.E. (Part – I) (Electrical & Electronics Engineering) Examination, 2016
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Thursday, 1-12-2016 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) Explain vapour absorption refrigeration system.
   2) With neat sketches explain seam welding.
   3) With neat sketch draw following lamps,
      Sodium vapour lamp, fluorescent tube.
   4) Explain the following terms,
      Candle power, space height ratio, utilization factor, maintenance factor, waste light factor.
   5) Draw and explain Ajax Watt furnace.

3. Solve **any two** : **20**
   1) Write short note on Photometry and Radiometry.
   2) With neat sketch describe the electric circuit of refrigerator.
   3) Explain the transformer used in an electric heating and derive the condition for maximum output.

SECTION – II

4. Solve **any four** : **20**
   1) Draw and explain discharging operation of Battery in EV.
   2) Explain suitability of DC series motor for traction work.
   3) Explain speed time curve in an Electric traction.
   4) What are advantages and disadvantages of Electric traction ?
   5) Explain different system of track electrification.

Set R

5. Solve **any two** : **20**

   1) Explain series parallel control of traction motor.

   2) An electric train is weighing 100 tonnes has a rotational interia 10%. Distance between two stop is 2.5 km and trains have an average speed of 50 kmph. The acceleration and retardation are 1 kmphps and 2 kmphps respectively. Track has an up gradient of 1%, train resistance is 40 N/tonne and efficiency of gearing and motor system is 60%.

      Determine :

      i) maximum power at driving axle,
      ii) total energy consumption,
      iii) specific energy consumption.

      Assume Trapezoidal speed-time curve.

   3) Derive specific energy output from speed-time curve.

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SLR-EP – 343

Seat No.	

Set S

B.E. (Part – I) (Electrical & Electronics Engineering) Examination, 2016
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Thursday, 1-12-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) For the same wastage which lamp is cheapest ?
A) Sodium vapor lamp B) Mercury vapor lamp
C) Fluorescent tube D) GLS lamps

2) A vapour absorption refrigerator uses _____ as a refrigerant.
A) Water B) Aqua-ammonia
C) Freon D) Ammonia

3) The temperature inside a furnace is usually measured by which of the following ?
A) Optical pyrometer B) Mercury thermometer
C) Alcohol thermometer D) None of the above

4) In a vapour compression system, the condition of refrigerant before entering the expansion or throttle valve is
A) High pressure saturated liquid B) Wet vapour
C) Very wet vapour D) Dry vapour

5) Maintenance requirements are least in case of
A) steam locomotives B) diesel locomotives
C) electric locomotives D) equal maintenance

6) Which of the following lamp gives nearly monochromatic light ?
A) Sodium vapor lamp B) GLS lamp
C) Tube light D) Mercury vapor lamp

7) 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) If the coefficient of adhesion on dry rails 0.25. Which of the following could be the value for wet rails ?
A) 0.32 B) 0.25 C) 0.245 D) 0.15

9) Area under the curve represents
A) distance traveled B) average acceleration
C) net acceleration D) average speed

10) Which of the following factor affects specific energy consumption ?
A) Distance between stops
B) Gradient
C) Retardation and acceleration values
D) All of the above

11) Free running and coasting periods arc generally long in ease if
A) urban service B) sub-urban service
C) main-line service D) all of the above

12) In Kando system
A) single phase supply is converted into three phase system
B) single phase ac is converted into dc
C) three phase ac is converted into dc
D) dc supply is due to run dc motors

13) In induction heating _____ is abnormally high.
A) phase angle B) frequency C) current D) voltage

14) Unit of luminous flux is
A) lux B) lumens C) candela D) voltage

15) A composite system consists of
A) a combination of diesel engine and dc series motor
B) a combination of diesel engine and ac single phase motor
C) single phase power received is converted into dc or three phase power ac system
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16) Cooling water is required for following equipment in ammonia absorption plant
A) Condenser B) Evaporator
C) Absorber D) Condenser, absorber and separator

17) The bank of tubes at the back of domestic refrigerator is
A) Condenser tubes B) Evaporator tubes
C) Refrigerant cooling tubes D) Capillary tubes

18) A train has a schedule speed of 36 km per hour on a level track. If the distance between the stations is 2 km and the stoppage is 30 seconds the actual time of run will be
A) 260 seconds B) 230 seconds C) 200 seconds D) 170 seconds

19) Melting temperature of tungsten is
A) 2000°K B) 2500°K C) 3655°K D) 2655°K

20) In an electric room heat convector the method of heating used is
A) Arc heating B) Resistance heating
C) Induction heating D) Dielectric heating

SLR-EP – 343

Seat No.	

B.E. (Part – I) (Electrical & Electronics Engineering) Examination, 2016
ELECTRICAL ENERGY UTILIZATION AND TRACTION

Day and Date : Thursday, 1-12-2016 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) Explain vapour absorption refrigeration system.
   2) With neat sketches explain seam welding.
   3) With neat sketch draw following lamps,
      Sodium vapour lamp, fluorescent tube.
   4) Explain the following terms,
      Candle power, space height ratio, utilization factor, maintenance factor, waste light factor.
   5) Draw and explain Ajax Watt furnace.

3. Solve **any two** : **20**
   1) Write short note on Photometry and Radiometry.
   2) With neat sketch describe the electric circuit of refrigerator.
   3) Explain the transformer used in an electric heating and derive the condition for maximum output.

SECTION – II

4. Solve **any four** : **20**
   1) Draw and explain discharging operation of Battery in EV.
   2) Explain suitability of DC series motor for traction work.
   3) Explain speed time curve in an Electric traction.
   4) What are advantages and disadvantages of Electric traction ?
   5) Explain different system of track electrification.

Set S

5. Solve **any two** : **20**

   1) Explain series parallel control of traction motor.

   2) An electric train is weighing 100 tonnes has a rotational interia 10%. Distance between two stop is 2.5 km and trains have an average speed of 50 kmph. The acceleration and retardation are 1 kmphps and 2 kmphps respectively. Track has an up gradient of 1%, train resistance is 40 N/tonne and efficiency of gearing and motor system is 60%.

      Determine :

      i) maximum power at driving axle,
      ii) total energy consumption,
      iii) specific energy consumption.

      Assume Trapezoidal speed-time curve.

   3) Derive specific energy output from speed-time curve.

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SLR-EP – 344

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engineering) (Part – I) Examination, 2016
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 3-12-2016 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 alternative : **(20×1=20)**

1) The most important stator winding fault in an alternator is
   a) Fault between phase and ground
   b) Fault between phases
   c) Inter-turn fault in one phase
   d) None of the above

2) An induction motor is preferred to a d.c. motor because it
   a) Provides high starting torque
   b) Provides fine speed control
   c) Has simple and rugged construction
   d) None of the above

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

4) The full load slip of a synchronous motor is
   a) 5% b) 1% c) 2% d) 0%

5) The ground wire protect the transmission lines against
   a) Direct lightning stroke b) Indirect lightning stroke
   c) Both a) and b) d) None of the above

6) The earth fault current is generally _____ that the short-circuit current.
   a) Less b) More c) Equal to d) None of the above

7) In an alternator, relay protection is absolutely necessary against
   a) Overcurrent b) Field failure
   c) Stator winding faults d) None of the above

P.T.O.

8) Large synchronous motor is started by
   a) Pony motor b) Damper winding
   c) Variable-frequency source d) None of the above

9) Under normal operation, a lightning arrester conducts _____ current to earth.
   a) Heavy b) Moderate c) No d) None of above

10) For P.F. correction synchronous motor is connected in
   a) Series with line b) Series with load
   c) Parallel with line d) None of the above

11) When the 3-phase induction motor is on no load, this resembles like
   a) Transformer on open circuit b) Transformer on short circuit
   c) Transformer on load d) None of the above

12) 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

13) Transformers upto 5 KVA rating can be cooled by
   a) Natural air cooling b) Forced air cooling
   c) Radiators d) None of the above

14) For the same rating, the P.F. of induction motor is _____ that synchronous motor.
   a) The same as b) Less than
   c) More than d) None of the above

15) The relay protection is not provided for overhead in
   a) Generator b) Transformers c) Both a) and b) d) None of the above

16) Which of the following machine has higher thermal capability ?
   a) DC motor b) Induction motor
   c) Synchronous motor d) None of the above

17) Synchronous motor delivers reactive power when
   a) Over-excited b) Under-excited
   c) Normal-excited d) None of the above

18) Most severe fault in transmission line is
   a) Three phase fault b) Two phase-ground fault
   c) One phase-ground fault d) None of the above

19) Open circuit test on transformer is carried on
   a) LV winding b) HV winding
   c) Both a) and b) d) None of the above

20) For the proper protection of power system, the operating time of relay should be
   a) 10 sec. b) less than1 sec.
   c) more than 10 sec. d) none of the above

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SLR-EP – 344

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) Examination, 2016
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 3-12-2016 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) Explain the method of checking of transformer oil.
   2) Explain the safety precaution to be taken while commissioning and maintain transformers.
   3) State the various type tests, special test and routine tests on power transformer.
   4) List acceptable qualification of site personnel at electrical plant site for doing ETCOM work.
   5) Explain the functions of the conservator, Breather and Silica-gel.

3. Solve **any two** : **20**
   1) Explain the safety management interface with operation and management.
   2) State the various causes of troubles and failures of core of power transformers.
   3) Describe the importance of efficiency of transformer. Also derive the condition for maximum efficiency.

SECTION – II

4. Solve **any four** : **20**
   1) Explain type test and routine test on induction motor.
   2) Which are the devices used for the control of induction motor ?
   3) Explain the procedure of measuring insulation resistance and high voltage tests on a.c. circuit breakers at site.
   4) Explain blocked test on induction motor.
   5) State the routine tests required for synchronous generator.

5. Solve **any two** : **20**
   1) Explain V-curves and inverted V-curves of synchronous motor.
   2) State and explain various type tests performed on high voltage a.c. circuit breakers.
   3) Explain the procedure of measurement of audible noise and its significant aspects in an induction motor.

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Set P

Set P

SLR-EP – 344

Seat No.	

Set Q

B.E. (Electrical and Electronics Engineering) (Part – I) Examination, 2016
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 3-12-2016 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 alternative : **(20×1=20)**

1) Which of the following machine has higher thermal capability ?
   a) DC motor b) Induction motor
   c) Synchronous motor d) None of the above

2) Synchronous motor delivers reactive power when
   a) Over-excited b) Under-excited
   c) Normal-excited d) None of the above

3) Most severe fault in transmission line is
   a) Three phase fault b) Two phase-ground fault
   c) One phase-ground fault d) None of the above

4) Open circuit test on transformer is carried on
   a) LV winding b) HV winding
   c) Both a) and b) d) None of the above

5) For the proper protection of power system, the operating time of relay should be
   a) 10 sec. b) less than1 sec.
   c) more than 10 sec. d) none of the above

6) The most important stator winding fault in an alternator is
   a) Fault between phase and ground
   b) Fault between phases
   c) Inter-turn fault in one phase
   d) None of the above

7) An induction motor is preferred to a d.c. motor because it
   a) Provides high starting torque
   b) Provides fine speed control
   c) Has simple and rugged construction
   d) None of the above

P.T.O.

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

9) The full load slip of a synchronous motor is
a) 5% b) 1% c) 2% d) 0%

10) The ground wire protect the transmission lines against
a) Direct lightning stroke b) Indirect lightning stroke
c) Both a) and b) d) None of the above

11) The earth fault current is generally _____ that the short-circuit current.
a) Less b) More c) Equal to d) None of the above

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a) Overcurrent b) Field failure
c) Stator winding faults d) None of the above

13) Large synchronous motor is started by
a) Pony motor b) Damper winding
c) Variable-frequency source d) None of the above

14) Under normal operation, a lightning arrester conducts _____ current to earth.
a) Heavy b) Moderate c) No d) None of above

15) For P.F. correction synchronous motor is connected in
a) Series with line b) Series with load
c) Parallel with line d) None of the above

16) When the 3-phase induction motor is on no load, this resembles like
a) Transformer on open circuit b) Transformer on short circuit
c) Transformer on load d) None of the above

17) 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

18) Transformers upto 5 KVA rating can be cooled by
a) Natural air cooling b) Forced air cooling
c) Radiators d) None of the above

19) For the same rating, the P.F. of induction motor is _____ that synchronous motor.
a) The same as b) Less than
c) More than d) None of the above

20) The relay protection is not provided for overhead in
a) Generator b) Transformers c) Both a) and b) d) None of the above

_____

SLR-EP – 344

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) Examination, 2016
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 3-12-2016 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) Explain the method of checking of transformer oil.
   2) Explain the safety precaution to be taken while commissioning and maintain transformers.
   3) State the various type tests, special test and routine tests on power transformer.
   4) List acceptable qualification of site personnel at electrical plant site for doing ETCOM work.
   5) Explain the functions of the conservator, Breather and Silica-gel.

3. Solve **any two** : **20**
   1) Explain the safety management interface with operation and management.
   2) State the various causes of troubles and failures of core of power transformers.
   3) Describe the importance of efficiency of transformer. Also derive the condition for maximum efficiency.

SECTION – II

4. Solve **any four** : **20**
   1) Explain type test and routine test on induction motor.
   2) Which are the devices used for the control of induction motor ?
   3) Explain the procedure of measuring insulation resistance and high voltage tests on a.c. circuit breakers at site.
   4) Explain blocked test on induction motor.
   5) State the routine tests required for synchronous generator.

5. Solve **any two** : **20**
   1) Explain V-curves and inverted V-curves of synchronous motor.
   2) State and explain various type tests performed on high voltage a.c. circuit breakers.
   3) Explain the procedure of measurement of audible noise and its significant aspects in an induction motor.

Set Q

Set Q

SLR-EP – 344

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engineering) (Part – I) Examination, 2016
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 3-12-2016 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 alternative : **(20×1=20)**

1) When the 3-phase induction motor is on no load, this resembles like
   a) Transformer on open circuit b) Transformer on short circuit
   c) Transformer on load d) None of the above

2) 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

3) Transformers upto 5 KVA rating can be cooled by
   a) Natural air cooling b) Forced air cooling
   c) Radiators d) None of the above

4) For the same rating, the P.F. of induction motor is _____ that synchronous motor.
   a) The same as b) Less than
   c) More than d) None of the above

5) The relay protection is not provided for overhead in
   a) Generator b) Transformers c) Both a) and b) d) None of the above

6) Which of the following machine has higher thermal capability ?
   a) DC motor b) Induction motor
   c) Synchronous motor d) None of the above

7) Synchronous motor delivers reactive power when
   a) Over-excited b) Under-excited
   c) Normal-excited d) None of the above

P.T.O.

8) Most severe fault in transmission line is
   a) Three phase fault b) Two phase-ground fault
   c) One phase-ground fault d) None of the above

9) Open circuit test on transformer is carried on
   a) LV winding b) HV winding
   c) Both a) and b) d) None of the above

10) For the proper protection of power system, the operating time of relay should be
   a) 10 sec. b) less than1 sec.
   c) more than 10 sec. d) none of the above

11) The most important stator winding fault in an alternator is
   a) Fault between phase and ground
   b) Fault between phases
   c) Inter-turn fault in one phase
   d) None of the above

12) An induction motor is preferred to a d.c. motor because it
   a) Provides high starting torque
   b) Provides fine speed control
   c) Has simple and rugged construction
   d) None of the above

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

14) The full load slip of a synchronous motor is
   a) 5% b) 1% c) 2% d) 0%

15) The ground wire protect the transmission lines against
   a) Direct lightning stroke b) Indirect lightning stroke
   c) Both a) and b) d) None of the above

16) The earth fault current is generally _____ that the short-circuit current.
   a) Less b) More c) Equal to d) None of the above

17) In an alternator, relay protection is absolutely necessary against
   a) Overcurrent b) Field failure
   c) Stator winding faults d) None of the above

18) Large synchronous motor is started by
   a) Pony motor b) Damper winding
   c) Variable-frequency source d) None of the above

19) Under normal operation, a lightning arrester conducts _____ current to earth.
   a) Heavy b) Moderate c) No d) None of above

20) For P.F. correction synchronous motor is connected in
   a) Series with line b) Series with load
   c) Parallel with line d) None of the above

_____

SLR-EP – 344

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) Examination, 2016
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 3-12-2016 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) Explain the method of checking of transformer oil.
   2) Explain the safety precaution to be taken while commissioning and maintain transformers.
   3) State the various type tests, special test and routine tests on power transformer.
   4) List acceptable qualification of site personnel at electrical plant site for doing ETCOM work.
   5) Explain the functions of the conservator, Breather and Silica-gel.

3. Solve **any two** : **20**
   1) Explain the safety management interface with operation and management.
   2) State the various causes of troubles and failures of core of power transformers.
   3) Describe the importance of efficiency of transformer. Also derive the condition for maximum efficiency.

SECTION – II

4. Solve **any four** : **20**
   1) Explain type test and routine test on induction motor.
   2) Which are the devices used for the control of induction motor ?
   3) Explain the procedure of measuring insulation resistance and high voltage tests on a.c. circuit breakers at site.
   4) Explain blocked test on induction motor.
   5) State the routine tests required for synchronous generator.

5. Solve **any two** : **20**
   1) Explain V-curves and inverted V-curves of synchronous motor.
   2) State and explain various type tests performed on high voltage a.c. circuit breakers.
   3) Explain the procedure of measurement of audible noise and its significant aspects in an induction motor.

Set R

Set R

SLR-EP – 344

Seat No.	

Set S

B.E. (Electrical and Electronics Engineering) (Part – I) Examination, 2016
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 3-12-2016 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 alternative : **(20×1=20)**

1) The earth fault current is generally _____ that the short-circuit current.
a) Less b) More c) Equal to d) None of the above

2) In an alternator, relay protection is absolutely necessary against
a) Overcurrent b) Field failure
c) Stator winding faults d) None of the above

3) Large synchronous motor is started by
a) Pony motor b) Damper winding
c) Variable-frequency source d) None of the above

4) Under normal operation, a lightning arrester conducts _____ current to earth.
a) Heavy b) Moderate c) No d) None of above

5) For P.F. correction synchronous motor is connected in
a) Series with line b) Series with load
c) Parallel with line d) None of the above

6) When the 3-phase induction motor is on no load, this resembles like
a) Transformer on open circuit b) Transformer on short circuit
c) Transformer on load d) None of the above

7) 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

8) Transformers upto 5 KVA rating can be cooled by
a) Natural air cooling b) Forced air cooling
c) Radiators d) None of the above

P.T.O.

9) For the same rating, the P.F. of induction motor is _____ that synchronous motor.
   a) The same as b) Less than
   c) More than d) None of the above

10) The relay protection is not provided for overhead in
   a) Generator b) Transformers c) Both a) and b) d) None of the above

11) Which of the following machine has higher thermal capability ?
   a) DC motor b) Induction motor
   c) Synchronous motor d) None of the above

12) Synchronous motor delivers reactive power when
   a) Over-excited b) Under-excited
   c) Normal-excited d) None of the above

13) Most severe fault in transmission line is
   a) Three phase fault b) Two phase-ground fault
   c) One phase-ground fault d) None of the above

14) Open circuit test on transformer is carried on
   a) LV winding b) HV winding
   c) Both a) and b) d) None of the above

15) For the proper protection of power system, the operating time of relay should be
   a) 10 sec. b) less than1 sec.
   c) more than 10 sec. d) none of the above

16) The most important stator winding fault in an alternator is
   a) Fault between phase and ground
   b) Fault between phases
   c) Inter-turn fault in one phase
   d) None of the above

17) An induction motor is preferred to a d.c. motor because it
   a) Provides high starting torque
   b) Provides fine speed control
   c) Has simple and rugged construction
   d) None of the above

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

19) The full load slip of a synchronous motor is
   a) 5% b) 1% c) 2% d) 0%

20) The ground wire protect the transmission lines against
   a) Direct lightning stroke b) Indirect lightning stroke
   c) Both a) and b) d) None of the above

_____

SLR-EP – 344

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – I) Examination, 2016
ELECTRICAL INSTALLATION, TESTING AND MAINTENANCE

Day and Date : Saturday, 3-12-2016 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) Explain the method of checking of transformer oil.
   2) Explain the safety precaution to be taken while commissioning and maintain transformers.
   3) State the various type tests, special test and routine tests on power transformer.
   4) List acceptable qualification of site personnel at electrical plant site for doing ETCOM work.
   5) Explain the functions of the conservator, Breather and Silica-gel.

3. Solve **any two** : **20**
   1) Explain the safety management interface with operation and management.
   2) State the various causes of troubles and failures of core of power transformers.
   3) Describe the importance of efficiency of transformer. Also derive the condition for maximum efficiency.

SECTION – II

4. Solve **any four** : **20**
   1) Explain type test and routine test on induction motor.
   2) Which are the devices used for the control of induction motor ?
   3) Explain the procedure of measuring insulation resistance and high voltage tests on a.c. circuit breakers at site.
   4) Explain blocked test on induction motor.
   5) State the routine tests required for synchronous generator.

5. Solve **any two** : **20**
   1) Explain V-curves and inverted V-curves of synchronous motor.
   2) State and explain various type tests performed on high voltage a.c. circuit breakers.
   3) Explain the procedure of measurement of audible noise and its significant aspects in an induction motor.

Set S

Set S

SLR-EP – 345

Seat No.	

Set **P**

B.E. (E&E) (Part – I) Examination, 2016
SWITCH GEAR AND PROTECTION

Day and Date : Tuesday, 6-12-2016 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) In a circuit breaker the active recovery voltage depends upon
   A) armature reaction B) circuit conditions
   C) power factor D) all of the above

2) Current chopping mainly occurs in
   A) SF_6 circuit breaker B) Oil circuit breaker
   C) Air blast circuit breaker D) Vacuum circuit breaker

3) The rate of rise of restriking voltage depends upon
   A) system voltage B) power factor
   C) switching conditions D) switching conditions and power factor

4) The major portion of heat generated in HRC fuse is dissipated by
   A) conduction B) radiation C) convection D) all of the above

5) The fuse blows off by
   A) arcing B) melting C) burning D) none of the above

6) D is being diameter of fuse wire, the fusing current is proportional to
   A) 1/D B) $1/D^2$ C) $D^{1/2}$ D) $D^{3/2}$

7) A circuit breaker is
   A) power factor correcting device
   B) a device to neutralize the effect of transients
   C) a waveform correcting device
   D) a current interrupting device

8) Low voltage circuit breakers have rated voltage of less than
   A) 220 V B) 400 V C) 1000 V D) 10000 V

9) Which of the following circuit breakers is preferred for EHT application ?
   A) Air blast circuit breakers B) Minimum oil circuit breakers
   C) Bulk oil circuit breakers D) SF_6 oil circuit breakers

P.T.O.

10) In air blast circuit breakers, the pressure of air is of the order of
A) 100 mm Hg B) 1 kg/cm^2 C) 20 to 30 kg/cm^2 D) 200 to 300 kg/cm^2

11) Mho relay have an R-X characteristics depicted by
A) A straight line passing through origin B) A straight line parallel to X-axis
C) A straight line parallel to R-axis D) A circle passing through the origin

12) The relay used for the feeder protection is
A) Under-voltage relay B) Translay relay
C) Thermal relay D) Buchholz relay

13) The relay best suited for phase fault relaying for medium transmission lines is
A) Mho relay B) Reactance relay
C) Impedance relay D) None of the above

14) Surge diverters are basically
A) Relays B) Fuses C) Earth fault D) All the above

15) Thermal relays are used for the protection of motors against over-current owing to
A) Short circuit B) Heavy loads C) Fast switches D) Circuit breakers

16) A lightning arrester connected between the line and earth in a power system
A) Protects the terminal equipment against travelling surges
B) Protects the terminal equipment against lightning strokes
C) Suppresses the high frequency oscillations in the line
D) Reflects back the travelling waves approaching it

17) For ground fault, which of the relay is preferred
A) Plain impedance relay B) Directional relay
C) Reactance relay D) Over-current relay

18) The pilot relay is provided to obtain
A) Preset tripping B) High speed tripping
C) Delayed tripping D) All the above

19) Relay burden is actually the power
A) Developed by the relay circuit
B) Required to operate the circuit breaker
C) Absorbed by the circuit of relay
D) None of the above

20) Location of lightning arrestor should be near
A) Bus bar B) The transformer
C) The generator D) All the above

SLR-EP – 345

Seat No.	

B.E. (E&E) (Part – I) Examination, 2016
SWITCH GEAR AND PROTECTION

Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(5 Marks Each)**

   1) What do you mean by discrimination ? Discuss with neat sketch discrimination between two fuses.

   2) A circuit breaker interrupts the magnetizing current of a 100 MVA transformer at 220 KV. The magnetizing current of the transformer is 5% of the full load current. Determine the maximum voltage which may appears across the gap of the circuit breaker when the magnetizing current is interrupted at 53% of its peak value. The stray capacitance is 2500 μF. The inductance is 30 H.

   3) What are the types of isolators ? Explain any one with neat sketch.

   4) Explain construction and working of bulk oil circuit breaker.

   5) Explain the term restriking voltage and recovery voltage.

3. Attempt **any 2** questions : **(10 Marks Each)**

   1) Briefly describe with neat sketch SF_6 circuit breaker.

   2) In a 132 KV system, reactance per phase up to the location of the circuit breaker is 5 ohm and capacitance to earth is 0.03 μF. Calculate :
      a) the maximum value of restriking voltage
      b) the maximum value of RRRV and
      c) the frequency of transient oscillation.

   3) Explain the following terms :
      a) Minimum fusing current
      b) Fusing factor
      c) Prospective current
      d) Cut-off current
      e) Rupturing capacity.

SECTION – II

4. Attempt **any 4** questions : **(5 Marks Each)**

   1) Explain the instantaneous over current relay, inverse over current relay.

   2) Write a short note on IDMT relay.

   3) Explain definite time over current relay.

   4) Write a short note on insulation co-ordination in power system.

   5) Write a short note on metal oxide arrestors.

5. Attempt **any 2** questions : **(10 Marks Each)**

   1) Briefly discuss essential qualities of protective relay.

   2) a) Describe the principle of operation and working of Mho relay.

      b) The current rating of relay is 5.0 amps. P.S.M – 1.5, TSM – 0.4 and C.T. Ratio is 400/5 Amps. Fault current is 6000 Amps. Determine the actual time of operation of relay at TMS = 1. The table of PSM and time is as follows :

PSM	2	4	5	8	10	20
Operating time in Sec.	10	5	4	3	2.8	2.4

   3) Describe the microprocessor based impedance relay with its block diagram and flow chart to realize its characteristics.

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SLR-EP – 345

Seat No.	

Set Q

B.E. (E&E) (Part – I) Examination, 2016
SWITCH GEAR AND PROTECTION

Day and Date : Tuesday, 6-12-2016 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) A lightning arrester connected between the line and earth in a power system
   A) Protects the terminal equipment against travelling surges
   B) Protects the terminal equipment against lightning strokes
   C) Suppresses the high frequency oscillations in the line
   D) Reflects back the travelling waves approaching it

2) For ground fault, which of the relay is preferred
   A) Plain impedance relay B) Directional relay
   C) Reactance relay D) Over-current relay

3) The pilot relay is provided to obtain
   A) Preset tripping B) High speed tripping
   C) Delayed tripping D) All the above

4) Relay burden is actually the power
   A) Developed by the relay circuit
   B) Required to operate the circuit breaker
   C) Absorbed by the circuit of relay
   D) None of the above

5) Location of lightning arrestor should be near
   A) Bus bar B) The transformer
   C) The generator D) All the above

6) In a circuit breaker the active recovery voltage depends upon
   A) armature reaction B) circuit conditions
   C) power factor D) all of the above

7) Current chopping mainly occurs in
   A) SF_6 circuit breaker B) Oil circuit breaker
   C) Air blast circuit breaker D) Vacuum circuit breaker

P.T.O.

8) The rate of rise of restriking voltage depends upon
   A) system voltage
   B) power factor
   C) switching conditions
   D) switching conditions and power factor

9) The major portion of heat generated in HRC fuse is dissipated by
   A) conduction B) radiation C) convection D) all of the above

10) The fuse blows off by
   A) arcing B) melting C) burning D) none of the above

11) D is being diameter of fuse wire, the fusing current is proportional to
   A) 1/D B) $1/D^2$ C) $D^{1/2}$ D) $D^{3/2}$

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   A) power factor correcting device
   B) a device to neutralize the effect of transients
   C) a waveform correcting device
   D) a current interrupting device

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   A) 220 V B) 400 V C) 1000 V D) 10000 V

14) Which of the following circuit breakers is preferred for EHT application ?
   A) Air blast circuit breakers
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   C) Bulk oil circuit breakers
   D) SF_6 oil circuit breakers

15) In air blast circuit breakers, the pressure of air is of the order of
   A) 100 mm Hg B) 1 kg/cm^2 C) 20 to 30 kg/cm^2 D) 200 to 300 kg/cm^2

16) Mho relay have an R-X characteristics depicted by
   A) A straight line passing through origin
   B) A straight line parallel to X-axis
   C) A straight line parallel to R-axis
   D) A circle passing through the origin

17) The relay used for the feeder protection is
   A) Under-voltage relay
   B) Translay relay
   C) Thermal relay
   D) Buchholz relay

18) The relay best suited for phase fault relaying for medium transmission lines is
   A) Mho relay
   B) Reactance relay
   C) Impedance relay
   D) None of the above

19) Surge diverters are basically
   A) Relays B) Fuses C) Earth fault D) All the above

20) Thermal relays are used for the protection of motors against over-current owing to
   A) Short circuit B) Heavy loads C) Fast switches D) Circuit breakers

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SLR-EP – 345

Seat No.	

B.E. (E&E) (Part – I) Examination, 2016
SWITCH GEAR AND PROTECTION

Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(5 Marks Each)**

   1) What do you mean by discrimination ? Discuss with neat sketch discrimination between two fuses.

   2) A circuit breaker interrupts the magnetizing current of a 100 MVA transformer at 220 KV. The magnetizing current of the transformer is 5% of the full load current. Determine the maximum voltage which may appears across the gap of the circuit breaker when the magnetizing current is interrupted at 53% of its peak value. The stray capacitance is 2500 μF. The inductance is 30 H.

   3) What are the types of isolators ? Explain any one with neat sketch.

   4) Explain construction and working of bulk oil circuit breaker.

   5) Explain the term restriking voltage and recovery voltage.

3. Attempt **any 2** questions : **(10 Marks Each)**

   1) Briefly describe with neat sketch SF_6 circuit breaker.

   2) In a 132 KV system, reactance per phase up to the location of the circuit breaker is 5 ohm and capacitance to earth is 0.03 μF. Calculate :
      a) the maximum value of restriking voltage
      b) the maximum value of RRRV and
      c) the frequency of transient oscillation.

   3) Explain the following terms :
      a) Minimum fusing current
      b) Fusing factor
      c) Prospective current
      d) Cut-off current
      e) Rupturing capacity.

SECTION – II

4. Attempt **any 4** questions : **(5 Marks Each)**

   1) Explain the instantaneous over current relay, inverse over current relay.

   2) Write a short note on IDMT relay.

   3) Explain definite time over current relay.

   4) Write a short note on insulation co-ordination in power system.

   5) Write a short note on metal oxide arrestors.

5. Attempt **any 2** questions : **(10 Marks Each)**

   1) Briefly discuss essential qualities of protective relay.

   2) a) Describe the principle of operation and working of Mho relay.

      b) The current rating of relay is 5.0 amps. P.S.M – 1.5, TSM – 0.4 and C.T. Ratio is 400/5 Amps. Fault current is 6000 Amps. Determine the actual time of operation of relay at TMS = 1. The table of PSM and time is as follows :

PSM	2	4	5	8	10	20
Operating time in Sec.	10	5	4	3	2.8	2.4

   3) Describe the microprocessor based impedance relay with its block diagram and flow chart to realize its characteristics.

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SLR-EP – 345

Seat No.	

Set R

B.E. (E&E) (Part – I) Examination, 2016
SWITCH GEAR AND PROTECTION

Day and Date : Tuesday, 6-12-2016 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) Mho relay have an R-X characteristics depicted by
   A) A straight line passing through origin B) A straight line parallel to X-axis
   C) A straight line parallel to R-axis D) A circle passing through the origin

2) The relay used for the feeder protection is
   A) Under-voltage relay B) Translay relay
   C) Thermal relay D) Buchholz relay

3) The relay best suited for phase fault relaying for medium transmission lines is
   A) Mho relay B) Reactance relay
   C) Impedance relay D) None of the above

4) Surge diverters are basically
   A) Relays B) Fuses C) Earth fault D) All the above

5) Thermal relays are used for the protection of motors against over-current owing to
   A) Short circuit B) Heavy loads C) Fast switches D) Circuit breakers

6) A lightning arrester connected between the line and earth in a power system
   A) Protects the terminal equipment against travelling surges
   B) Protects the terminal equipment against lightning strokes
   C) Suppresses the high frequency oscillations in the line
   D) Reflects back the travelling waves approaching it

7) For ground fault, which of the relay is preferred
   A) Plain impedance relay B) Directional relay
   C) Reactance relay D) Over-current relay

8) The pilot relay is provided to obtain
   A) Preset tripping B) High speed tripping
   C) Delayed tripping D) All the above

P.T.O.

9) Relay burden is actually the power
   A) Developed by the relay circuit
   B) Required to operate the circuit breaker
   C) Absorbed by the circuit of relay
   D) None of the above

10) Location of lightning arrestor should be near
   A) Bus bar B) The transformer
   C) The generator D) All the above

11) In a circuit breaker the active recovery voltage depends upon
   A) armature reaction B) circuit conditions
   C) power factor D) all of the above

12) Current chopping mainly occurs in
   A) SF_6 circuit breaker B) Oil circuit breaker
   C) Air blast circuit breaker D) Vacuum circuit breaker

13) The rate of rise of restriking voltage depends upon
   A) system voltage B) power factor
   C) switching conditions D) switching conditions and power factor

14) The major portion of heat generated in HRC fuse is dissipated by
   A) conduction B) radiation C) convection D) all of the above

15) The fuse blows off by
   A) arcing B) melting C) burning D) none of the above

16) D is being diameter of fuse wire, the fusing current is proportional to
   A) 1/D B) $1/D^2$ C) $D^{1/2}$ D) $D^{3/2}$

17) A circuit breaker is
   A) power factor correcting device
   B) a device to neutralize the effect of transients
   C) a waveform correcting device
   D) a current interrupting device

18) Low voltage circuit breakers have rated voltage of less than
   A) 220 V B) 400 V C) 1000 V D) 10000 V

19) Which of the following circuit breakers is preferred for EHT application ?
   A) Air blast circuit breakers B) Minimum oil circuit breakers
   C) Bulk oil circuit breakers D) SF_6 oil circuit breakers

20) In air blast circuit breakers, the pressure of air is of the order of
   A) 100 mm Hg B) 1 kg/cm^2 C) 20 to 30 kg/cm^2 D) 200 to 300 kg/cm^2

SLR-EP – 345

Seat No.	

B.E. (E&E) (Part – I) Examination, 2016
SWITCH GEAR AND PROTECTION

Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(5 Marks Each)**

   1) What do you mean by discrimination ? Discuss with neat sketch discrimination between two fuses.

   2) A circuit breaker interrupts the magnetizing current of a 100 MVA transformer at 220 KV. The magnetizing current of the transformer is 5% of the full load current. Determine the maximum voltage which may appears across the gap of the circuit breaker when the magnetizing current is interrupted at 53% of its peak value. The stray capacitance is 2500 μF. The inductance is 30 H.

   3) What are the types of isolators ? Explain any one with neat sketch.

   4) Explain construction and working of bulk oil circuit breaker.

   5) Explain the term restriking voltage and recovery voltage.

3. Attempt **any 2** questions : **(10 Marks Each)**

   1) Briefly describe with neat sketch SF_6 circuit breaker.

   2) In a 132 KV system, reactance per phase up to the location of the circuit breaker is 5 ohm and capacitance to earth is 0.03 μF. Calculate :
      a) the maximum value of restriking voltage
      b) the maximum value of RRRV and
      c) the frequency of transient oscillation.

   3) Explain the following terms :
      a) Minimum fusing current
      b) Fusing factor
      c) Prospective current
      d) Cut-off current
      e) Rupturing capacity.

SECTION – II

4. Attempt **any 4** questions : **(5 Marks Each)**

   1) Explain the instantaneous over current relay, inverse over current relay.

   2) Write a short note on IDMT relay.

   3) Explain definite time over current relay.

   4) Write a short note on insulation co-ordination in power system.

   5) Write a short note on metal oxide arrestors.

5. Attempt **any 2** questions : **(10 Marks Each)**

   1) Briefly discuss essential qualities of protective relay.

   2) a) Describe the principle of operation and working of Mho relay.

      b) The current rating of relay is 5.0 amps. P.S.M – 1.5, TSM – 0.4 and C.T. Ratio is 400/5 Amps. Fault current is 6000 Amps. Determine the actual time of operation of relay at TMS = 1. The table of PSM and time is as follows :

PSM	2	4	5	8	10	20
Operating time in Sec.	10	5	4	3	2.8	2.4

   3) Describe the microprocessor based impedance relay with its block diagram and flow chart to realize its characteristics.

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SLR-EP – 345

Seat No.	

Set **S**

B.E. (E&E) (Part – I) Examination, 2016
SWITCH GEAR AND PROTECTION

Day and Date : Tuesday, 6-12-2016 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) D is being diameter of fuse wire, the fusing current is proportional to
A) 1/D B) $1/D^2$ C) $D^{1/2}$ D) $D^{3/2}$

2) A circuit breaker is
A) power factor correcting device
B) a device to neutralize the effect of transients
C) a waveform correcting device
D) a current interrupting device

3) Low voltage circuit breakers have rated voltage of less than
A) 220 V B) 400 V C) 1000 V D) 10000 V

4) Which of the following circuit breakers is preferred for EHT application ?
A) Air blast circuit breakers B) Minimum oil circuit breakers
C) Bulk oil circuit breakers D) SF_6 oil circuit breakers

5) In air blast circuit breakers, the pressure of air is of the order of
A) 100 mm Hg B) 1 kg/cm^2 C) 20 to 30 kg/cm^2 D) 200 to 300 kg/cm^2

6) Mho relay have an R-X characteristics depicted by
A) A straight line passing through origin B) A straight line parallel to X-axis
C) A straight line parallel to R-axis D) A circle passing through the origin

7) The relay used for the feeder protection is
A) Under-voltage relay B) Translay relay
C) Thermal relay D) Buchholz relay

8) The relay best suited for phase fault relaying for medium transmission lines is
A) Mho relay B) Reactance relay
C) Impedance relay D) None of the above

P.T.O.

9) Surge diverters are basically
A) Relays B) Fuses C) Earth fault D) All the above

10) Thermal relays are used for the protection of motors against over-current owing to
A) Short circuit B) Heavy loads C) Fast switches D) Circuit breakers

11) A lightning arrester connected between the line and earth in a power system
A) Protects the terminal equipment against travelling surges
B) Protects the terminal equipment against lightning strokes
C) Suppresses the high frequency oscillations in the line
D) Reflects back the travelling waves approaching it

12) For ground fault, which of the relay is preferred
A) Plain impedance relay B) Directional relay
C) Reactance relay D) Over-current relay

13) The pilot relay is provided to obtain
A) Preset tripping B) High speed tripping
C) Delayed tripping D) All the above

14) Relay burden is actually the power
A) Developed by the relay circuit
B) Required to operate the circuit breaker
C) Absorbed by the circuit of relay
D) None of the above

15) Location of lightning arrestor should be near
A) Bus bar B) The transformer
C) The generator D) All the above

16) In a circuit breaker the active recovery voltage depends upon
A) armature reaction B) circuit conditions
C) power factor D) all of the above

17) Current chopping mainly occurs in
A) SF_6 circuit breaker B) Oil circuit breaker
C) Air blast circuit breaker D) Vacuum circuit breaker

18) The rate of rise of restriking voltage depends upon
A) system voltage B) power factor
C) switching conditions D) switching conditions and power factor

19) The major portion of heat generated in HRC fuse is dissipated by
A) conduction B) radiation C) convection D) all of the above

20) The fuse blows off by
A) arcing B) melting C) burning D) none of the above

SLR-EP – 345

Seat No.	

B.E. (E&E) (Part – I) Examination, 2016
SWITCH GEAR AND PROTECTION

Day and Date : Tuesday, 6-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Attempt **any 4** questions : **(5 Marks Each)**

   1) What do you mean by discrimination ? Discuss with neat sketch discrimination between two fuses.

   2) A circuit breaker interrupts the magnetizing current of a 100 MVA transformer at 220 KV. The magnetizing current of the transformer is 5% of the full load current. Determine the maximum voltage which may appears across the gap of the circuit breaker when the magnetizing current is interrupted at 53% of its peak value. The stray capacitance is 2500 μF. The inductance is 30 H.

   3) What are the types of isolators ? Explain any one with neat sketch.

   4) Explain construction and working of bulk oil circuit breaker.

   5) Explain the term restriking voltage and recovery voltage.

3. Attempt **any 2** questions : **(10 Marks Each)**

   1) Briefly describe with neat sketch SF_6 circuit breaker.

   2) In a 132 KV system, reactance per phase up to the location of the circuit breaker is 5 ohm and capacitance to earth is 0.03 μF. Calculate :
      a) the maximum value of restriking voltage
      b) the maximum value of RRRV and
      c) the frequency of transient oscillation.

   3) Explain the following terms :
      a) Minimum fusing current
      b) Fusing factor
      c) Prospective current
      d) Cut-off current
      e) Rupturing capacity.

SECTION – II

4. Attempt **any 4** questions : **(5 Marks Each)**

   1) Explain the instantaneous over current relay, inverse over current relay.

   2) Write a short note on IDMT relay.

   3) Explain definite time over current relay.

   4) Write a short note on insulation co-ordination in power system.

   5) Write a short note on metal oxide arrestors.

5. Attempt **any 2** questions : **(10 Marks Each)**

   1) Briefly discuss essential qualities of protective relay.

   2) a) Describe the principle of operation and working of Mho relay.

      b) The current rating of relay is 5.0 amps. P.S.M – 1.5, TSM – 0.4 and C.T. Ratio is 400/5 Amps. Fault current is 6000 Amps. Determine the actual time of operation of relay at TMS = 1. The table of PSM and time is as follows :

PSM	2	4	5	8	10	20
Operating time in Sec.	10	5	4	3	2.8	2.4

   3) Describe the microprocessor based impedance relay with its block diagram and flow chart to realize its characteristics.

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SLR-EP – 347

Seat No.	

Set P

B.E. (Electrical and Electronics Engineering) (Part – II) (Old) Examination, 2016
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 21-11-2016 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) Assume suitable data **wherever** necessary.*
*3) Non-programmable calculators are **permitted**.*
4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The normal current in a power line is 100 A, 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) Altenators 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

P.T.O.

8) Arc in a circuit breaker is interrupted at
   a) Zero current b) Maximum current
   c) Maximum voltage d) Minimum voltage

9) The IDMT relays are used for over current and earth fault protection of transformer against
   a) Heavy load b) Internal short circuits
   c) External short circuits d) All of the above

10) A fuse is a
   a) Protective device b) Current limiting device
   c) Current controlling device d) None of the above

11) The ideal scheme of protections for overhead lines is
   a) Time graded over current protection b) Distance protection
   c) Differential protection d) None of above

12) Most serious voltages on the power system are those caused by
   a) Insulation failure b) Lightning
   c) Resonance d) Arcing ground

13) The breaking capacity of SF6 circuit breaker is not affected by
   a) Weather and moisture b) Pollution
   c) Atmospheric pressure d) All above

14) The over current relay having current setting 125% is connected to a supply circuit through a. C.T. of ratio 400/5 A. The pickup current is
   a) 6.25 A b) 12.5 A c) 3.125 A d) 25 A

15) Induction relays are used for
   a) AC quantities b) DC quantities c) Both (a) and (b) d) None of above

16) The rate of rise of restriking voltage depends on
   a) Type of circuit breaker
   b) Inductance of the system only
   c) The capacitance of the system only
   d) Both inductance and capacitance of the system

17) The current rating of fuse wire is 5 A. The fusing current will be
   a) 5 A b) 2.5 A c) 1 A d) More than 5 A

18) The fusing factor is
   a) Always one b) Always more than one
   c) Always less than one d) None of above

19) A fuse should have
   a) Low melting point b) High conductivity
   c) Low cost d) All above

20) Which statment is correct ?
   a) SF_6 gas is nontoxic b) SF_6 gas is lighter than air
   c) SF_6 gas has pungent smell d) SF_6 gas is yellow in colour

SLR-EP – 347

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (Old) Examination, 2016
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**

a) Define the following terms with waveform
   1) arc voltage
   2) system voltage
   3) restriking voltage
   4) recovery voltage

b) Explain HRC fuse with advantages and disadvantages.

c) Explain Recovery Rate Theory and Energy Balance Theory in brief.

d) Explain phenomenon of arc quenching in air break circuit breaker.

e) Explain phenomenon of arc quenching in vacuum circuit breaker.

3. Attempt **any two** questions : **(2×10=20)**

a) Discuss rating and testing of circuit breaker.

b) Explain working principle of vacuum circuit breaker with diagram.

c) Compare oil circuit breaker and air blast circuit breaker.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**

   a) Clearly distinguish the terms 'Overload' and 'Overcurrent'.

   b) Explain impedance relay with necessary diagram.

   c) Describe Buccholz relay in detail.

   d) What is the principle of differential relays ? What are their limitations ?

   e) What is function of surge absorber ? Explain Ferranti surge absorber.

5. Attempt **any two** questions : **(2×10=20)**

   a) Give the comment on protection of generator with stator, rotor and miscellaneous protection.

   b) Explain block diagram of static definite-time overcurrent relay.

   c) Explain wire pilot protection scheme with circulating current scheme and balanced voltage scheme.

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SLR-EP – 347

Seat No.	

Set Q

B.E. (Electrical and Electronics Engineering) (Part – II) (Old) Examination, 2016
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 21-11-2016 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) Assume suitable data **wherever** necessary.*
*3) Non-programmable calculators are **permitted**.*
*4) **Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The rate of rise of restriking voltage depends on
   a) Type of circuit breaker
   b) Inductance of the system only
   c) The capacitance of the system only
   d) Both inductance and capacitance of the system

2) The current rating of fuse wire is 5 A. The fusing current will be
   a) 5 A b) 2.5 A c) 1 A d) More than 5 A

3) The fusing factor is
   a) Always one b) Always more than one
   c) Always less than one d) None of above

4) A fuse should have
   a) Low melting point b) High conductivity
   c) Low cost d) All above

5) Which statment is correct ?
   a) SF_6 gas is nontoxic b) SF_6 gas is lighter than air
   c) SF_6 gas has pungent smell d) SF_6 gas is yellow in colour

6) The normal current in a power line is 100 A, suddenly their line current becomes 150A, one can expect
   a) Open circuit fault b) Short circuit fault
   c) Overload condition d) None of above

P.T.O.

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
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) Altenators 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 IDMT relays are used for over current and earth fault protection of transformer against
   a) Heavy load b) Internal short circuits
   c) External short circuits d) All of the above
15) A fuse is a
   a) Protective device b) Current limiting device
   c) Current controlling device d) None of the above
16) The ideal scheme of protections for overhead lines is
   a) Time graded over current protection b) Distance protection
   c) Differential protection d) None of above
17) Most serious voltages on the power system are those caused by
   a) Insulation failure b) Lightning
   c) Resonance d) Arcing ground
18) The breaking capacity of SF6 circuit breaker is not affected by
   a) Weather and moisture b) Pollution
   c) Atmospheric pressure d) All above
19) The over current relay having current setting 125% is connected to a supply circuit through a. C.T. of ratio 400/5 A. The pickup current is
   a) 6.25 A b) 12.5 A c) 3.125 A d) 25 A
20) Induction relays are used for
   a) AC quantities b) DC quantities c) Both (a) and (b) d) None of above

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SLR-EP – 347

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (Old) Examination, 2016
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**

a) Define the following terms with waveform
   1) arc voltage
   2) system voltage
   3) restriking voltage
   4) recovery voltage

b) Explain HRC fuse with advantages and disadvantages.

c) Explain Recovery Rate Theory and Energy Balance Theory in brief.

d) Explain phenomenon of arc quenching in air break circuit breaker.

e) Explain phenomenon of arc quenching in vacuum circuit breaker.

3. Attempt **any two** questions : **(2×10=20)**

a) Discuss rating and testing of circuit breaker.

b) Explain working principle of vacuum circuit breaker with diagram.

c) Compare oil circuit breaker and air blast circuit breaker.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**

   a) Clearly distinguish the terms 'Overload' and 'Overcurrent'.

   b) Explain impedance relay with necessary diagram.

   c) Describe Buccholz relay in detail.

   d) What is the principle of differential relays ? What are their limitations ?

   e) What is function of surge absorber ? Explain Ferranti surge absorber.

5. Attempt **any two** questions : **(2×10=20)**

   a) Give the comment on protection of generator with stator, rotor and miscellaneous protection.

   b) Explain block diagram of static definite-time overcurrent relay.

   c) Explain wire pilot protection scheme with circulating current scheme and balanced voltage scheme.

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SLR-EP – 347

Seat No.	

Set R

B.E. (Electrical and Electronics Engineering) (Part – II) (Old) Examination, 2016
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 21-11-2016 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) Assume suitable data **wherever** necessary.*
*3) Non-programmable calculators are **permitted**.*
4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The ideal scheme of protections for overhead lines is
   a) Time graded over current protection b) Distance protection
   c) Differential protection d) None of above

2) Most serious voltages on the power system are those caused by
   a) Insulation failure b) Lightning
   c) Resonance d) Arcing ground

3) The breaking capacity of SF6 circuit breaker is not affected by
   a) Weather and moisture b) Pollution
   c) Atmospheric pressure d) All above

4) The over current relay having current setting 125% is connected to a supply circuit through a. C.T. of ratio 400/5 A. The pickup current is
   a) 6.25 A b) 12.5 A c) 3.125 A d) 25 A

5) Induction relays are used for
   a) AC quantities b) DC quantities c) Both (a) and (b) d) None of above

6) The rate of rise of restriking voltage depends on
   a) Type of circuit breaker
   b) Inductance of the system only
   c) The capacitance of the system only
   d) Both inductance and capacitance of the system

P.T.O.

7) The current rating of fuse wire is 5 A. The fusing current will be
   a) 5 A b) 2.5 A c) 1 A d) More than 5 A

8) The fusing factor is
   a) Always one b) Always more than one
   c) Always less than one d) None of above

9) A fuse should have
   a) Low melting point b) High conductivity
   c) Low cost d) All above

10) Which statment is correct ?
   a) SF_6 gas is nontoxic b) SF_6 gas is lighter than air
   c) SF_6 gas has pungent smell d) SF_6 gas is yellow in colour

11) The normal current in a power line is 100 A, 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) Altenators 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 IDMT relays are used for over current and earth fault protection of transformer against
   a) Heavy load b) Internal short circuits
   c) External short circuits d) All of the above

20) A fuse is a
   a) Protective device b) Current limiting device
   c) Current controlling device d) None of the above

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SLR-EP – 347

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (Old) Examination, 2016
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**

a) Define the following terms with waveform
   1) arc voltage
   2) system voltage
   3) restriking voltage
   4) recovery voltage

b) Explain HRC fuse with advantages and disadvantages.

c) Explain Recovery Rate Theory and Energy Balance Theory in brief.

d) Explain phenomenon of arc quenching in air break circuit breaker.

e) Explain phenomenon of arc quenching in vacuum circuit breaker.

3. Attempt **any two** questions : **(2×10=20)**

a) Discuss rating and testing of circuit breaker.

b) Explain working principle of vacuum circuit breaker with diagram.

c) Compare oil circuit breaker and air blast circuit breaker.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**

   a) Clearly distinguish the terms 'Overload' and 'Overcurrent'.

   b) Explain impedance relay with necessary diagram.

   c) Describe Buccholz relay in detail.

   d) What is the principle of differential relays ? What are their limitations ?

   e) What is function of surge absorber ? Explain Ferranti surge absorber.

5. Attempt **any two** questions : **(2×10=20)**

   a) Give the comment on protection of generator with stator, rotor and miscellaneous protection.

   b) Explain block diagram of static definite-time overcurrent relay.

   c) Explain wire pilot protection scheme with circulating current scheme and balanced voltage scheme.

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SLR-EP – 347

Seat No.	

Set **S**

B.E. (Electrical and Electronics Engineering) (Part – II) (Old) Examination, 2016
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 21-11-2016 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) Assume suitable data **wherever** necessary.*
*3) Non-programmable calculators are **permitted**.*
4) Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The Merz-Price protection scheme is uneconomical for the protection of
a) Overhead lines b) Altenators 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 IDMT relays are used for over current and earth fault protection of transformer against
a) Heavy load b) Internal short circuits
c) External short circuits d) All of the above

5) A fuse is a
a) Protective device b) Current limiting device
c) Current controlling device d) None of the above

6) The ideal scheme of protections for overhead lines is
a) Time graded over current protection b) Distance protection
c) Differential protection d) None of above

7) Most serious voltages on the power system are those caused by
a) Insulation failure b) Lightning
c) Resonance d) Arcing ground

P.T.O.

8) The breaking capacity of SF6 circuit breaker is not affected by
   a) Weather and moisture b) Pollution
   c) Atmospheric pressure d) All above

9) The over current relay having current setting 125% is connected to a supply circuit through a. C.T. of ratio 400/5 A. The pickup current is
   a) 6.25 A b) 12.5 A c) 3.125 A d) 25 A

10) Induction relays are used for
   a) AC quantities b) DC quantities c) Both (a) and (b) d) None of above

11) The rate of rise of restriking voltage depends on
   a) Type of circuit breaker
   b) Inductance of the system only
   c) The capacitance of the system only
   d) Both inductance and capacitance of the system

12) The current rating of fuse wire is 5 A. The fusing current will be
   a) 5 A b) 2.5 A c) 1 A d) More than 5 A

13) The fusing factor is
   a) Always one b) Always more than one
   c) Always less than one d) None of above

14) A fuse should have
   a) Low melting point b) High conductivity
   c) Low cost d) All above

15) Which statment is correct ?
   a) SF_6 gas is nontoxic b) SF_6 gas is lighter than air
   c) SF_6 gas has pungent smell d) SF_6 gas is yellow in colour

16) The normal current in a power line is 100 A, 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

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SLR-EP – 347

Seat No.	

B.E. (Electrical and Electronics Engineering) (Part – II) (Old) Examination, 2016
SWITCHGEAR AND PROTECTION

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume suitable data* ***wherever*** *necessary.*
2) Non-programmable calculators are ***permitted****.*

SECTION – I

2. Attempt **any four** questions : **(4×5=20)**

a) Define the following terms with waveform
   1) arc voltage
   2) system voltage
   3) restriking voltage
   4) recovery voltage

b) Explain HRC fuse with advantages and disadvantages.

c) Explain Recovery Rate Theory and Energy Balance Theory in brief.

d) Explain phenomenon of arc quenching in air break circuit breaker.

e) Explain phenomenon of arc quenching in vacuum circuit breaker.

3. Attempt **any two** questions : **(2×10=20)**

a) Discuss rating and testing of circuit breaker.

b) Explain working principle of vacuum circuit breaker with diagram.

c) Compare oil circuit breaker and air blast circuit breaker.

SECTION – II

4. Attempt **any four** questions : **(4×5=20)**

   a) Clearly distinguish the terms 'Overload' and 'Overcurrent'.

   b) Explain impedance relay with necessary diagram.

   c) Describe Buccholz relay in detail.

   d) What is the principle of differential relays ? What are their limitations ?

   e) What is function of surge absorber ? Explain Ferranti surge absorber.

5. Attempt **any two** questions : **(2×10=20)**

   a) Give the comment on protection of generator with stator, rotor and miscellaneous protection.

   b) Explain block diagram of static definite-time overcurrent relay.

   c) Explain wire pilot protection scheme with circulating current scheme and balanced voltage scheme.

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SLR-EP – 348

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – II) (Old) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 Total Marks : 100

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The output of rotating machine is limited by
   A) Peripheral speed B) Temperature rise
   C) Size of machine D) None of the above

2) CRGO has _____ permeability in the direction of grain orientation.
   A) Nil B) Maximum
   C) Minimum D) None of the above

3) Eddy current are reduced in high content silicon steel as it
   A) Increases resistivity B) Reduces resistivity
   C) Short circuits D) None of the above

4) Stepped core is used to
   A) Increase output B) Reduces the cost
   C) Decrease the cost of copper D) Increases efficiency

5) With increase in voltage, window space factor
   A) Increases B) Remain same
   C) Decreases D) None of the above

6) In an Induction motor L/T = 1 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

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) The percentage of silicon in the core steel is
   A) 4 to 6 percent B) 2 to 3 percent C) 8 to 10 percent D) 1 to 2 percent

P.T.O.

9) Air gap of a 3 phase induction motor is kept small to
   A) Reduce the possibility of the crawling
   B) Reduce the magnetizing current
   C) Reduce the noise
   D) Obtain high starting torque

10) Which component of the no load current of the transformer is opposite in phase to the Induced EMF ?
   A) Magnetizing component
   B) Core loss component
   C) Both A) and B) above
   D) None of the above

11) 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

12) In case of Induction motor the air gap flux density is usually taken is
   A) 0.1 T – 0.2 T B) 0.2 T – 0.35 T C) 0.3 T – 0.6 T D) 1 T – 1.2 T

13) Transformer action requires a
   A) Constant magnetic flux
   B) Increasing magnetic flux
   C) Alternating magnetic flux
   D) Alternating electric flux

14) The shaft of electric motors is generally made of
   A) Mild steel B) Cast iron C) Copper D) Aluminum alloy

15) Induction motors are provided with open slots because
   A) Exciting current is high
   B) PF is low
   C) PF is high
   D) Both A) and B)

16) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
   A) 10 MW B) 20 MW C) 25 MW D) 50 MW

17) Open circuit test on a transformer is conducted to obtain
   A) The leakage impedances
   B) The ohmic loss
   C) Hysteresis loss only
   D) Core loss only

18) Pitch 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

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) Which is non-magnetic material ?
   A) Nickel B) Cobalt C) Aluminum D) Gadolinium

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SLR-EP –348

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) (Old) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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** : **(5×4=20)**

a) Explain the methods of improving starting torque of three phase induction motor.

b) Explain the choice of flux density and choice of current density for transformer.

c) Estimate magnetizing current per phase for 11000/415 V, three phase, delta-star core type transformer from following data :

i) Gross cross section area of limb and yoke = 200 cm^2

ii) Height of each limb = 130 cm

iii) Length of each yoke = 100 cm

iv) Stacking factor = 0.9

v) Density of steel = 7600 Kg/m^3

vi) Reactive VA/Kg = 5

d) Derive the expression end ring current for a three phase induction motor.

e) Discuss different factors to be considered while making choice of specific loading for three phase induction motor.

3. Solve **any two** : **(10×2=20)**

   a) Derive the expression for leakage reactance for transformer. State assumption made.

   b) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 200 KVA, 6.6 KV/440 V, 50 Hz, three phase delta/star core transformer. Emf/turn = 10 V, stacking factor = 0.9, a flux density of 1.3 wb/m^2, current density of 2.5 A/Sq.mm, window space factor of 0.3, overall height = overall width.

   c) Explain the design procedure for stator of single phase induction motor.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Derive an expression for capacitance required for maximum torque in capacitor start single phase induction motor.

   b) Derive an expression for estimation of air gap length in an alternator.

   c) Explain the design procedure for rotor of single phase induction motor.

   d) A 500 KVA, 600 rpm, 3.3 KV, 50 Hz, 3-phase, salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 wb/m^2. The ratio of pole arc to Pole pitch = 0.65, the short circuit ratio = 1.2 and gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.

   e) What are different factors for making the choice of specific loading for an alternator ?

5. Solve **any two** : **(10×2=20)**

   a) State and explain different leakage reactance in case of single phase induction motor.

   b) A 3-phase, 50 Hz, star connected alternator has the following design data :

      Terminal Voltage = 3300 V, RPM = 300, rotor diameter = 2.3 m, core length = 0.35 m, stator winding has single layer, Kw = 0.955, Bav = 0.9 Tesla. Estimate,

      a) No. of slots b) No. of conductors/slot.

   c) Explain the design procedure of damper winding used for alternator.

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SLR-EP – 348

Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – II) (Old) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 Total Marks : 100

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
A) 10 MW B) 20 MW C) 25 MW D) 50 MW

2) Open circuit test on a transformer is conducted to obtain
A) The leakage impedances B) The ohmic loss
C) Hysteresis loss only D) Core loss only

3) Pitch 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

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) Which is non-magnetic material ?
A) Nickel B) Cobalt C) Aluminum D) Gadolinium

6) The output of rotating machine is limited by
A) Peripheral speed B) Temperature rise
C) Size of machine D) None of the above

7) CRGO has _____ permeability in the direction of grain orientation.
A) Nil B) Maximum
C) Minimum D) None of the above

8) Eddy current are reduced in high content silicon steel as it
   A) Increases resistivity B) Reduces resistivity
   C) Short circuits D) None of the above

9) Stepped core is used to
   A) Increase output B) Reduces the cost
   C) Decrease the cost of copper D) Increases efficiency

10) With increase in voltage, window space factor
   A) Increases B) Remain same
   C) Decreases D) None of the above

11) In an Induction motor L/T = 1 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

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) The percentage of silicon in the core steel is
   A) 4 to 6 percent B) 2 to 3 percent C) 8 to 10 percent D) 1 to 2 percent

14) Air gap of a 3 phase induction motor is kept small to
   A) Reduce the possibility of the crawling B) Reduce the magnetizing current
   C) Reduce the noise D) Obtain high starting torque

15) Which component of the no load current of the transformer is opposite in phase to the Induced EMF ?
   A) Magnetizing component B) Core loss component
   C) Both A) and B) above D) None of the above

16) 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

17) In case of Induction motor the air gap flux density is usually taken is
   A) 0.1 T – 0.2 T B) 0.2 T – 0.35 T C) 0.3 T – 0.6 T D) 1 T – 1.2 T

18) Transformer action requires a
   A) Constant magnetic flux B) Increasing magnetic flux
   C) Alternating magnetic flux D) Alternating electric flux

19) The shaft of electric motors is generally made of
   A) Mild steel B) Cast iron C) Copper D) Aluminum alloy

20) Induction motors are provided with open slots because
   A) Exciting current is high B) PF is low
   C) PF is high D) Both A) and B)

SLR-EP –348

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) (Old) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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** : **(5×4=20)**

a) Explain the methods of improving starting torque of three phase induction motor.

b) Explain the choice of flux density and choice of current density for transformer.

c) Estimate magnetizing current per phase for 11000/415 V, three phase, delta-star core type transformer from following data :

i) Gross cross section area of limb and yoke = 200 cm^2

ii) Height of each limb = 130 cm

iii) Length of each yoke = 100 cm

iv) Stacking factor = 0.9

v) Density of steel = 7600 Kg/m^3

vi) Reactive VA/Kg = 5

d) Derive the expression end ring current for a three phase induction motor.

e) Discuss different factors to be considered while making choice of specific loading for three phase induction motor.

3. Solve **any two** : **(10×2=20)**

   a) Derive the expression for leakage reactance for transformer. State assumption made.

   b) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 200 KVA, 6.6 KV/440 V, 50 Hz, three phase delta/star core transformer. Emf/turn = 10 V, stacking factor = 0.9, a flux density of 1.3 wb/m^2, current density of 2.5 A/Sq.mm, window space factor of 0.3, overall height = overall width.

   c) Explain the design procedure for stator of single phase induction motor.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Derive an expression for capacitance required for maximum torque in capacitor start single phase induction motor.

   b) Derive an expression for estimation of air gap length in an alternator.

   c) Explain the design procedure for rotor of single phase induction motor.

   d) A 500 KVA, 600 rpm, 3.3 KV, 50 Hz, 3-phase, salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 wb/m^2. The ratio of pole arc to Pole pitch = 0.65, the short circuit ratio = 1.2 and gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.

   e) What are different factors for making the choice of specific loading for an alternator ?

5. Solve **any two** : **(10×2=20)**

   a) State and explain different leakage reactance in case of single phase induction motor.

   b) A 3-phase, 50 Hz, star connected alternator has the following design data :

      Terminal Voltage = 3300 V, RPM = 300, rotor diameter = 2.3 m, core length = 0.35 m, stator winding has single layer, Kw = 0.955, Bav = 0.9 Tesla. Estimate,

      a) No. of slots b) No. of conductors/slot.

   c) Explain the design procedure of damper winding used for alternator.

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SLR-EP – 348

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – II) (Old) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 Total Marks : 100

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In an alternator, which of the following coils will have EMF closer to sine waveform ?
   A) Concentrated winding in full pitch coils
   B) Concentrated winding in short pitch coils
   C) Distributed winding in full pitch coils
   D) Distributed winding in short pitch coils

2) In case of Induction motor the air gap flux density is usually taken is
   A) 0.1 T – 0.2 T B) 0.2 T – 0.35 T C) 0.3 T – 0.6 T D) 1 T – 1.2 T

3) Transformer action requires a
   A) Constant magnetic flux B) Increasing magnetic flux
   C) Alternating magnetic flux D) Alternating electric flux

4) The shaft of electric motors is generally made of
   A) Mild steel B) Cast iron C) Copper D) Aluminum alloy

5) Induction motors are provided with open slots because
   A) Exciting current is high B) PF is low
   C) PF is high D) Both A) and B)

6) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
   A) 10 MW B) 20 MW C) 25 MW D) 50 MW

7) Open circuit test on a transformer is conducted to obtain
   A) The leakage impedances B) The ohmic loss
   C) Hysteresis loss only D) Core loss only

P.T.O.

8) Pitch 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

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) Which is non-magnetic material ?
   A) Nickel B) Cobalt C) Aluminum D) Gadolinium

11) The output of rotating machine is limited by
   A) Peripheral speed B) Temperature rise
   C) Size of machine D) None of the above

12) CRGO has _____ permeability in the direction of grain orientation.
   A) Nil B) Maximum
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13) Eddy current are reduced in high content silicon steel as it
   A) Increases resistivity B) Reduces resistivity
   C) Short circuits D) None of the above

14) Stepped core is used to
   A) Increase output B) Reduces the cost
   C) Decrease the cost of copper D) Increases efficiency

15) With increase in voltage, window space factor
   A) Increases B) Remain same
   C) Decreases D) None of the above

16) In an Induction motor L/T = 1 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

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) The percentage of silicon in the core steel is
   A) 4 to 6 percent B) 2 to 3 percent C) 8 to 10 percent D) 1 to 2 percent

19) Air gap of a 3 phase induction motor is kept small to
   A) Reduce the possibility of the crawling B) Reduce the magnetizing current
   C) Reduce the noise D) Obtain high starting torque

20) Which component of the no load current of the transformer is opposite in phase to the Induced EMF ?
   A) Magnetizing component B) Core loss component
   C) Both A) and B) above D) None of the above

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SLR-EP –348

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) (Old) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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** : **(5×4=20)**

a) Explain the methods of improving starting torque of three phase induction motor.

b) Explain the choice of flux density and choice of current density for transformer.

c) Estimate magnetizing current per phase for 11000/415 V, three phase, delta-star core type transformer from following data :

i) Gross cross section area of limb and yoke = 200 cm^2

ii) Height of each limb = 130 cm

iii) Length of each yoke = 100 cm

iv) Stacking factor = 0.9

v) Density of steel = 7600 Kg/m^3

vi) Reactive VA/Kg = 5

d) Derive the expression end ring current for a three phase induction motor.

e) Discuss different factors to be considered while making choice of specific loading for three phase induction motor.

3. Solve **any two** : **(10×2=20)**

   a) Derive the expression for leakage reactance for transformer. State assumption made.

   b) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 200 KVA, 6.6 KV/440 V, 50 Hz, three phase delta/star core transformer. Emf/turn = 10 V, stacking factor = 0.9, a flux density of 1.3 wb/m^2, current density of 2.5 A/Sq.mm, window space factor of 0.3, overall height = overall width.

   c) Explain the design procedure for stator of single phase induction motor.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Derive an expression for capacitance required for maximum torque in capacitor start single phase induction motor.

   b) Derive an expression for estimation of air gap length in an alternator.

   c) Explain the design procedure for rotor of single phase induction motor.

   d) A 500 KVA, 600 rpm, 3.3 KV, 50 Hz, 3-phase, salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 wb/m^2. The ratio of pole arc to Pole pitch = 0.65, the short circuit ratio = 1.2 and gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.

   e) What are different factors for making the choice of specific loading for an alternator ?

5. Solve **any two** : **(10×2=20)**

   a) State and explain different leakage reactance in case of single phase induction motor.

   b) A 3-phase, 50 Hz, star connected alternator has the following design data :

      Terminal Voltage = 3300 V, RPM = 300, rotor diameter = 2.3 m, core length = 0.35 m, stator winding has single layer, Kw = 0.955, Bav = 0.9 Tesla. Estimate,

      a) No. of slots b) No. of conductors/slot.

   c) Explain the design procedure of damper winding used for alternator.

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SLR-EP – 348

Seat No.	

Set **S**

B.E. (Electrical and Electronics Engg.) (Part – II) (Old) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 Total Marks : 100

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

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In an Induction motor L/T = 1 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

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) The percentage of silicon in the core steel is
   A) 4 to 6 percent B) 2 to 3 percent C) 8 to 10 percent D) 1 to 2 percent

4) Air gap of a 3 phase induction motor is kept small to
   A) Reduce the possibility of the crawling B) Reduce the magnetizing current
   C) Reduce the noise D) Obtain high starting torque

5) Which component of the no load current of the transformer is opposite in phase to the Induced EMF ?
   A) Magnetizing component B) Core loss component
   C) Both A) and B) above D) None of the above

6) 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

7) In case of Induction motor the air gap flux density is usually taken is
   A) 0.1 T – 0.2 T B) 0.2 T – 0.35 T C) 0.3 T – 0.6 T D) 1 T – 1.2 T

P.T.O.

8) Transformer action requires a
   A) Constant magnetic flux B) Increasing magnetic flux
   C) Alternating magnetic flux D) Alternating electric flux

9) The shaft of electric motors is generally made of
   A) Mild steel B) Cast iron C) Copper D) Aluminum alloy

10) Induction motors are provided with open slots because
   A) Exciting current is high B) PF is low
   C) PF is high D) Both A) and B)

11) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
   A) 10 MW B) 20 MW C) 25 MW D) 50 MW

12) Open circuit test on a transformer is conducted to obtain
   A) The leakage impedances B) The ohmic loss
   C) Hysteresis loss only D) Core loss only

13) Pitch 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

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) Which is non-magnetic material ?
   A) Nickel B) Cobalt C) Aluminum D) Gadolinium

16) The output of rotating machine is limited by
   A) Peripheral speed B) Temperature rise
   C) Size of machine D) None of the above

17) CRGO has _____ permeability in the direction of grain orientation.
   A) Nil B) Maximum
   C) Minimum D) None of the above

18) Eddy current are reduced in high content silicon steel as it
   A) Increases resistivity B) Reduces resistivity
   C) Short circuits D) None of the above

19) Stepped core is used to
   A) Increase output B) Reduces the cost
   C) Decrease the cost of copper D) Increases efficiency

20) With increase in voltage, window space factor
   A) Increases B) Remain same
   C) Decreases D) None of the above

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SLR-EP –348

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) (Old) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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** : **(5×4=20)**

a) Explain the methods of improving starting torque of three phase induction motor.

b) Explain the choice of flux density and choice of current density for transformer.

c) Estimate magnetizing current per phase for 11000/415 V, three phase, delta-star core type transformer from following data :

i) Gross cross section area of limb and yoke = 200 cm^2

ii) Height of each limb = 130 cm

iii) Length of each yoke = 100 cm

iv) Stacking factor = 0.9

v) Density of steel = 7600 Kg/m^3

vi) Reactive VA/Kg = 5

d) Derive the expression end ring current for a three phase induction motor.

e) Discuss different factors to be considered while making choice of specific loading for three phase induction motor.

3. Solve **any two** : **(10×2=20)**

   a) Derive the expression for leakage reactance for transformer. State assumption made.

   b) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 200 KVA, 6.6 KV/440 V, 50 Hz, three phase delta/star core transformer. Emf/turn = 10 V, stacking factor = 0.9, a flux density of 1.3 wb/m^2, current density of 2.5 A/Sq.mm, window space factor of 0.3, overall height = overall width.

   c) Explain the design procedure for stator of single phase induction motor.

SECTION – II

4. Solve **any four** : **(5×4=20)**

   a) Derive an expression for capacitance required for maximum torque in capacitor start single phase induction motor.

   b) Derive an expression for estimation of air gap length in an alternator.

   c) Explain the design procedure for rotor of single phase induction motor.

   d) A 500 KVA, 600 rpm, 3.3 KV, 50 Hz, 3-phase, salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 wb/m^2. The ratio of pole arc to Pole pitch = 0.65, the short circuit ratio = 1.2 and gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.

   e) What are different factors for making the choice of specific loading for an alternator ?

5. Solve **any two** : **(10×2=20)**

   a) State and explain different leakage reactance in case of single phase induction motor.

   b) A 3-phase, 50 Hz, star connected alternator has the following design data :

      Terminal Voltage = 3300 V, RPM = 300, rotor diameter = 2.3 m, core length = 0.35 m, stator winding has single layer, Kw = 0.955, Bav = 0.9 Tesla. Estimate,

      a) No. of slots b) No. of conductors/slot.

   c) Explain the design procedure of damper winding used for alternator.

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SLR-EP – 349

Seat No.	

Set **P**

B.E. (Part – II) (Electrical and Electronics Engineering) Examination, 2016
FLEXIBLE AC TRANSMISSION SYSTEM (Old)

Day and Date : Wednesday, 23-11-2016 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=20)**

1) For dynamic stability of an transmission line, the line current

a) $I_L = V - I_a R_a$ b) $I_L = \sqrt{3}\, I_{ph}$ c) $I_L = E_L/X$ d) $I_L = V^2/X$

2) Mid-point VAR compensator exchanges only _____ power with the transmission line in this process.
a) Reactive b) Active
c) Apparent d) None of the above

3) In SVC the thyristor
a) With GTO capability b) Without GTO capability
c) With Toff capability d) Without Toff capability

4) In tap changing transformers, the tapping are provided on
a) Secondary winding b) Primary winding
c) Tertiary winding d) High voltage winding

5) Induction regulator are employed for voltage control in
a) Distribution system b) Transmission lines
c) Alternators d) Anywhere in the line

6) Shunt compensation in an EHV line is used to
a) Improve stability b) Reduce fault level
c) Improve the voltage profile d) Substitute for synchronous phase modifier

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 these

P.T.O.

8) Transient stability can be increased by increasing
   a) Declerating energy b) Accelerating energy
   c) Both of these d) None of these

9) Steady state can be obtained by muiratairing
   a) Frequency b) Voltage and frequency
   c) Voltage d) Malline angle

10) STATCOM operates whose capacitive of inductive o/p current can be controlled independent of
   a) AC system current b) AC system voltage
   c) AC system d) AC system power factor

11) The time required to give full composition to line by TC-TCR is
   a) Half cycle b) At the instant of switching
   c) Firing angle d) One cycle

12) SVG combination of
   a) SVC and battery b) Battery and controller
   c) SVC and controller d) None of these

13) In power flow control when the angle is not large, the power flow is controlled by
   a) Xc b) Xr c) Xc-Xr d) X

14) UPFC device is used for
   a) Real time control b) Dynamic compensation
   c) Both of these d) None of these

15) TSSC and TCSC can be operated at
   a) High voltage and high current b) High voltage and low current
   c) Low voltage and high current d) Low voltage and low current

16) IPFC provides capacity of directly transfer _____ power between compensated line.
   a) Active b) Real c) Reactive d) Apparent

17) Following controller is used for power transmission management in a multimachine substation.
   a) IPFC b) UPFC c) SVC d) TCSC

18) _____ in which a dc voltage has one polarity.
   a) CSC b) VSC
   c) Both of these d) None of these

19) The best location of booster transformer in a transmission line is
   a) At the sending end b) At the receiving end
   c) At the intermediate point d) Anywhere in the line

20) In GTO, the gate current pulse required for turn on may be
   a) 1-2% b) 2-5%
   c) 3-5% d) None of the above

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SLR-EP – 349

Seat No.	

B.E. (Part – II) (Electrical and Electronics Engineering) Examination, 2016
FLEXIBLE AC TRANSMISSION SYSTEM (Old)

Day and Date : Wednesday, 23-11-2016 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) Explain Static Var System.
   2) Explain need of transmission interconnections.
   3) Draw block diagram and characteristics of TSC.
   4) Compare STATCOM and SVC.
   5) Explain how power flow in AC system.

3. Solve **any two** : **(10×2=20)**
   1) State and explain the objectives of shunt compensator.
   2) With neat circuit diagram and VI characteristics, explain the working of FC-TCR.
   3) Give brief explanation along with necessary ckt. Diagrams of the FACT controllers.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain hybrid phase angle regulators.
   2) Give objectives of a phase angle regulator.
   3) What is UPFC ? Why it is called unified ?
   4) Explain IPFC with working and benefits.
   5) Explain harmonic mitigation in FACT's.

5. Solve **any two** : **(10×2=20)**
   1) Derive expression for x^2 power transfer limits.
   2) Compare UPFC with series compensators.
   3) Give brief explanation on the generalize and multifunctional FACTS controller.

Set P

Set P

SLR-EP – 349

Seat No.	

Set Q

B.E. (Part – II) (Electrical and Electronics Engineering) Examination, 2016
FLEXIBLE AC TRANSMISSION SYSTEM (Old)

Day and Date : Wednesday, 23-11-2016 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=20)**

1) IPFC provides capacity of directly transfer _____ power between compensated line.
a) Active b) Real c) Reactive d) Apparent

2) Following controller is used for power transmission management in a multimachine substation.
a) IPFC b) UPFC c) SVC d) TCSC

3) _____ in which a dc voltage has one polarity.
a) CSC b) VSC
c) Both of these d) None of these

4) The best location of booster transformer in a transmission line is
a) At the sending end b) At the receiving end
c) At the intermediate point d) Anywhere in the line

5) In GTO, the gate current pulse required for turn on may be
a) 1-2% b) 2-5%
c) 3-5% d) None of the above

6) For dynamic stability of an transmission line, the line current
a) $I_L = V - I_a R_a$ b) $I_L = \sqrt{3}\, I_{ph}$ c) $I_L = E_L/X$ d) $I_L = V^2/X$

7) Mid-point VAR compensator exchanges only _____ power with the transmission line in this process.
a) Reactive b) Active
c) Apparent d) None of the above

P.T.O.

8) In SVC the thyristor
   a) With GTO capability b) Without GTO capability
   c) With Toff capability d) Without Toff capability

9) In tap changing transformers, the tapping are provided on
   a) Secondary winding b) Primary winding
   c) Tertiary winding d) High voltage winding

10) Induction regulator are employed for voltage control in
   a) Distribution system b) Transmission lines
   c) Alternators d) Anywhere in the line

11) Shunt compensation in an EHV line is used to
   a) Improve stability b) Reduce fault level
   c) Improve the voltage profile d) Substitute for synchronous phase modifier

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 these

13) Transient stability can be increased by increasing
   a) Declerating energy b) Accelerating energy
   c) Both of these d) None of these

14) Steady state can be obtained by muiratairing
   a) Frequency b) Voltage and frequency
   c) Voltage d) Malline angle

15) STATCOM operates whose capacitive of inductive o/p current can be controlled independent of
   a) AC system current b) AC system voltage
   c) AC system d) AC system power factor

16) The time required to give full composition to line by TC-TCR is
   a) Half cycle b) At the instant of switching
   c) Firing angle d) One cycle

17) SVG combination of
   a) SVC and battery b) Battery and controller
   c) SVC and controller d) None of these

18) In power flow control when the angle is not large, the power flow is controlled by
   a) Xc b) Xr c) Xc-Xr d) X

19) UPFC device is used for
   a) Real time control b) Dynamic compensation
   c) Both of these d) None of these

20) TSSC and TCSC can be operated at
   a) High voltage and high current b) High voltage and low current
   c) Low voltage and high current d) Low voltage and low current

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SLR-EP – 349

Seat No.	

B.E. (Part – II) (Electrical and Electronics Engineering) Examination, 2016
FLEXIBLE AC TRANSMISSION SYSTEM (Old)

Day and Date : Wednesday, 23-11-2016 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) Explain Static Var System.
   2) Explain need of transmission interconnections.
   3) Draw block diagram and characteristics of TSC.
   4) Compare STATCOM and SVC.
   5) Explain how power flow in AC system.

3. Solve **any two** : **(10×2=20)**
   1) State and explain the objectives of shunt compensator.
   2) With neat circuit diagram and VI characteristics, explain the working of FC-TCR.
   3) Give brief explanation along with necessary ckt. Diagrams of the FACT controllers.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain hybrid phase angle regulators.
   2) Give objectives of a phase angle regulator.
   3) What is UPFC ? Why it is called unified ?
   4) Explain IPFC with working and benefits.
   5) Explain harmonic mitigation in FACT's.

5. Solve **any two** : **(10×2=20)**
   1) Derive expression for x^2 power transfer limits.
   2) Compare UPFC with series compensators.
   3) Give brief explanation on the generalize and multifunctional FACTS controller.

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Set Q

Set Q

SLR-EP – 349

Seat No.	

Set **R**

B.E. (Part – II) (Electrical and Electronics Engineering) Examination, 2016
FLEXIBLE AC TRANSMISSION SYSTEM (Old)

Day and Date : Wednesday, 23-11-2016 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=20)**

1) The time required to give full composition to line by TC-TCR is
   a) Half cycle b) At the instant of switching
   c) Firing angle d) One cycle

2) SVG combination of
   a) SVC and battery b) Battery and controller
   c) SVC and controller d) None of these

3) In power flow control when the angle is not large, the power flow is controlled by
   a) Xc b) Xr c) Xc-Xr d) X

4) UPFC device is used for
   a) Real time control b) Dynamic compensation
   c) Both of these d) None of these

5) TSSC and TCSC can be operated at
   a) High voltage and high current b) High voltage and low current
   c) Low voltage and high current d) Low voltage and low current

6) IPFC provides capacity of directly transfer _____ power between compensated line.
   a) Active b) Real c) Reactive d) Apparent

7) Following controller is used for power transmission management in a multimachine substation.
   a) IPFC b) UPFC c) SVC d) TCSC

8) _____ in which a dc voltage has one polarity.
   a) CSC b) VSC
   c) Both of these d) None of these

P.T.O.

9) The best location of booster transformer in a transmission line is
   a) At the sending end b) At the receiving end
   c) At the intermediate point d) Anywhere in the line

10) In GTO, the gate current pulse required for turn on may be
   a) 1-2% b) 2-5%
   c) 3-5% d) None of the above

11) For dynamic stability of an transmission line, the line current
   a) $I_L = V - I_a R_a$ b) $I_L = \sqrt{3}\, I_{ph}$ c) $I_L = E_L/X$ d) $I_L = V^2/X$

12) Mid-point VAR compensator exchanges only _____ power with the transmission line in this process.
   a) Reactive b) Active
   c) Apparent d) None of the above

13) In SVC the thyristor
   a) With GTO capability b) Without GTO capability
   c) With Toff capability d) Without Toff capability

14) In tap changing transformers, the tapping are provided on
   a) Secondary winding b) Primary winding
   c) Tertiary winding d) High voltage winding

15) Induction regulator are employed for voltage control in
   a) Distribution system b) Transmission lines
   c) Alternators d) Anywhere in the line

16) Shunt compensation in an EHV line is used to
   a) Improve stability b) Reduce fault level
   c) Improve the voltage profile d) Substitute for synchronous phase modifier

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 these

18) Transient stability can be increased by increasing
   a) Declerating energy b) Accelerating energy
   c) Both of these d) None of these

19) Steady state can be obtained by muiratairing
   a) Frequency b) Voltage and frequency
   c) Voltage d) Malline angle

20) STATCOM operates whose capacitive of inductive o/p current can be controlled independent of
   a) AC system current b) AC system voltage
   c) AC system d) AC system power factor

_____

SLR-EP – 349

Seat No.	

B.E. (Part – II) (Electrical and Electronics Engineering) Examination, 2016
FLEXIBLE AC TRANSMISSION SYSTEM (Old)

Day and Date : Wednesday, 23-11-2016 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) Explain Static Var System.
   2) Explain need of transmission interconnections.
   3) Draw block diagram and characteristics of TSC.
   4) Compare STATCOM and SVC.
   5) Explain how power flow in AC system.

3. Solve **any two** : **(10×2=20)**
   1) State and explain the objectives of shunt compensator.
   2) With neat circuit diagram and VI characteristics, explain the working of FC-TCR.
   3) Give brief explanation along with necessary ckt. Diagrams of the FACT controllers.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain hybrid phase angle regulators.
   2) Give objectives of a phase angle regulator.
   3) What is UPFC ? Why it is called unified ?
   4) Explain IPFC with working and benefits.
   5) Explain harmonic mitigation in FACT's.

5. Solve **any two** : **(10×2=20)**
   1) Derive expression for x^2 power transfer limits.
   2) Compare UPFC with series compensators.
   3) Give brief explanation on the generalize and multifunctional FACTS controller.

Set R

Set R

SLR-EP – 349

Seat No.	

Set **S**

B.E. (Part – II) (Electrical and Electronics Engineering) Examination, 2016
FLEXIBLE AC TRANSMISSION SYSTEM (Old)

Day and Date : Wednesday, 23-11-2016 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=20)**

1) Shunt compensation in an EHV line is used to
   a) Improve stability b) Reduce fault level
   c) Improve the voltage profile d) Substitute for synchronous phase modifier

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 these

3) Transient stability can be increased by increasing
   a) Declerating energy b) Accelerating energy
   c) Both of these d) None of these

4) Steady state can be obtained by muiratairing
   a) Frequency b) Voltage and frequency
   c) Voltage d) Malline angle

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   a) AC system current b) AC system voltage
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6) The time required to give full composition to line by TC-TCR is
   a) Half cycle b) At the instant of switching
   c) Firing angle d) One cycle

7) SVG combination of
   a) SVC and battery b) Battery and controller
   c) SVC and controller d) None of these

P.T.O.

8) In power flow control when the angle is not large, the power flow is controlled by
   a) Xc b) Xr c) Xc-Xr d) X

9) UPFC device is used for
   a) Real time control b) Dynamic compensation
   c) Both of these d) None of these

10) TSSC and TCSC can be operated at
   a) High voltage and high current b) High voltage and low current
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11) IPFC provides capacity of directly transfer _____ power between compensated line.
   a) Active b) Real c) Reactive d) Apparent

12) Following controller is used for power transmission management in a multimachine substation.
   a) IPFC b) UPFC c) SVC d) TCSC

13) _____ in which a dc voltage has one polarity.
   a) CSC b) VSC
   c) Both of these d) None of these

14) The best location of booster transformer in a transmission line is
   a) At the sending end b) At the receiving end
   c) At the intermediate point d) Anywhere in the line

15) In GTO, the gate current pulse required for turn on may be
   a) 1-2% b) 2-5%
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16) For dynamic stability of an transmission line, the line current
   a) $I_L = V - I_a R_a$ b) $I_L = \sqrt{3}\, I_{ph}$ c) $I_L = E_L/X$ d) $I_L = V^2/X$

17) Mid-point VAR compensator exchanges only _____ power with the transmission line in this process.
   a) Reactive b) Active
   c) Apparent d) None of the above

18) In SVC the thyristor
   a) With GTO capability b) Without GTO capability
   c) With Toff capability d) Without Toff capability

19) In tap changing transformers, the tapping are provided on
   a) Secondary winding b) Primary winding
   c) Tertiary winding d) High voltage winding

20) Induction regulator are employed for voltage control in
   a) Distribution system b) Transmission lines
   c) Alternators d) Anywhere in the line

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SLR-EP – 349

Seat No.	

B.E. (Part – II) (Electrical and Electronics Engineering) Examination, 2016
FLEXIBLE AC TRANSMISSION SYSTEM (Old)

Day and Date : Wednesday, 23-11-2016 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) Explain Static Var System.
   2) Explain need of transmission interconnections.
   3) Draw block diagram and characteristics of TSC.
   4) Compare STATCOM and SVC.
   5) Explain how power flow in AC system.

3. Solve **any two** : **(10×2=20)**
   1) State and explain the objectives of shunt compensator.
   2) With neat circuit diagram and VI characteristics, explain the working of FC-TCR.
   3) Give brief explanation along with necessary ckt. Diagrams of the FACT controllers.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain hybrid phase angle regulators.
   2) Give objectives of a phase angle regulator.
   3) What is UPFC ? Why it is called unified ?
   4) Explain IPFC with working and benefits.
   5) Explain harmonic mitigation in FACT's.

5. Solve **any two** : **(10×2=20)**
   1) Derive expression for x^2 power transfer limits.
   2) Compare UPFC with series compensators.
   3) Give brief explanation on the generalize and multifunctional FACTS controller.

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Set S

Set S

SLR-EP – 350

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
HVDC (Old) (Elective – II)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 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 answer : **(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 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)

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 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 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 breakeven 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-EP – 350

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
HVDC (Old) (Elective – II)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 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) Explain 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.

Set P

Set P

SLR-EP – 350

Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
HVDC (Old) (Elective – II)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 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 answer : **(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 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 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 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 breakeven 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-EP – 350

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
HVDC (Old) (Elective – II)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 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) Explain 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.

Set Q

Set Q

SLR-EP – 350

Seat No.	

Set **R**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
HVDC (Old) (Elective – II)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 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 answer : **(20×1=20)**

1) In HVDC transmission system, rectifier firing angle 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 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 breakeven 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 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-EP – 350

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
HVDC (Old) (Elective – II)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 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) Explain 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.

Set R

Set R

SLR-EP – 350

Seat No.	

Set **S**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
HVDC (Old) (Elective – II)

Day and Date : Thursday, 24-11-2016 Total Marks : 100
Time : 3.00 p.m. to 6.00 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 answer : **(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 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 above

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

P.T.O.

9) Normal value of breakeven 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 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-EP – 350

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
HVDC (Old) (Elective – II)

Day and Date : Thursday, 24-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 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) Explain 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.

Set S

Set S

SLR-EP – 351

Seat No.	

Set **P**

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2016
FACTS AND HVDC (New)

Day and Date : Monday, 21-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

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) In turbo alternator rotor diameter is limited to about
   a) 0.6 m b) 1.2 m c) 1.8 m d) 3 m

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 consumer 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 compensator
   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) 18°

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

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SLR-EP – 351

Seat No.	

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2016
FACTS AND HVDC (New)

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Mention the applications of high voltage DC transmission system.
   b) Compare the voltage controlled source with current controlled source.
   c) Explain merits and demerits of STATCOM.
   d) Explain objectives of shunt compensation.
   e) Explain in brief basic types of FACTS controller.

3. Solve the following : **(10×2=20)**
   1) Explain power flow controlled in HVDC transmission line and power flow control using FACTS controller, distinguish both the methods with their merits and demerits.
   2) Compare STATCOM with SSSC.

   OR

   2) Explain the merits and demerits of SSSC.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain in detail modern trends in HVDC transmission system.
   2) Explain planning for HVDC transmission system.
   3) Explain pulse frequency control and pulse phase control.
   4) Give classification of HVDC links and explain each in detail.
   5) State basic principle of control and control implementation in HVDC system.

5. Solve the following : **(10×2=20)**
   1) Explain grid control of thyristor and valve analysis with grid control with no overlap.
   2) Derive the analysis equation for two and three valve conduction mode.

   OR

   2) Derive the analysis equation of a 12 pulse converters with required waveforms.

Set P

Set P

SLR-EP – 351

Seat No.	

Set **Q**

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2016
FACTS AND HVDC (New)

Day and Date : Monday, 21-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
2) ***Answer MCQ/Objective type questions on Page No. 3 only. Don't forget to mention, Q.P. Set (P/Q/R/S) on Top of Page.***
3) ***All*** *questions are* ***compulsory****.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*
5) 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 compensator 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) 18°

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

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

P.T.O.

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) 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

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) In turbo alternator rotor diameter is limited to about
a) 0.6 m b) 1.2 m c) 1.8 m d) 3 m

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 consumer 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-EP – 351

Seat No.	

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2016
FACTS AND HVDC (New)

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Mention the applications of high voltage DC transmission system.
   b) Compare the voltage controlled source with current controlled source.
   c) Explain merits and demerits of STATCOM.
   d) Explain objectives of shunt compensation.
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   1) Explain power flow controlled in HVDC transmission line and power flow control using FACTS controller, distinguish both the methods with their merits and demerits.
   2) Compare STATCOM with SSSC.

   OR

   2) Explain the merits and demerits of SSSC.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain in detail modern trends in HVDC transmission system.
   2) Explain planning for HVDC transmission system.
   3) Explain pulse frequency control and pulse phase control.
   4) Give classification of HVDC links and explain each in detail.
   5) State basic principle of control and control implementation in HVDC system.

5. Solve the following : **(10×2=20)**
   1) Explain grid control of thyristor and valve analysis with grid control with no overlap.
   2) Derive the analysis equation for two and three valve conduction mode.

   OR

   2) Derive the analysis equation of a 12 pulse converters with required waveforms.

Set Q

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SLR-EP – 351

Seat No.	

Set R

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2016
FACTS AND HVDC (New)

Day and Date : Monday, 21-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In turbo alternator rotor diameter is limited to about
a) 0.6 m b) 1.2 m c) 1.8 m d) 3 m

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 consumer reactive power
b) Consumes as much reactive power as real power
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d) None of the above

4) Problems of AC interconnection
a) presence of large power oscillations which can lead to frequent tripping
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P.T.O.

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9) In HVDC transmission system, rectifier firing angle a is kept near
   a) 0° b) 15° c) 30° d) 18°

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   a) Bulk power transmission over very long distances
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   a) load compensation b) load up gradation
   c) load current control d) none of the above

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   a) even harmonics b) odd harmonics
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   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

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   a) MOSFET b) S.C.R. c) Diode d) GTO

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   a) Corona loss is much more in HVDC transmission
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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
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SLR-EP – 351

Seat No.	

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2016
FACTS AND HVDC (New)

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Mention the applications of high voltage DC transmission system.
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SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain in detail modern trends in HVDC transmission system.
   2) Explain planning for HVDC transmission system.
   3) Explain pulse frequency control and pulse phase control.
   4) Give classification of HVDC links and explain each in detail.
   5) State basic principle of control and control implementation in HVDC system.

5. Solve the following : **(10×2=20)**
   1) Explain grid control of thyristor and valve analysis with grid control with no overlap.
   2) Derive the analysis equation for two and three valve conduction mode.

   OR

   2) Derive the analysis equation of a 12 pulse converters with required waveforms.

Set R

Set R

SLR-EP – 351

Seat No.	

Set S

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2016
FACTS AND HVDC (New)

Day and Date : Monday, 21-11-2016 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.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

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   c) Series connection of converters on D.C. side is better
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P.T.O.

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   a) Does not consumer reactive power
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   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-EP – 351

Seat No.	

B.E. (Part – II) (Electrical & Electronics Engineering) Examination, 2016
FACTS AND HVDC (New)

Day and Date : Monday, 21-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

SECTION – I

2. Solve **any four** : **(5×4=20)**
   a) Mention the applications of high voltage DC transmission system.
   b) Compare the voltage controlled source with current controlled source.
   c) Explain merits and demerits of STATCOM.
   d) Explain objectives of shunt compensation.
   e) Explain in brief basic types of FACTS controller.

3. Solve the following : **(10×2=20)**
   1) Explain power flow controlled in HVDC transmission line and power flow control using FACTS controller, distinguish both the methods with their merits and demerits.
   2) Compare STATCOM with SSSC.

   OR

   2) Explain the merits and demerits of SSSC.

SECTION – II

4. Solve **any four** : **(5×4=20)**
   1) Explain in detail modern trends in HVDC transmission system.
   2) Explain planning for HVDC transmission system.
   3) Explain pulse frequency control and pulse phase control.
   4) Give classification of HVDC links and explain each in detail.
   5) State basic principle of control and control implementation in HVDC system.

5. Solve the following : **(10×2=20)**
   1) Explain grid control of thyristor and valve analysis with grid control with no overlap.
   2) Derive the analysis equation for two and three valve conduction mode.

   OR

   2) Derive the analysis equation of a 12 pulse converters with required waveforms.

Set S

Set S

SLR-EP – 352

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – II) (New) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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 alternatives : **(20×1=20)**

1) Air gap of a 3 phase induction motor is kept small to
   A) reduce the possibility of the crawling
   B) reduce the magnetizing current
   C) reduce the noise
   D) obtain high starting torque

2) The material used for high frequency transformer
   A) Cast iron B) Paramagnetic C) Soft iron D) Ferrite

3) Distribution 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

4) In an oil filled transformer, oil is provided for
   A) Cooling B) Insulation
   C) Lubricating D) Both cooling and insulation

5) An ideal insulating material should have low
   A) Insulation resistance B) Dielectric strength
   C) Dielectric loss angle D) Mechanic strength

6) Which component of the no load current of the transformer is in phase to the Induced EMF ?
   A) Magnetizing component B) Core loss component
   C) Both (A) and (B) above D) None of the above

7) In an Induction motor L/T = 1.5-2 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

8) Specific magnetic loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

9) Hysteresis loss varies with maximum flux density (B) as
   A) B B) $B^{1.6}$ C) B^2 D) $B^{2.6}$

10) Open circuit test on a transformer is conducted to obtain
   A) the leakage impedances B) the ohmic loss
   C) hysteresis loss only D) core loss only

11) Line joining tangent and output line in a circle diagram gives
   A) Copper loss B) Stator loss
   C) Maximum output D) Maximum torque

12) The stacking factor will be least for
   A) Square core B) Cruciform core
   C) Three stepped core D) Four stepped core

13) The material used for making electromagnet magnet is
   A) Cast iron B) Soft iron C) Silicon steel D) Hard steel

14) Short circuit test on a transformer is conducted to obtain
   A) The leakage impedances B) The ohmic loss
   C) Hysteresis loss only D) Core loss only

15) Stepped core is used to
   A) Increase output B) Reduces the cost
   C) Decrease the cost of copper D) Increases efficiency

16) Skewing of rotor slots helps in
   A) Improving beat transfer B) Reducing noise
   C) Suppressing undesirable harmonics D) All of the above

17) The thickness of laminations of the core of a power transformer usually
   A) 0.003 to 0.05 mm B) 0.03 to 0.05 mm
   C) 0.03 to 0.5 mm D) 3 to 5 mm

18) If the permeability of a material is more than 1 but less than 1.1, it can be classified as
   A) Diamagnetic material B) Paramagnetic material
   C) Ferro-magnetic material D) Ferrite

19) Magnetostriction
   A) Grain oriented magnetic properties
   B) Represents the upper limit to which magnetic properties can be induced
   C) Change in dimensions resulting from magnetization of ferromagnetic materials
   D) None of the above

20) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
   A) 10 MW B) 20 MW C) 25 MW D) 50 MW

SLR-EP – 352

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) (New) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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) Derive an expression for no load current of three phase transformer.
   b) Estimate magnetizing current per phase for 11000/415 V, three phase, delta-star core type transformer from the following data :
      i) Gross cross section area of limb and yoke = 200 cm^2
      ii) Height of each limb = 130 cm
      iii) Length of each yoke = 100 cm
      iv) Stacking factor = 0.9
      v) Density of steel = 7600 Kg/m^3
      vi) Reactive VA/Kg = 5.
   c) Explain the different conducting materials used for electrical machines.
   d) Derive the output equation of three phase transformer.
   e) Explain the design procedure of cooling tubes used for transformer.

3. Solve **any two** : **(2×10=20)**
   a) Why stepped cores are used in transformer ? Explain different core section used for transformer.
   b) Explain the different modes of heat transfer.
   c) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 200 KVA, 6.6 KV/440 V, 50 Hz, three phase delta/star core transformer. Emf/turn = 10 V, stacking factor = 0.9, a flux density of 1.3 Wb/m^2, current density of 2.5 A/Sq.mm, window space factor of 0.3, overall height = overall width.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Derive an expression for winding resistance of three phase induction motor.

   b) Explain short circuit ratio and its effect on performance of synchronous machine.

   c) Derive an output equation of 3ϕ induction motor.

   d) A 500 KVA, 600 rpm, 3.3 KV, 50 Hz, 3-phase, salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 Wb/m^2. The ratio of pole arc to pole pitch = 0.65, the short circuit ratio = 1.2 and gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.

   e) Discuss different factors to be considered while making choice of specific loading for three phase induction motor.

5. Solve **any two** : **(2×10=20)**

   a) Explain the design procedure of squirrel cage rotor of three phase induction motor.

   b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor. D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 m Wb, current density = 4 A/mm^2, winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.

   c) Explain the design procedure field winding in an alternator.

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SLR-EP – 352

Seat No.	

Set **Q**

B.E. (Electrical and Electronics Engg.) (Part – II) (New) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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 alternatives : **(20×1=20)**

1) Skewing of rotor slots helps in
   A) Improving beat transfer B) Reducing noise
   C) Suppressing undesirable harmonics D) All of the above

2) The thickness of laminations of the core of a power transformer usually
   A) 0.003 to 0.05 mm B) 0.03 to 0.05 mm
   C) 0.03 to 0.5 mm D) 3 to 5 mm

3) If the permeability of a material is more than 1 but less than 1.1, it can be classified as
   A) Diamagnetic material B) Paramagnetic material
   C) Ferro-magnetic material D) Ferrite

4) Magnetostriction
   A) Grain oriented magnetic properties
   B) Represents the upper limit to which magnetic properties can be induced
   C) Change in dimensions resulting from magnetization of ferromagnetic materials
   D) None of the above

5) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
   A) 10 MW B) 20 MW C) 25 MW D) 50 MW

6) Air gap of a 3 phase induction motor is kept small to
   A) reduce the possibility of the crawling
   B) reduce the magnetizing current
   C) reduce the noise
   D) obtain high starting torque

7) The material used for high frequency transformer
   A) Cast iron B) Paramagnetic C) Soft iron D) Ferrite

P.T.O.

8) Distribution 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

9) In an oil filled transformer, oil is provided for
   A) Cooling B) Insulation
   C) Lubricating D) Both cooling and insulation

10) An ideal insulating material should have low
   A) Insulation resistance B) Dielectric strength
   C) Dielectric loss angle D) Mechanic strength

11) Which component of the no load current of the transformer is in phase to the Induced EMF ?
   A) Magnetizing component B) Core loss component
   C) Both (A) and (B) above D) None of the above

12) In an Induction motor L/T = 1.5-2 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

13) Specific magnetic loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

14) Hysteresis loss varies with maximum flux density (B) as
   A) B B) $B^{1.6}$ C) B^{2} D) $B^{2.6}$

15) Open circuit test on a transformer is conducted to obtain
   A) the leakage impedances B) the ohmic loss
   C) hysteresis loss only D) core loss only

16) Line joining tangent and output line in a circle diagram gives
   A) Copper loss B) Stator loss
   C) Maximum output D) Maximum torque

17) The stacking factor will be least for
   A) Square core B) Cruciform core
   C) Three stepped core D) Four stepped core

18) The material used for making electromagnet magnet is
   A) Cast iron B) Soft iron C) Silicon steel D) Hard steel

19) Short circuit test on a transformer is conducted to obtain
   A) The leakage impedances B) The ohmic loss
   C) Hysteresis loss only D) Core loss only

20) Stepped core is used to
   A) Increase output B) Reduces the cost
   C) Decrease the cost of copper D) Increases efficiency

SLR-EP – 352

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) (New) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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) Derive an expression for no load current of three phase transformer.
   b) Estimate magnetizing current per phase for 11000/415 V, three phase, delta-star core type transformer from the following data :
      i) Gross cross section area of limb and yoke = 200 cm^2
      ii) Height of each limb = 130 cm
      iii) Length of each yoke = 100 cm
      iv) Stacking factor = 0.9
      v) Density of steel = 7600 Kg/m^3
      vi) Reactive VA/Kg = 5.
   c) Explain the different conducting materials used for electrical machines.
   d) Derive the output equation of three phase transformer.
   e) Explain the design procedure of cooling tubes used for transformer.

3. Solve **any two** : **(2×10=20)**
   a) Why stepped cores are used in transformer ? Explain different core section used for transformer.
   b) Explain the different modes of heat transfer.
   c) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 200 KVA, 6.6 KV/440 V, 50 Hz, three phase delta/star core transformer. Emf/turn = 10 V, stacking factor = 0.9, a flux density of 1.3 Wb/m^2, current density of 2.5 A/Sq.mm, window space factor of 0.3, overall height = overall width.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Derive an expression for winding resistance of three phase induction motor.

   b) Explain short circuit ratio and its effect on performance of synchronous machine.

   c) Derive an output equation of 3ϕ induction motor.

   d) A 500 KVA, 600 rpm, 3.3 KV, 50 Hz, 3-phase, salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 Wb/m^2. The ratio of pole arc to pole pitch = 0.65, the short circuit ratio = 1.2 and gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.

   e) Discuss different factors to be considered while making choice of specific loading for three phase induction motor.

5. Solve **any two** : **(2×10=20)**

   a) Explain the design procedure of squirrel cage rotor of three phase induction motor.

   b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor. D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 m Wb, current density = 4 A/mm^2, winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.

   c) Explain the design procedure field winding in an alternator.

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SLR-EP – 352

Seat No.	

Set R

B.E. (Electrical and Electronics Engg.) (Part – II) (New) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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 alternatives : **(20×1=20)**

1) Line joining tangent and output line in a circle diagram gives
   A) Copper loss B) Stator loss
   C) Maximum output D) Maximum torque

2) The stacking factor will be least for
   A) Square core B) Cruciform core
   C) Three stepped core D) Four stepped core

3) The material used for making electromagnet magnet is
   A) Cast iron B) Soft iron C) Silicon steel D) Hard steel

4) Short circuit test on a transformer is conducted to obtain
   A) The leakage impedances B) The ohmic loss
   C) Hysteresis loss only D) Core loss only

5) Stepped core is used to
   A) Increase output B) Reduces the cost
   C) Decrease the cost of copper D) Increases efficiency

6) Skewing of rotor slots helps in
   A) Improving beat transfer B) Reducing noise
   C) Suppressing undesirable harmonics D) All of the above

7) The thickness of laminations of the core of a power transformer usually
   A) 0.003 to 0.05 mm B) 0.03 to 0.05 mm
   C) 0.03 to 0.5 mm D) 3 to 5 mm

8) If the permeability of a material is more than 1 but less than 1.1, it can be classified as
   A) Diamagnetic material B) Paramagnetic material
   C) Ferro-magnetic material D) Ferrite

P.T.O.

9) Magnetostriction
   A) Grain oriented magnetic properties
   B) Represents the upper limit to which magnetic properties can be induced
   C) Change in dimensions resulting from magnetization of ferromagnetic materials
   D) None of the above

10) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
   A) 10 MW B) 20 MW C) 25 MW D) 50 MW

11) Air gap of a 3 phase induction motor is kept small to
   A) reduce the possibility of the crawling
   B) reduce the magnetizing current
   C) reduce the noise
   D) obtain high starting torque

12) The material used for high frequency transformer
   A) Cast iron B) Paramagnetic C) Soft iron D) Ferrite

13) Distribution 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

14) In an oil filled transformer, oil is provided for
   A) Cooling B) Insulation
   C) Lubricating D) Both cooling and insulation

15) An ideal insulating material should have low
   A) Insulation resistance B) Dielectric strength
   C) Dielectric loss angle D) Mechanic strength

16) Which component of the no load current of the transformer is in phase to the Induced EMF ?
   A) Magnetizing component B) Core loss component
   C) Both (A) and (B) above D) None of the above

17) In an Induction motor L/T = 1.5-2 for
   A) Minimum cost B) Good efficiency
   C) Overall good design D) Good PF

18) Specific magnetic loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

19) Hysteresis loss varies with maximum flux density (B) as
   A) B B) $B^{1.6}$ C) B^{2} D) $B^{2.6}$

20) Open circuit test on a transformer is conducted to obtain
   A) the leakage impedances B) the ohmic loss
   C) hysteresis loss only D) core loss only

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SLR-EP – 352

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) (New) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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) Derive an expression for no load current of three phase transformer.

b) Estimate magnetizing current per phase for 11000/415 V, three phase, delta-star core type transformer from the following data :
   i) Gross cross section area of limb and yoke = 200 cm^2
   ii) Height of each limb = 130 cm
   iii) Length of each yoke = 100 cm
   iv) Stacking factor = 0.9
   v) Density of steel = 7600 Kg/m^3
   vi) Reactive VA/Kg = 5.

c) Explain the different conducting materials used for electrical machines.

d) Derive the output equation of three phase transformer.

e) Explain the design procedure of cooling tubes used for transformer.

3. Solve **any two** : **(2×10=20)**

a) Why stepped cores are used in transformer ? Explain different core section used for transformer.

b) Explain the different modes of heat transfer.

c) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 200 KVA, 6.6 KV/440 V, 50 Hz, three phase delta/star core transformer. Emf/turn = 10 V, stacking factor = 0.9, a flux density of 1.3 Wb/m^2, current density of 2.5 A/Sq.mm, window space factor of 0.3, overall height = overall width.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Derive an expression for winding resistance of three phase induction motor.

   b) Explain short circuit ratio and its effect on performance of synchronous machine.

   c) Derive an output equation of 3ϕ induction motor.

   d) A 500 KVA, 600 rpm, 3.3 KV, 50 Hz, 3-phase, salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 Wb/m^2. The ratio of pole arc to pole pitch = 0.65, the short circuit ratio = 1.2 and gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.

   e) Discuss different factors to be considered while making choice of specific loading for three phase induction motor.

5. Solve **any two** : **(2×10=20)**

   a) Explain the design procedure of squirrel cage rotor of three phase induction motor.

   b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor. D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 m Wb, current density = 4 A/mm^2, winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.

   c) Explain the design procedure field winding in an alternator.

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SLR-EP – 352

Seat No.	

Set **S**

B.E. (Electrical and Electronics Engg.) (Part – II) (New) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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 alternatives : **(20×1=20)**

1) Which component of the no load current of the transformer is in phase to the Induced EMF ?
   A) Magnetizing component B) Core loss component
   C) Both (A) and (B) above D) None of the above

2) In an Induction motor L/T = 1.5-2 for
   A) Minimum cost B) Good efficiency
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3) Specific magnetic loading is not governed by
   A) Heating B) Speed of machine
   C) Machine size D) Magnetizing current

4) Hysteresis loss varies with maximum flux density (B) as
   A) B B) $B^{1.6}$ C) B^2 D) $B^{2.6}$

5) Open circuit test on a transformer is conducted to obtain
   A) the leakage impedances B) the ohmic loss
   C) hysteresis loss only D) core loss only

6) Line joining tangent and output line in a circle diagram gives
   A) Copper loss B) Stator loss
   C) Maximum output D) Maximum torque

7) The stacking factor will be least for
   A) Square core B) Cruciform core
   C) Three stepped core D) Four stepped core

8) The material used for making electromagnet magnet is
   A) Cast iron B) Soft iron C) Silicon steel D) Hard steel

P.T.O.

9) Short circuit test on a transformer is conducted to obtain
   A) The leakage impedances B) The ohmic loss
   C) Hysteresis loss only D) Core loss only

10) Stepped core is used to
   A) Increase output B) Reduces the cost
   C) Decrease the cost of copper D) Increases efficiency

11) Skewing of rotor slots helps in
   A) Improving beat transfer B) Reducing noise
   C) Suppressing undesirable harmonics D) All of the above

12) The thickness of laminations of the core of a power transformer usually
   A) 0.003 to 0.05 mm B) 0.03 to 0.05 mm
   C) 0.03 to 0.5 mm D) 3 to 5 mm

13) If the permeability of a material is more than 1 but less than 1.1, it can be classified as
   A) Diamagnetic material B) Paramagnetic material
   C) Ferro-magnetic material D) Ferrite

14) Magnetostriction
   A) Grain oriented magnetic properties
   B) Represents the upper limit to which magnetic properties can be induced
   C) Change in dimensions resulting from magnetization of ferromagnetic materials
   D) None of the above

15) Turbo-alternators of rating _____ and above are normally hydrogen cooled.
   A) 10 MW B) 20 MW C) 25 MW D) 50 MW

16) Air gap of a 3 phase induction motor is kept small to
   A) reduce the possibility of the crawling
   B) reduce the magnetizing current
   C) reduce the noise
   D) obtain high starting torque

17) The material used for high frequency transformer
   A) Cast iron B) Paramagnetic C) Soft iron D) Ferrite

18) Distribution 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

19) In an oil filled transformer, oil is provided for
   A) Cooling B) Insulation
   C) Lubricating D) Both cooling and insulation

20) An ideal insulating material should have low
   A) Insulation resistance B) Dielectric strength
   C) Dielectric loss angle D) Mechanic strength

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SLR-EP – 352

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) (New) Examination, 2016
ELECTRICAL MACHINE DESIGN

Day and Date : Tuesday, 22-11-2016 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) Derive an expression for no load current of three phase transformer.

b) Estimate magnetizing current per phase for 11000/415 V, three phase, delta-star core type transformer from the following data :
   i) Gross cross section area of limb and yoke = 200 cm^2
   ii) Height of each limb = 130 cm
   iii) Length of each yoke = 100 cm
   iv) Stacking factor = 0.9
   v) Density of steel = 7600 Kg/m^3
   vi) Reactive VA/Kg = 5.

c) Explain the different conducting materials used for electrical machines.

d) Derive the output equation of three phase transformer.

e) Explain the design procedure of cooling tubes used for transformer.

3. Solve **any two** : **(2×10=20)**

a) Why stepped cores are used in transformer ? Explain different core section used for transformer.

b) Explain the different modes of heat transfer.

c) Estimate the main dimensions of core, number of turns and cross-sectional area of conductor for a 200 KVA, 6.6 KV/440 V, 50 Hz, three phase delta/star core transformer. Emf/turn = 10 V, stacking factor = 0.9, a flux density of 1.3 Wb/m^2, current density of 2.5 A/Sq.mm, window space factor of 0.3, overall height = overall width.

SECTION – II

4. Solve **any four** : **(4×5=20)**

   a) Derive an expression for winding resistance of three phase induction motor.

   b) Explain short circuit ratio and its effect on performance of synchronous machine.

   c) Derive an output equation of 3ϕ induction motor.

   d) A 500 KVA, 600 rpm, 3.3 KV, 50 Hz, 3-phase, salient pole alternator has 180 turns per phase. Estimate the length of air gap if the average flux density is 0.54 Wb/m^2. The ratio of pole arc to pole pitch = 0.65, the short circuit ratio = 1.2 and gap extension coefficient = 1.15. The mmf required for gap is 80% of no load field mmf. Winding factor = 0.955.

   e) Discuss different factors to be considered while making choice of specific loading for three phase induction motor.

5. Solve **any two** : **(2×10=20)**

   a) Explain the design procedure of squirrel cage rotor of three phase induction motor.

   b) Determine the no. of stator and rotor slots, no. of rotor conductor and area of 30 KW, 3-phase, 50 Hz, 400 V, 6 poles slip ring induction motor. D = 40 cm, efficiency = 0.8, power factor = 0.8, flux per pole = 12.4 m Wb, current density = 4 A/mm^2, winding factor = 0.96, rotor voltage at slip ring at standstill about 200 V.

   c) Explain the design procedure field winding in an alternator.

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SLR-EP – 353

Seat No.	

Set **P**

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT (New)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) _____ is the process by which managers selects, train, promote and retire their sub-ordinates.
a) Directing b) Staffing c) Controlling d) Planning

2) The enterprise owned and managed by state is called as
a) Private company b) Public company
c) Joint stock company d) Partnership firm

3) _____ is not a function of management.
a) Leading b) Planning c) Forecasting d) Staffing

4) Effective managing doesnot requires
a) Education b) Leadership c) Punctuality d) Money

5) Which of the skill is most needed for top level managers ?
a) Technical and Human b) Technical and conceptual
c) Only Human d) Human and conceptual

6) Organization charts are useful because they can
a) Help, explain the organization to new staff
b) Help, plan management training and succession
c) Indicate apparent weakness in structure
d) All of above

7) In _____ leadership style, leader assumes all power and decisions.
a) Democratic b) Free-reign c) Autocratic d) None of above

8) The clearing house is managed by which of the following bank.
a) State Bank of India b) Co-operative Bank
c) Reserve Bank of India d) Commercial Bank

9) In an organization the policy decisions formally taken by
a) Supervisors b) Board of directors
c) Workers d) Trade union leader

P.T.O.

10) In private limited company the capital is collected from
a) Single partner b) Government c) Sleeping partner d) Private partners

11) Make and buy decisions are based on
a) Quality b) Quantity c) Urgency d) Variety

12) The main aim of value engineering is to study the relationship between _____ of a part.
a) Design function and cost b) Time and cost
c) Production and design d) Design and time

13) Which is the most appropriate statement in India's power generation scenario ?
a) Power generation targets fully achieved
b) Big gap between targets and achievements
c) No such targets ever fixed by government
d) There is excess power generation in the country all the times

14) Entrepreneurs essentially are required to
a) Carry out innovative activities b) Supervise the work of labour
c) Undertake labour welfare activities d) Celebrate events in org.

15) The authorities normally delegated to
a) The person of higher grade b) The person of below grade
c) No delegation is allow to any one d) Delegation is not necessary

16) High tech. industries may find it difficult to set
a) Short term goals b) Intermediate goals
c) Long term goals d) Co-ordinating

17) Premissing is
a) Choosing an appropriate course of action
b) Identifying opportunities and constraints affecting future operation for achieving an objective
c) Implementation of plan
d) Determination of future units

18) The father of scientific management is
a) Henri Fayol b) Fredrick Winslow Taylor
c) Frank Gilbert d) H. Emerson

19) Small scale industry employ _____ peoples.
a) 10 to 50 b) 20 to 50 c) 50 to 100 d) None of the above

20) In cost reduction process the reduction due to _____ are not treated as cost reduction.
a) Wind falls b) Fortunous receipts
c) Change in government policy d) All of above

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SLR-EP – 353

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT (New)

Day and Date : Wednesday, 23-11-2016 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 value Engineering. **5**
   b) Explain cost and cost ratios. **5**

3. Explain in detail tools of Engineering Economics. **10**

   OR

   Explain in detail different types of business organisations. **10**

4. Write short notes on **any four**. **(5×4=20)**
   a) Break even analysis
   b) Advantages and disadvantages of Partnership Firm
   c) Indian Economy for electrical sector
   d) Five year plan in Indian economy
   e) Joint stock company.

SECTION – II

5. Explain the functions of management in detail. **10**

6. Explain the various steps and procedures for setting small scale industry. **10**

   OR

   Explain definition, types, functions and qualities of entrepreneur. **10**

7. Write short notes on **any four**. **(5×4=20)**
   a) Industrial safety
   b) Management information system
   c) Project planning tools
   d) Indian electricity acts and rules
   e) Industrial policies for small scale industry.

Set P

Set P

SLR-EP – 353

Seat No.	

Set Q

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT (New)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) High tech. industries may find it difficult to set
   a) Short term goals b) Intermediate goals
   c) Long term goals d) Co-ordinating

2) Premissing is
   a) Choosing an appropriate course of action
   b) Identifying opportunities and constraints affecting future operation for achieving an objective
   c) Implementation of plan
   d) Determination of future units

3) The father of scientific management is
   a) Henri Fayol b) Fredrick Winslow Taylor
   c) Frank Gilbert d) H. Emerson

4) Small scale industry employ _____ peoples.
   a) 10 to 50 b) 20 to 50 c) 50 to 100 d) None of the above

5) In cost reduction process the reduction due to _____ are not treated as cost reduction.
   a) Wind falls b) Fortunous receipts
   c) Change in government policy d) All of above

6) _____ is the process by which managers selects, train, promote and retire their sub-ordinates.
   a) Directing b) Staffing c) Controlling d) Planning

7) The enterprise owned and managed by state is called as
   a) Private company b) Public company
   c) Joint stock company d) Partnership firm

P.T.O.

8) _____ is not a function of management.
a) Leading b) Planning c) Forecasting d) Staffing

9) Effective managing doesnot requires
a) Education b) Leadership c) Punctuality d) Money

10) Which of the skill is most needed for top level managers ?
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a) Help, explain the organization to new staff
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d) All of above

12) In _____ leadership style, leader assumes all power and decisions.
a) Democratic b) Free-reign c) Autocratic d) None of above

13) The clearing house is managed by which of the following bank.
a) State Bank of India b) Co-operative Bank
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14) In an organization the policy decisions formally taken by
a) Supervisors b) Board of directors
c) Workers d) Trade union leader

15) In private limited company the capital is collected from
a) Single partner b) Government c) Sleeping partner d) Private partners

16) Make and buy decisions are based on
a) Quality b) Quantity c) Urgency d) Variety

17) The main aim of value engineering is to study the relationship between _____ of a part.
a) Design function and cost b) Time and cost
c) Production and design d) Design and time

18) Which is the most appropriate statement in India's power generation scenario ?
a) Power generation targets fully achieved
b) Big gap between targets and achievements
c) No such targets ever fixed by government
d) There is excess power generation in the country all the times

19) Entrepreneurs essentially are required to
a) Carry out innovative activities b) Supervise the work of labour
c) Undertake labour welfare activities d) Celebrate events in org.

20) The authorities normally delegated to
a) The person of higher grade b) The person of below grade
c) No delegation is allow to any one d) Delegation is not necessary

_____

SLR-EP – 353

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT (New)

Day and Date : Wednesday, 23-11-2016 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 value Engineering. **5**
   b) Explain cost and cost ratios. **5**

3. Explain in detail tools of Engineering Economics. **10**

   OR

   Explain in detail different types of business organisations. **10**

4. Write short notes on **any four**. **(5×4=20)**
   a) Break even analysis
   b) Advantages and disadvantages of Partnership Firm
   c) Indian Economy for electrical sector
   d) Five year plan in Indian economy
   e) Joint stock company.

SECTION – II

5. Explain the functions of management in detail. **10**

6. Explain the various steps and procedures for setting small scale industry. **10**

   OR

   Explain definition, types, functions and qualities of entrepreneur. **10**

7. Write short notes on **any four**. **(5×4=20)**
   a) Industrial safety
   b) Management information system
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   e) Industrial policies for small scale industry.

Set Q

Set Q

SLR-EP – 353

Seat No.	

Set R

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT (New)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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2) ***Answer MCQ/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****.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) Make and buy decisions are based on
a) Quality b) Quantity c) Urgency d) Variety

2) The main aim of value engineering is to study the relationship between _____ of a part.
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6) High tech. industries may find it difficult to set
a) Short term goals b) Intermediate goals
c) Long term goals d) Co-ordinating

7) Premissing is
a) Choosing an appropriate course of action
b) Identifying opportunities and constraints affecting future operation for achieving an objective
c) Implementation of plan
d) Determination of future units

P.T.O.

8) The father of scientific management is
   a) Henri Fayol b) Fredrick Winslow Taylor
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13) _____ is not a function of management.
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_____

SLR-EP – 353

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT (New)

Day and Date : Wednesday, 23-11-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

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

2. a) Explain value Engineering. **5**
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3. Explain in detail tools of Engineering Economics. **10**

   OR

   Explain in detail different types of business organisations. **10**

4. Write short notes on **any four**. **(5×4=20)**
   a) Break even analysis
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   e) Joint stock company.

SECTION – II

5. Explain the functions of management in detail. **10**

6. Explain the various steps and procedures for setting small scale industry. **10**

   OR

   Explain definition, types, functions and qualities of entrepreneur. **10**

7. Write short notes on **any four**. **(5×4=20)**
   a) Industrial safety
   b) Management information system
   c) Project planning tools
   d) Indian electricity acts and rules
   e) Industrial policies for small scale industry.

Set R

Set R

SLR-EP – 353

Seat No.	

Set S

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT (New)

Day and Date : Wednesday, 23-11-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

N.B. *: 1) Q. No.* ***1*** *is* ***compulsory****. It should be solved in* ***first 30 minutes*** *in Answer Book Page No.* ***3****.* ***Each*** *question carries* ***one*** *mark.*
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3) ***All*** *questions are* ***compulsory****.*
4) Figures to the ***right*** *indicate* ***full*** *marks.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

1. Choose the correct answer : **20**

1) Organization charts are useful because they can
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   c) Indicate apparent weakness in structure
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P.T.O.

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   a) Technical and Human
   b) Technical and conceptual
   c) Only Human
   d) Human and conceptual

_____

SLR-EP – 353

Seat No.	

B.E. (Electrical and Electronics Engg.) (Part – II) Examination, 2016
ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT (New)

Day and Date : Wednesday, 23-11-2016 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 value Engineering. **5**
   b) Explain cost and cost ratios. **5**

3. Explain in detail tools of Engineering Economics. **10**

   OR

   Explain in detail different types of business organisations. **10**

4. Write short notes on **any four**. **(5×4=20)**
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   b) Advantages and disadvantages of Partnership Firm
   c) Indian Economy for electrical sector
   d) Five year plan in Indian economy
   e) Joint stock company.

SECTION – II

5. Explain the functions of management in detail. **10**

6. Explain the various steps and procedures for setting small scale industry. **10**

   OR

   Explain definition, types, functions and qualities of entrepreneur. **10**

7. Write short notes on **any four**. **(5×4=20)**
   a) Industrial safety
   b) Management information system
   c) Project planning tools
   d) Indian electricity acts and rules
   e) Industrial policies for small scale industry.

Set S

Set S

SLR-EP – 373

Seat No.	

Set P

B.E. (Electrical & Electronics Engineering) (Part – I) (Old) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 13-12-2016 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 essential element of an electronic instrument are
   a) Transducer b) Signal Conditioner
   c) Indicating device d) All of above

2) The current sensitivity of a meter is expressed in
   a) Ampere b) Ohm/ampere c) Ohm/volt d) Ampere/division

3) The main difference between the electrical and electronics instrument is that an electronic instrument contains
   a) An electronic device b) Transducer
   c) Digital read out d) Electrons

4) A vertical amplifier for CRO can be designed for
   a) High frequency signals with a fast rise time
   b) High amplitude signals with slow rise time
   c) High amplitude signals with fast rise time
   d) Low amplitude signals with fast rise time

5) AC amplifier are best suited for
   a) Steady state signal b) Low frequency signals
   c) Rapidly varying signal d) None of above

6) What are the desirable features in an electronic amplifier ?
   a) High output impedance b) Low input impedance
   c) Good frequency response d) All of above

7) One of the following can act as an Inverse transducer
   a) electrical resistance potentiometer b) LVDT
   c) capacitive transducer d) piezo electric crystals

8) An inverse transducer can convert
   a) Electrical energy to any other form of energy
   b) Electrical energy to light energy
   c) Mechanical displacement into electrical signal
   d) Electrical energy to mechanical form

P.T.O.

9) A strip chart recorder is
   a) an active transducer
   b) an inverse transducer
   c) an output transducer
   d) b and c

10) FM System as compared to AM system are
   a) Less affected by noise
   b) Equally affected by noise
   c) More affected by noise
   d) Highly affected by noise since they operate at VHF & UHF

11) FM telemetry as compared with AM telemetry requires a channel that is
   a) Smaller than what is required for AM telemetry
   b) Equal of that of AM telemetry
   c) 10 times that required for AM telemetry
   d) 100 times that required for AM telemetry

12) Which of the following has highest frequency response and least response time ?
   a) X-Y plotter b) U-V recorder c) pen recorder d) CRO

13) XY 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) all of above

14) The purpose of instrument is to
   a) allow measurement is to be made
   b) transmit the information
   c) change signals
   d) all of the above

15) The intermediate stage of an instrument is used to
   a) sense the primary (input) signal
   b) indicate or record the measurements
   c) amplify and transmit the secondary signal (signal after it has been transduced)
   d) all of the above

16) In a digital storage oscilloscope, the input signals are
   a) Directly applied to the oscilloscope
   b) Multiplexed, converted to digital form and stored and applied to oscilloscope
   c) Multiplexed, converted to digital form and stored, converted to analog form and applied to oscilloscope
   d) Applied to amplifier, stored as analog signals, multiplexed, converted to digital form, stored in digital form, converted to analog form, and applied to CRO through an amplifier

17) The source of emission of electrons in a CRT is
   a) PN junction diode
   b) a barium and strontium oxide coated cathode
   c) accelerating anodes
   d) post accelerating anodes

18) RTD is a/an
   a) active transducer
   b) passive transducer
   c) inductive transducer
   d) capacitive transducer

19) A thermocouple is
   a) Two similar metals connected together
   b) Two dissimilar metals connected together
   c) Two wire wound resistors connected together
   d) Two inductive coils connected together

20) The closeness of values indicated by an instrument to the actual value is defined as
   a) Repeatability b) Reliability c) Uncertainty d) Accuracy

———————

SLR-EP – 373

Seat No.	

B.E. (Electrical & Electronics Engineering) (Part – I) (Old) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 13-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four**. **(4×5=20)**
   a) Draw block diagram of Instrumentation system and explain function of each.
   b) Explain method of measurement displacement with LVDT.
   c) Explain with neat diagram working of sample and hold circuit.
   d) Define the following terms :
      a) Accuracy b) Precision
      c) Errors d) Resolution
      e) Uncernities.
   e) Draw and explain diode bridge modulator.

3. a) With neat diagram explain programmable gain amplifier. Also derive the expression for gain. **10**

   OR

   b) With neat diagram explain chopper stabilized type amplifier. **10**
   c) Explain data acquisition system. **10**

SECTION – II

4. Solve **any four**. **(4×5=20)**
   a) Give any five advantages and disadvantages of digital data transmission over analog data transmission.
   b) Explain time division multiplexing.
   c) Explain working of strip-chart recorder with neat diagram.
   d) Write short note on installation of PLC.
   e) State and explain basic components of tape recorder.

5. a) Explain storage oscilloscope with neat block diagram. **10**

   OR

   b) What is Telemetry ? Explain time division multiplexing and frequency division multiplexing. **10**
   c) Explain with diagram method of voltage to frequency conversion and derive its equation. **10**

Set P

Set P

SLR-EP – 373

Seat No.	

Set Q

B.E. (Electrical & Electronics Engineering) (Part – I) (Old) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 13-12-2016 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.*
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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In a digital storage oscilloscope, the input signals are
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P.T.O.

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20) The intermediate stage of an instrument is used to
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   b) indicate or record the measurements
   c) amplify and transmit the secondary signal (signal after it has been transduced)
   d) all of the above

SLR-EP – 373

Seat No.	

B.E. (Electrical & Electronics Engineering) (Part – I) (Old) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 13-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

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   e) Draw and explain diode bridge modulator.

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   b) With neat diagram explain chopper stabilized type amplifier. **10**
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SECTION – II

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   a) Give any five advantages and disadvantages of digital data transmission over analog data transmission.
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   c) Explain with diagram method of voltage to frequency conversion and derive its equation. **10**

Set Q

Set Q

SLR-EP – 373

Seat No.	

Set R

B.E. (Electrical & Electronics Engineering) (Part – I) (Old) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 13-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) FM telemetry as compared with AM telemetry requires a channel that is
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6) In a digital storage oscilloscope, the input signals are
   a) Directly applied to the oscilloscope
   b) Multiplexed, converted to digital form and stored and applied to oscilloscope
   c) Multiplexed, converted to digital form and stored, converted to analog form and applied to oscilloscope
   d) Applied to amplifier, stored as analog signals, multiplexed, converted to digital form, stored in digital form, converted to analog form, and applied to CRO through an amplifier

7) The source of emission of electrons in a CRT is
   a) PN junction diode
   b) a barium and strontium oxide coated cathode
   c) accelerating anodes
   d) post accelerating anodes

P.T.O.

8) RTD is a/an
   a) active transducer b) passive transducer
   c) inductive transducer d) capacitive transducer

9) A thermocouple is
   a) Two similar metals connected together
   b) Two dissimilar metals connected together
   c) Two wire wound resistors connected together
   d) Two inductive coils connected together

10) The closeness of values indicated by an instrument to the actual value is defined as
   a) Repeatability b) Reliability c) Uncertainty d) Accuracy

11) The essential element of an electronic instrument are
   a) Transducer b) Signal Conditioner
   c) Indicating device d) All of above

12) The current sensitivity of a meter is expressed in
   a) Ampere b) Ohm/ampere c) Ohm/volt d) Ampere/division

13) The main difference between the electrical and electronics instrument is that an electronic instrument contains
   a) An electronic device b) Transducer
   c) Digital read out d) Electrons

14) A vertical amplifier for CRO can be designed for
   a) High frequency signals with a fast rise time
   b) High amplitude signals with slow rise time
   c) High amplitude signals with fast rise time
   d) Low amplitude signals with fast rise time

15) AC amplifier are best suited for
   a) Steady state signal b) Low frequency signals
   c) Rapidly varying signal d) None of above

16) What are the desirable features in an electronic amplifier ?
   a) High output impedance b) Low input impedance
   c) Good frequency response d) All of above

17) One of the following can act as an Inverse transducer
   a) electrical resistance potentiometer b) LVDT
   c) capacitive transducer d) piezo electric crystals

18) An inverse transducer can convert
   a) Electrical energy to any other form of energy
   b) Electrical energy to light energy
   c) Mechanical displacement into electrical signal
   d) Electrical energy to mechanical form

19) A strip chart recorder is
   a) an active transducer b) an inverse transducer
   c) an output transducer d) b and c

20) FM System as compared to AM system are
   a) Less affected by noise
   b) Equally affected by noise
   c) More affected by noise
   d) Highly affected by noise since they operate at VHF & UHF

SLR-EP – 373

Seat No.	

B.E. (Electrical & Electronics Engineering) (Part – I) (Old) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 13-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four**. **(4×5=20)**
   a) Draw block diagram of Instrumentation system and explain function of each.
   b) Explain method of measurement displacement with LVDT.
   c) Explain with neat diagram working of sample and hold circuit.
   d) Define the following terms :
      a) Accuracy b) Precision
      c) Errors d) Resolution
      e) Uncernities.
   e) Draw and explain diode bridge modulator.

3. a) With neat diagram explain programmable gain amplifier. Also derive the expression for gain. **10**

   OR

   b) With neat diagram explain chopper stabilized type amplifier. **10**
   c) Explain data acquisition system. **10**

SECTION – II

4. Solve **any four**. **(4×5=20)**
   a) Give any five advantages and disadvantages of digital data transmission over analog data transmission.
   b) Explain time division multiplexing.
   c) Explain working of strip-chart recorder with neat diagram.
   d) Write short note on installation of PLC.
   e) State and explain basic components of tape recorder.

5. a) Explain storage oscilloscope with neat block diagram. **10**

   OR

   b) What is Telemetry ? Explain time division multiplexing and frequency division multiplexing. **10**
   c) Explain with diagram method of voltage to frequency conversion and derive its equation. **10**

Set R

Set R

SLR-EP – 373

Seat No.	

Set S

B.E. (Electrical & Electronics Engineering) (Part – I) (Old) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 13-12-2016 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) What are the desirable features in an electronic amplifier ?
   a) High output impedance b) Low input impedance
   c) Good frequency response d) All of above

2) One of the following can act as an Inverse transducer
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   c) capacitive transducer d) piezo electric crystals

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   c) Mechanical displacement into electrical signal
   d) Electrical energy to mechanical form

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   a) an active transducer b) an inverse transducer
   c) an output transducer d) b and c

5) FM System as compared to AM system are
   a) Less affected by noise
   b) Equally affected by noise
   c) More affected by noise
   d) Highly affected by noise since they operate at VHF & UHF

6) FM telemetry as compared with AM telemetry requires a channel that is
   a) Smaller than what is required for AM telemetry
   b) Equal of that of AM telemetry
   c) 10 times that required for AM telemetry
   d) 100 times that required for AM telemetry

7) Which of the following has highest frequency response and least response time ?
   a) X-Y plotter b) U-V recorder c) pen recorder d) CRO

8) XY 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) all of above

P.T.O.

9) The purpose of instrument is to
   a) allow measurement is to be made
   b) transmit the information
   c) change signals
   d) all of the above

10) The intermediate stage of an instrument is used to
   a) sense the primary (input) signal
   b) indicate or record the measurements
   c) amplify and transmit the secondary signal (signal after it has been transduced)
   d) all of the above

11) In a digital storage oscilloscope, the input signals are
   a) Directly applied to the oscilloscope
   b) Multiplexed, converted to digital form and stored and applied to oscilloscope
   c) Multiplexed, converted to digital form and stored, converted to analog form and applied to oscilloscope
   d) Applied to amplifier, stored as analog signals, multiplexed, converted to digital form, stored in digital form, converted to analog form, and applied to CRO through an amplifier

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   a) PN junction diode
   b) a barium and strontium oxide coated cathode
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   d) post accelerating anodes

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   c) inductive transducer
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   d) All of above

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   c) Digital read out
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   c) High amplitude signals with fast rise time
   d) Low amplitude signals with fast rise time

20) AC amplifier are best suited for
   a) Steady state signal
   b) Low frequency signals
   c) Rapidly varying signal
   d) None of above

SLR-EP – 373

Seat No.	

B.E. (Electrical & Electronics Engineering) (Part – I) (Old) Examination, 2016
INSTRUMENTATION TECHNIQUES

Day and Date : Tuesday, 13-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Solve **any four**. **(4×5=20)**
   a) Draw block diagram of Instrumentation system and explain function of each.
   b) Explain method of measurement displacement with LVDT.
   c) Explain with neat diagram working of sample and hold circuit.
   d) Define the following terms :
      a) Accuracy b) Precision
      c) Errors d) Resolution
      e) Uncernities.
   e) Draw and explain diode bridge modulator.

3. a) With neat diagram explain programmable gain amplifier. Also derive the expression for gain. **10**

   OR

   b) With neat diagram explain chopper stabilized type amplifier. **10**
   c) Explain data acquisition system. **10**

SECTION – II

4. Solve **any four**. **(4×5=20)**
   a) Give any five advantages and disadvantages of digital data transmission over analog data transmission.
   b) Explain time division multiplexing.
   c) Explain working of strip-chart recorder with neat diagram.
   d) Write short note on installation of PLC.
   e) State and explain basic components of tape recorder.

5. a) Explain storage oscilloscope with neat block diagram. **10**

   OR

   b) What is Telemetry ? Explain time division multiplexing and frequency division multiplexing. **10**
   c) Explain with diagram method of voltage to frequency conversion and derive its equation. **10**

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Set S

Set S

SLR-EP – 374

Seat No.	

Set **P**

B.E. (Electrical & Electronics Engg.) (Part – I) (Old) Examination, 2016
POWER SYSTEM – II

Day and Date : Wednesday, 14-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) If all the sequence voltages at the fault point in a power system are equal, then the fault is a
   a) 3-phase fault b) Line to ground fault
   c) Line to line fault d) Double line to ground fault

2) The per unit impedance of a synchronous machine is 0.242, if the base voltage is increased by 1.1 times, the per unit value will be
   a) 0.266 b) 0.242 c) 0.200 d) 0.220

3) If positive, negative and zero sequence reactances of an element of a power system are 0.3, 0.3 and 0.8 pu respectively, then the element would be a
   a) Synchronous generator b) Synchronous motor
   c) Static load d) Transmission line

4) Which of the following results in a symmetrical fault ?
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phases to earth fault d) Two phase to earth

5) The magnitude of the fault current depends upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both (a) and (b)

6) In a star connected system without neutral grounding, zero sequence currents are
   a) Zero b) Phasor sum of phase currents
   c) Same as rms value of phase currents d) Same as peak value of phase currents

7) The positive sequence currents of a transmission line is
   a) Always zero b) 1/3 of negative sequence current
   c) Equal to negative sequence current d) 3 times negative sequence current

8) When a line to ground fault occurs, the current in the faulted phase is 100A. The zero sequence current in this case will be
   a) zero b) 33.3 A c) 66.6 A d) 100 A

9) Load frequency controls are carried out with
   a) P controllers only b) I controllers only c) D controllers only d) PID controllers

10) In AGC, the voltage and frequency is controlled by
   a) Excitation control
   b) Turbine speed control
   c) Turbine speed control and excitation control respectively
   d) Excitation control and Turbine speed control respectively

P.T.O.

11) The main objective of load frequency controller is to apply control of
   a) Frequency alone
   b) Frequency and at the same time of real power exchange via the outgoing lines
   c) Frequency and at the same time of real power exchange via the incoming lines
   d) Frequency and bus voltage

12) In power system, the maximum number of buses are
   a) Generator buses b) Load buses c) Slack buses d) P-V buses

13) The critical clearing time of a fault in power system is related to
   a) Reactive power limit b) Short circuit limit
   c) Steady state stability limit d) Transient stability limit

14) For what value of damping parameter, the transient stability is assured by equal area criterion ?
   a) Independent of systems damping b) If only damping is exactly zero
   c) For all values of damping parameters d) If only damping is positive and finite

15) The incremental fuel cost for two generating units are given by
   $IC_1 = 25 + 0.2\ PG_1$
   $IC_2 = 32 + 0.2\ PG_2$, where PG_1 and PG_2 are real power generated y the units
   The economic allocation for a total load of 250 MW, neglecting transmission loss is given by
   a) $PG_1 = 140.25$ MW, $PG_2 = 109.75$ MW b) $PG_1 = 109.75$ MW, $PG_2 = 140.25$ MW
   c) $PG_1 = PG_2 = 125$ MW d) $PG_1 = 100$ MW, $PG_2 = 150$ MW

16) The 'equal area criterion' for the determination of transient stability of a synchronous machine connected to an infinite bus
   a) Ignores line as well as synchronous machine resistances and shunt capacitances
   b) Assumes accelerating power acting on the rotor as constant
   c) Ignores the effect of voltage regulators and governor but considers the inherent damping present in the machine
   d) Takes into consideration the possibility of machine losing synchronism after it has survived during the first swing

17) In a multi-machine interconnected system, subsequent to a 3-phase fault, the transient stability is examined by
   a) Equal area criterion
   b) Solution of swing equation
   c) Either by equal area criterion or by solution of swing equation
   d) Combination of equal area criterion and by solution of swing equation

18) Steady state stability of a power system is improved by
   a) Reducing fault clearing time
   b) Single pole switching
   c) Using double circuit line instead of single circuit line
   d) Decreasing generator inertia

19) Which of the following statements is true ?
   a) Steady state stability limit is greater than transient stability limit
   b) Steady state stability limit is equal to transient stability limit
   c) Steady state stability limit is less than transient stability limit
   d) Transient stability limit is greater than steady state stability limit

20) The power transmission capacity of a transmission line is
   a) Proportional to transmission voltage
   b) Proportional to the square of transmission voltage
   c) Inversely proportional to transmission voltage
   d) Inversely proportional to the square of transmission voltage

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SLR-EP – 374

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (Old) Examination, 2016
POWER SYSTEM – II

Day and Date : Wednesday, 14-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume the suitable data* ***whenever*** *necessary.*
2) Attempt ***any two*** *questions from* ***each*** *Section.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

1) Draw the diagram of turbine speed governing system.

2) Draw zero sequence networks for transformer connections such as star-star, star-delta, delta-delta and delta-star.

3) Draw block diagram of automatic voltage control.

4) Differentiate between symmetrical and unsymmetrical faults.

5) Show the open conductors fault connections of sequence network.

3. Solve **any two** : **(10×2=20)**

1) Derive an expression for symmetrical component transformation.

2) Derive an expression for sequence impedance and network of transformer.

3) The one line diagram of a two generator system is shown in fig. (a). redraw the diagram to show all values in per unit on a 7000 kVA base i.e. (7 MVA base).

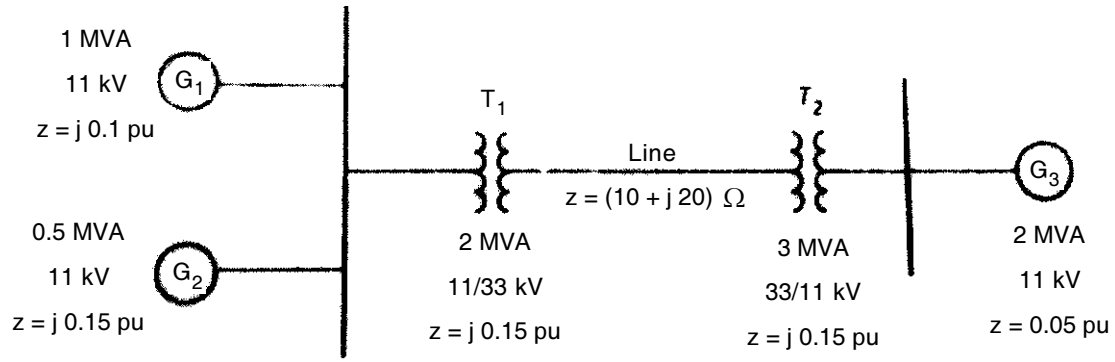

Fig. (a)

4) Explain load frequency control system.

Set P

SECTION – II

4. Solve **any four** : **(5×4=20)**

   1) Explain steady state and transient stability.

   2) Draw the block diagram of power system static security levels.

   3) Explain the dynamic of a synchronous machine.

   4) Derive the swing equations.

   5) Draw the curve of input-output of a generating unit and heat rate curve.

5. Solve **any two** : **(10×2=20)**

   1) Given a system of fig. (a) where a three phase fault is apply at the point P as shown,

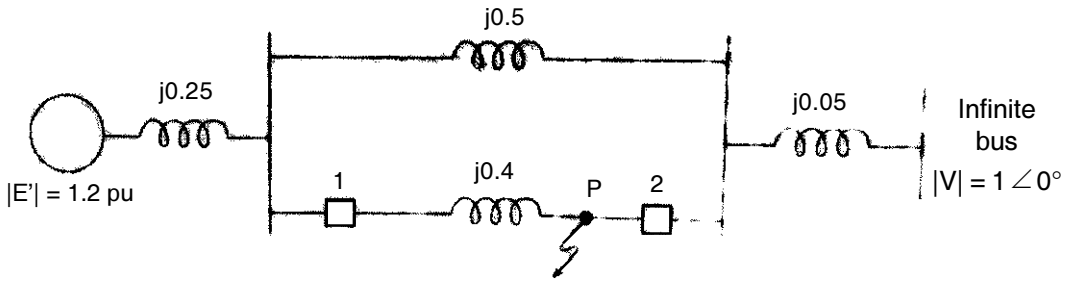

Fig. (b)

   Find the critical clearing angle for clearing the fault with simultaneous opening of the breakers 1 and 2. The reactance values of various components are indicated on the diagram. The generator is delivering 1.0 pu at the instant preceding the fault.

   2) Explain the concept of equal area criterion.

   3) Explain per unit system and their procedure to change the base values.

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SLR-EP – 374

Seat No.	

Set **Q**

B.E. (Electrical & Electronics Engg.) (Part – I) (Old) Examination, 2016
POWER SYSTEM – II

Day and Date : Wednesday, 14-12-2016 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.*
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4) *Attempt* ***any two*** *questions from* ***each*** *Section.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The 'equal area criterion' for the determination of transient stability of a synchronous machine connected to an infinite bus
   a) Ignores line as well as synchronous machine resistances and shunt capacitances
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   b) Single pole switching
   c) Using double circuit line instead of single circuit line
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4) Which of the following statements is true ?
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   c) Steady state stability limit is less than transient stability limit
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P.T.O.

8) If positive, negative and zero sequence reactances of an element of a power system are 0.3, 0.3 and 0.8 pu respectively, then the element would be a
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   $IC_2 = 32 + 0.2\ PG_2$, where PG_1 and PG_2 are real power generated y the units

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SLR-EP – 374

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (Old) Examination, 2016
POWER SYSTEM – II

Day and Date : Wednesday, 14-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume the suitable data* ***whenever*** *necessary.*
2) Attempt ***any two*** *questions from* ***each*** *Section.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

1) Draw the diagram of turbine speed governing system.

2) Draw zero sequence networks for transformer connections such as star-star, star-delta, delta-delta and delta-star.

3) Draw block diagram of automatic voltage control.

4) Differentiate between symmetrical and unsymmetrical faults.

5) Show the open conductors fault connections of sequence network.

3. Solve **any two** : **(10×2=20)**

1) Derive an expression for symmetrical component transformation.

2) Derive an expression for sequence impedance and network of transformer.

3) The one line diagram of a two generator system is shown in fig. (a). redraw the diagram to show all values in per unit on a 7000 kVA base i.e. (7 MVA base).

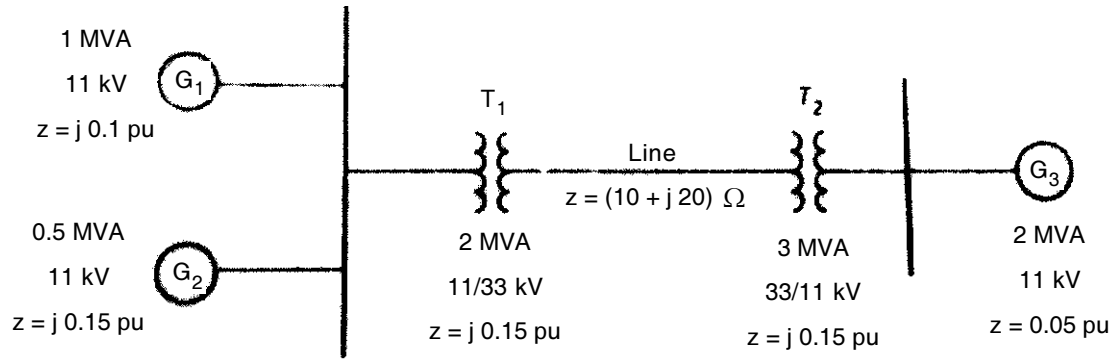

Fig. (a)

4) Explain load frequency control system.

Set Q

SECTION – II

4. Solve **any four** : **(5×4=20)**

   1) Explain steady state and transient stability.

   2) Draw the block diagram of power system static security levels.

   3) Explain the dynamic of a synchronous machine.

   4) Derive the swing equations.

   5) Draw the curve of input-output of a generating unit and heat rate curve.

5. Solve **any two** : **(10×2=20)**

   1) Given a system of fig. (a) where a three phase fault is apply at the point P as shown,

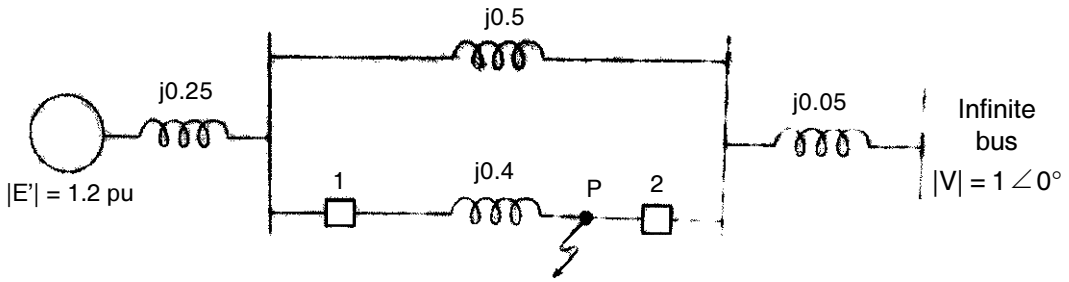

Fig. (b)

   Find the critical clearing angle for clearing the fault with simultaneous opening of the breakers 1 and 2. The reactance values of various components are indicated on the diagram. The generator is delivering 1.0 pu at the instant preceding the fault.

   2) Explain the concept of equal area criterion.

   3) Explain per unit system and their procedure to change the base values.

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SLR-EP – 374

Seat No.	

Set R

B.E. (Electrical & Electronics Engg.) (Part – I) (Old) Examination, 2016
POWER SYSTEM – II

Day and Date : Wednesday, 14-12-2016 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.*
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3) Assume the suitable data ***whenever*** *necessary.*
4) Attempt ***any two*** *questions from* ***each*** *Section.*

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) The main objective of load frequency controller is to apply control of
   a) Frequency alone
   b) Frequency and at the same time of real power exchange via the outgoing lines
   c) Frequency and at the same time of real power exchange via the incoming lines
   d) Frequency and bus voltage

2) In power system, the maximum number of buses are
   a) Generator buses b) Load buses c) Slack buses d) P-V buses

3) The critical clearing time of a fault in power system is related to
   a) Reactive power limit b) Short circuit limit
   c) Steady state stability limit d) Transient stability limit

4) For what value of damping parameter, the transient stability is assured by equal area criterion ?
   a) Independent of systems damping b) If only damping is exactly zero
   c) For all values of damping parameters d) If only damping is positive and finite

5) The incremental fuel cost for two generating units are given by
   $IC_1 = 25 + 0.2\ PG_1$
   $IC_2 = 32 + 0.2\ PG_2$, where PG_1 and PG_2 are real power generated y the units
   The economic allocation for a total load of 250 MW, neglecting transmission loss is given by
   a) $PG_1 = 140.25$ MW, $PG_2 = 109.75$ MW b) $PG_1 = 109.75$ MW, $PG_2 = 140.25$ MW
   c) $PG_1 = PG_2 = 125$ MW d) $PG_1 = 100$ MW, $PG_2 = 150$ MW

6) The 'equal area criterion' for the determination of transient stability of a synchronous machine connected to an infinite bus
   a) Ignores line as well as synchronous machine resistances and shunt capacitances
   b) Assumes accelerating power acting on the rotor as constant
   c) Ignores the effect of voltage regulators and governor but considers the inherent damping present in the machine
   d) Takes into consideration the possibility of machine losing synchronism after it has survived during the first swing

7) In a multi-machine interconnected system, subsequent to a 3-phase fault, the transient stability is examined by
   a) Equal area criterion
   b) Solution of swing equation
   c) Either by equal area criterion or by solution of swing equation
   d) Combination of equal area criterion and by solution of swing equation

P.T.O.

8) Steady state stability of a power system is improved by
   a) Reducing fault clearing time
   b) Single pole switching
   c) Using double circuit line instead of single circuit line
   d) Decreasing generator inertia

9) Which of the following statements is true ?
   a) Steady state stability limit is greater than transient stability limit
   b) Steady state stability limit is equal to transient stability limit
   c) Steady state stability limit is less than transient stability limit
   d) Transient stability limit is greater than steady state stability limit

10) The power transmission capacity of a transmission line is
   a) Proportional to transmission voltage
   b) Proportional to the square of transmission voltage
   c) Inversely proportional to transmission voltage
   d) Inversely proportional to the square of transmission voltage

11) If all the sequence voltages at the fault point in a power system are equal, then the fault is a
   a) 3-phase fault b) Line to ground fault
   c) Line to line fault d) Double line to ground fault

12) The per unit impedance of a synchronous machine is 0.242, if the base voltage is increased by 1.1 times, the per unit value will be
   a) 0.266 b) 0.242 c) 0.200 d) 0.220

13) If positive, negative and zero sequence reactances of an element of a power system are 0.3, 0.3 and 0.8 pu respectively, then the element would be a
   a) Synchronous generator b) Synchronous motor
   c) Static load d) Transmission line

14) Which of the following results in a symmetrical fault ?
   a) Single line to ground fault b) Phase to phase fault
   c) All the three phases to earth fault d) Two phase to earth

15) The magnitude of the fault current depends upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both (a) and (b)

16) In a star connected system without neutral grounding, zero sequence currents are
   a) Zero b) Phasor sum of phase currents
   c) Same as rms value of phase currents d) Same as peak value of phase currents

17) The positive sequence currents of a transmission line is
   a) Always zero b) 1/3 of negative sequence current
   c) Equal to negative sequence current d) 3 times negative sequence current

18) When a line to ground fault occurs, the current in the faulted phase is 100A. The zero sequence current in this case will be
   a) zero b) 33.3 A c) 66.6 A d) 100 A

19) Load frequency controls are carried out with
   a) P controllers only b) I controllers only c) D controllers only d) PID controllers

20) In AGC, the voltage and frequency is controlled by
   a) Excitation control
   b) Turbine speed control
   c) Turbine speed control and excitation control respectively
   d) Excitation control and Turbine speed control respectively

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SLR-EP – 374

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (Old) Examination, 2016
POWER SYSTEM – II

Day and Date : Wednesday, 14-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume the suitable data* ***whenever*** *necessary.*
2) Attempt ***any two*** *questions from* ***each*** *Section.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

1) Draw the diagram of turbine speed governing system.

2) Draw zero sequence networks for transformer connections such as star-star, star-delta, delta-delta and delta-star.

3) Draw block diagram of automatic voltage control.

4) Differentiate between symmetrical and unsymmetrical faults.

5) Show the open conductors fault connections of sequence network.

3. Solve **any two** : **(10×2=20)**

1) Derive an expression for symmetrical component transformation.

2) Derive an expression for sequence impedance and network of transformer.

3) The one line diagram of a two generator system is shown in fig. (a). redraw the diagram to show all values in per unit on a 7000 kVA base i.e. (7 MVA base).

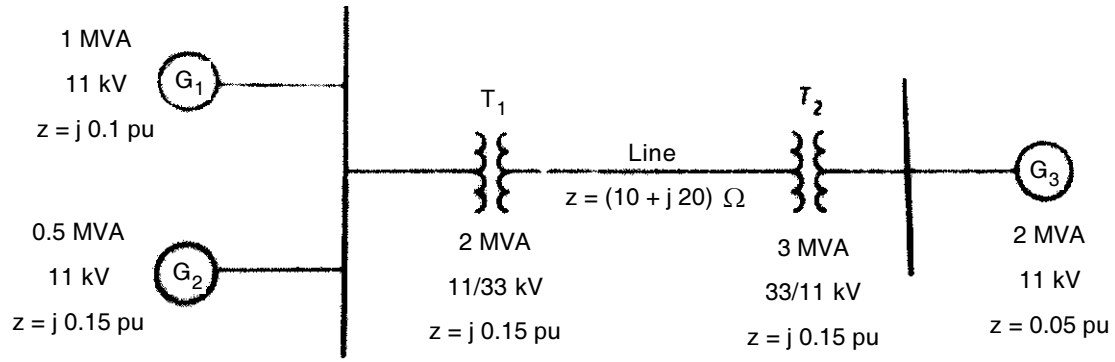

Fig. (a)

4) Explain load frequency control system.

Set R

SECTION – II

4. Solve **any four** : **(5×4=20)**

   1) Explain steady state and transient stability.

   2) Draw the block diagram of power system static security levels.

   3) Explain the dynamic of a synchronous machine.

   4) Derive the swing equations.

   5) Draw the curve of input-output of a generating unit and heat rate curve.

5. Solve **any two** : **(10×2=20)**

   1) Given a system of fig. (a) where a three phase fault is apply at the point P as shown,

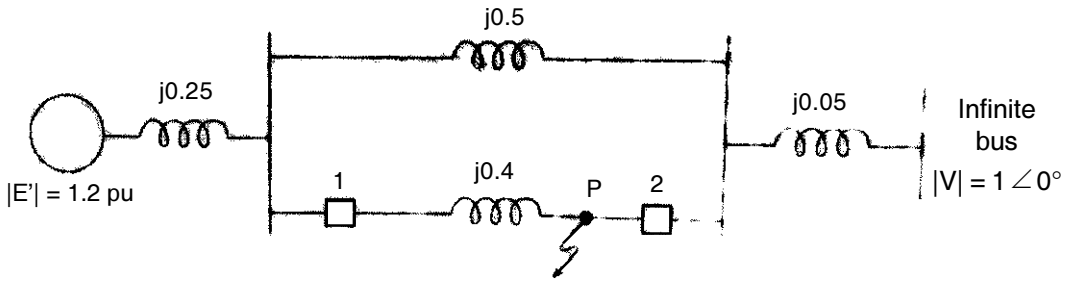

Fig. (b)

   Find the critical clearing angle for clearing the fault with simultaneous opening of the breakers 1 and 2. The reactance values of various components are indicated on the diagram. The generator is delivering 1.0 pu at the instant preceding the fault.

   2) Explain the concept of equal area criterion.

   3) Explain per unit system and their procedure to change the base values.

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SLR-EP – 374

Seat No.	

Set **S**

B.E. (Electrical & Electronics Engg.) (Part – I) (Old) Examination, 2016
POWER SYSTEM – II

Day and Date : Wednesday, 14-12-2016 Max. Marks : 100
Time : 3.00 p.m. to 6.00 p.m.

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

MCQ/Objective Type Questions

Duration : 30 Minutes Marks : 20

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

1) In a star connected system without neutral grounding, zero sequence currents are
   a) Zero
   b) Phasor sum of phase currents
   c) Same as rms value of phase currents
   d) Same as peak value of phase currents

2) The positive sequence currents of a transmission line is
   a) Always zero
   b) 1/3 of negative sequence current
   c) Equal to negative sequence current
   d) 3 times negative sequence current

3) When a line to ground fault occurs, the current in the faulted phase is 100A. The zero sequence current in this case will be
   a) zero b) 33.3 A c) 66.6 A d) 100 A

4) Load frequency controls are carried out with
   a) P controllers only b) I controllers only c) D controllers only d) PID controllers

5) In AGC, the voltage and frequency is controlled by
   a) Excitation control
   b) Turbine speed control
   c) Turbine speed control and excitation control respectively
   d) Excitation control and Turbine speed control respectively

6) The main objective of load frequency controller is to apply control of
   a) Frequency alone
   b) Frequency and at the same time of real power exchange via the outgoing lines
   c) Frequency and at the same time of real power exchange via the incoming lines
   d) Frequency and bus voltage

7) In power system, the maximum number of buses are
   a) Generator buses b) Load buses c) Slack buses d) P-V buses

8) The critical clearing time of a fault in power system is related to
   a) Reactive power limit
   b) Short circuit limit
   c) Steady state stability limit
   d) Transient stability limit

9) For what value of damping parameter, the transient stability is assured by equal area criterion ?
   a) Independent of systems damping
   b) If only damping is exactly zero
   c) For all values of damping parameters
   d) If only damping is positive and finite

P.T.O.

10) The incremental fuel cost for two generating units are given by

$IC_1 = 25 + 0.2\ PG_1$

$IC_2 = 32 + 0.2\ PG_2$, where PG_1 and PG_2 are real power generated y the units

The economic allocation for a total load of 250 MW, neglecting transmission loss is given by

a) $PG_1 = 140.25$ MW, $PG_2 = 109.75$ MW
b) $PG_1 = 109.75$ MW, $PG_2 = 140.25$ MW
c) $PG_1 = PG_2 = 125$ MW
d) $PG_1 = 100$ MW, $PG_2 = 150$ MW

11) The 'equal area criterion' for the determination of transient stability of a synchronous machine connected to an infinite bus
   a) Ignores line as well as synchronous machine resistances and shunt capacitances
   b) Assumes accelerating power acting on the rotor as constant
   c) Ignores the effect of voltage regulators and governor but considers the inherent damping present in the machine
   d) Takes into consideration the possibility of machine losing synchronism after it has survived during the first swing

12) In a multi-machine interconnected system, subsequent to a 3-phase fault, the transient stability is examined by
   a) Equal area criterion
   b) Solution of swing equation
   c) Either by equal area criterion or by solution of swing equation
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13) Steady state stability of a power system is improved by
   a) Reducing fault clearing time
   b) Single pole switching
   c) Using double circuit line instead of single circuit line
   d) Decreasing generator inertia

14) Which of the following statements is true ?
   a) Steady state stability limit is greater than transient stability limit
   b) Steady state stability limit is equal to transient stability limit
   c) Steady state stability limit is less than transient stability limit
   d) Transient stability limit is greater than steady state stability limit

15) The power transmission capacity of a transmission line is
   a) Proportional to transmission voltage
   b) Proportional to the square of transmission voltage
   c) Inversely proportional to transmission voltage
   d) Inversely proportional to the square of transmission voltage

16) If all the sequence voltages at the fault point in a power system are equal, then the fault is a
   a) 3-phase fault
   b) Line to ground fault
   c) Line to line fault
   d) Double line to ground fault

17) The per unit impedance of a synchronous machine is 0.242, if the base voltage is increased by 1.1 times, the per unit value will be
   a) 0.266 b) 0.242 c) 0.200 d) 0.220

18) If positive, negative and zero sequence reactances of an element of a power system are 0.3, 0.3 and 0.8 pu respectively, then the element would be a
   a) Synchronous generator
   b) Synchronous motor
   c) Static load
   d) Transmission line

19) Which of the following results in a symmetrical fault ?
   a) Single line to ground fault
   b) Phase to phase fault
   c) All the three phases to earth fault
   d) Two phase to earth

20) The magnitude of the fault current depends upon
   a) Total impedance up to fault
   b) Voltage at the fault point
   c) Load current being supplied before occurrence of fault
   d) Both (a) and (b)

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SLR-EP – 374

Seat No.	

B.E. (Electrical & Electronics Engg.) (Part – I) (Old) Examination, 2016
POWER SYSTEM – II

Day and Date : Wednesday, 14-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

Instructions *: 1) Assume the suitable data* ***whenever*** *necessary.*
2) Attempt ***any two*** *questions from* ***each*** *Section.*

SECTION – I

2. Solve **any four** : **(5×4=20)**

1) Draw the diagram of turbine speed governing system.

2) Draw zero sequence networks for transformer connections such as star-star, star-delta, delta-delta and delta-star.

3) Draw block diagram of automatic voltage control.

4) Differentiate between symmetrical and unsymmetrical faults.

5) Show the open conductors fault connections of sequence network.

3. Solve **any two** : **(10×2=20)**

1) Derive an expression for symmetrical component transformation.

2) Derive an expression for sequence impedance and network of transformer.

3) The one line diagram of a two generator system is shown in fig. (a). redraw the diagram to show all values in per unit on a 7000 kVA base i.e. (7 MVA base).

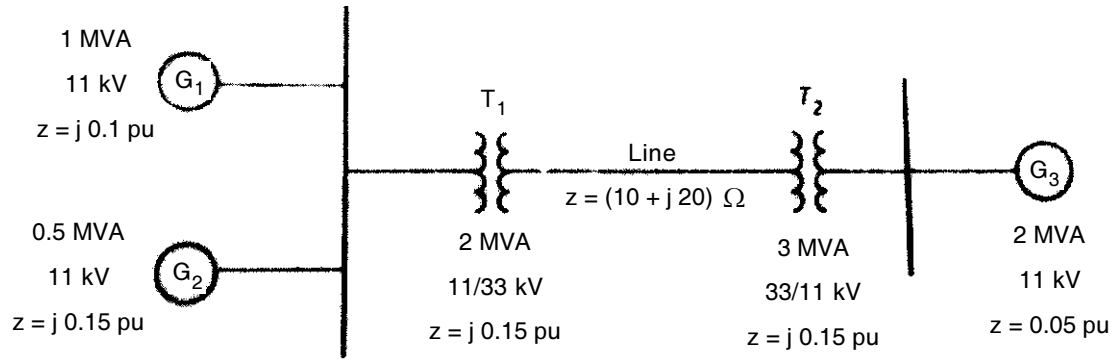

Fig. (a)

4) Explain load frequency control system.

Set S

SECTION – II

4. Solve **any four** : **(5×4=20)**

   1) Explain steady state and transient stability.

   2) Draw the block diagram of power system static security levels.

   3) Explain the dynamic of a synchronous machine.

   4) Derive the swing equations.

   5) Draw the curve of input-output of a generating unit and heat rate curve.

5. Solve **any two** : **(10×2=20)**

   1) Given a system of fig. (a) where a three phase fault is apply at the point P as shown,

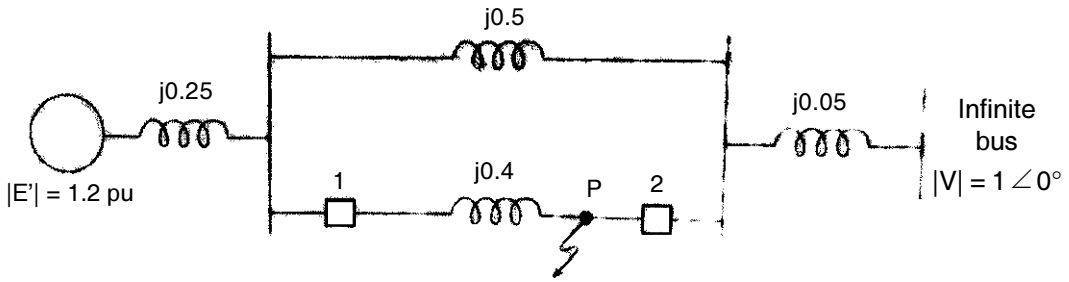

Fig. (b)

   Find the critical clearing angle for clearing the fault with simultaneous opening of the breakers 1 and 2. The reactance values of various components are indicated on the diagram. The generator is delivering 1.0 pu at the instant preceding the fault.

   2) Explain the concept of equal area criterion.

   3) Explain per unit system and their procedure to change the base values.

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SLR-EP – 515

Seat No.	

Set **P**

B.E. (E & E) (Part – I) Examination, 2016
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Thursday, 8-12-2016 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) Which of the following system is an application of solar thermal energy ?
   a) I.C. engine b) Biogas generation
   c) Solar water heating d) Solar lighting

2) Fill factor (FF) for a good silicon cell is about
   a) 1 b) 0.8 c) 0.5 d) 10

3) The following material can be used to fabricate the solar cell
   a) Carbon b) Cadmium sulphide
   c) Chlorine sulphide d) Potassium sulphide

4) The value of solar constant is approximately
   a) 6.5 kw/m^2 b) 1.36 kw/m^2 c) 3.64 kw/m^2 d) 10 kw/m^2

5) Energy pattern factor is always
   a) Less than one b) Equal to one
   c) Greater than one d) None of these

6) Multi blade type wind mill is used for pumping the water because of
   a) High starting characteristic b) Low cost
   c) Easily available d) All of the above

7) Lower speed wind turbine is mainly driven by
   a) Drag factor b) Lift forces
   c) Plash forces d) None of the above

8) Biogas plant converts wet biomass into the biogas by the process of
   a) Anaerobic fermentation b) Aerobic fermentation
   c) Digestion d) All of the above

9) The retention period ranges from _____ days.
   a) 5 to 10 days b) 20 to 40 days c) 30 to 50 days d) 10 to 20 days

P.T.O.

10) The biogas generation is not affected by which of the foiling factors ?
   a) Temperature b) Type of plant
   c) Loading rate d) Solid concentration

11) Fixed done type biogas plant is also called as
   a) Pragati plant b) Janata modal biogas plant
   c) KVIC plant d) None of these

12) HDR is
   a) Heavy Depth Rock b) Hot Dry Rock
   c) Hard Dry Rock d) High Density Rock

13) The hot molten rock of the mantle is called
   a) Magnetism b) Iron c) Valcones d) Magma

14) The binary cycle system is basically an
   a) Rankin cycle b) Claude cycle c) Hybrid system d) Bar jot cycle

15) The close cycle is called as
   a) Steam cycle b) Claude cycle c) Anderson cycle d) Rankin cycle

16) The open cycle utilizes _____ as a working fluid.
   a) Ammonia b) Sea-heat c) Hydro carbon d) Halo carbon

17) Ocean tides occur due to
   a) Gravitational attractive forces from sun and moon
   b) Rotation of earth across sun
   c) Gravitational attractive force earth and moon
   d) None of these

18) A lunar month is of _____ days.
   a) 30 b) 29.5 c) 31 d) 28

19) In a solid storage the hydrogen is stored in the steam of
   a) Non-metal hydrogen b) Metal hydride
   c) Non metal hydrides d) Metal mixture

20) _____ can be used to extract hydrogen and use it to power fuel cells.
   a) Nitrogen b) Methane c) Ethane d) Carbon

SLR-EP – 515

Seat No.	

B.E. (E & E) (Part – I) Examination, 2016
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Answer **any four** questions : **(4×5=20)**

a) Explain the difference between renewable and non-renewable energy sources with examples.

b) With neat figure explain the “Solar distillation”.

c) Draw the block diagram and explain the photo voltaic system.

d) Explain the wind energy system with the help of neat block diagram.

e) With neat figure explain the “Solar Drying”.

f) Define :
   i) Pitch and Yaw control
   ii) Cut in speed
   iii) Cut out speed
   iv) Tip speed ratio
   v) Swept area.

3. Answer **any two** questions : **(2×10=20)**

a) What is solar cell ? With neat figure explain the operation and V-I characteristics of solar cell.

b) What are the design considerations of horizontal axis wind machines ? Explain Yaw control and blade design in brief.

c) Derive an expression for forces on the blades and axial thrust on turbines.

SECTION – II

4. Answer **any four** questions : **(4×5=20)**

a) What are the factors to be considered for site selection of bio gas plant ? Explain briefly.

b) Explain various geo-thermal sources and re-sources in brief.

c) With neat figure explain the open cycle OTEC System.

d) Explain the double stage process for bio gas production.

e) What are the types of tidal power plant ? Explain single basic plant.

f) Discuss the various problems associated with storage and transportation of hydrogen gas.

5. Answer **any two** questions : **(2×10=20)**

a) With neat figure explain the operation of floating drum type bio gas plant. Mention its advantages and disadvantages.

b) With neat figure explain the closed cycle of a tidal plant. Mention the advantages and disadvantages of tidal power plants.

c) What is geo-thermal energy ? Explain how the geo-thermal energy can be used for generation of electrical power.

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SLR-EP – 515

Seat No.	

Set **Q**

B.E. (E & E) (Part – I) Examination, 2016
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Thursday, 8-12-2016 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 open cycle utilizes _____ as a working fluid.
   a) Ammonia b) Sea-heat c) Hydro carbon d) Halo carbon

2) Ocean tides occur due to
   a) Gravitational attractive forces from sun and moon
   b) Rotation of earth across sun
   c) Gravitational attractive force earth and moon
   d) None of these

3) A lunar month is of _____ days.
   a) 30 b) 29.5 c) 31 d) 28

4) In a solid storage the hydrogen is stored in the steam of
   a) Non-metal hydrogen b) Metal hydride
   c) Non metal hydrides d) Metal mixture

5) _____ can be used to extract hydrogen and use it to power fuel cells.
   a) Nitrogen b) Methane c) Ethane d) Carbon

6) Which of the following system is an application of solar thermal energy ?
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   a) 1 b) 0.8 c) 0.5 d) 10

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P.T.O.

9) The value of solar constant is approximately
   a) 6.5 kw/m^2 b) 1.36 kw/m^2 c) 3.64 kw/m^2 d) 10 kw/m^2

10) Energy pattern factor is always
   a) Less than one b) Equal to one
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   a) High starting characteristic b) Low cost
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14) The retention period ranges from _____ days.
   a) 5 to 10 days b) 20 to 40 days c) 30 to 50 days d) 10 to 20 days

15) The biogas generation is not affected by which of the foiling factors ?
   a) Temperature b) Type of plant
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16) Fixed done type biogas plant is also called as
   a) Pragati plant b) Janata modal biogas plant
   c) KVIC plant d) None of these

17) HDR is
   a) Heavy Depth Rock b) Hot Dry Rock
   c) Hard Dry Rock d) High Density Rock

18) The hot molten rock of the mantle is called
   a) Magnetism b) Iron c) Valcones d) Magma

19) The binary cycle system is basically an
   a) Rankin cycle b) Claude cycle c) Hybrid system d) Bar jot cycle

20) The close cycle is called as
   a) Steam cycle b) Claude cycle c) Anderson cycle d) Rankin cycle

_____

SLR-EP – 515

Seat No.	

B.E. (E & E) (Part – I) Examination, 2016
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Answer **any four** questions : **(4×5=20)**

a) Explain the difference between renewable and non-renewable energy sources with examples.

b) With neat figure explain the “Solar distillation”.

c) Draw the block diagram and explain the photo voltaic system.

d) Explain the wind energy system with the help of neat block diagram.

e) With neat figure explain the “Solar Drying”.

f) Define :
   i) Pitch and Yaw control
   ii) Cut in speed
   iii) Cut out speed
   iv) Tip speed ratio
   v) Swept area.

3. Answer **any two** questions : **(2×10=20)**

a) What is solar cell ? With neat figure explain the operation and V-I characteristics of solar cell.

b) What are the design considerations of horizontal axis wind machines ? Explain Yaw control and blade design in brief.

c) Derive an expression for forces on the blades and axial thrust on turbines.

SECTION – II

4. Answer **any four** questions : **(4×5=20)**

a) What are the factors to be considered for site selection of bio gas plant ? Explain briefly.

b) Explain various geo-thermal sources and re-sources in brief.

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c) With neat figure explain the open cycle OTEC System.

d) Explain the double stage process for bio gas production.

e) What are the types of tidal power plant ? Explain single basic plant.

f) Discuss the various problems associated with storage and transportation of hydrogen gas.

5. Answer **any two** questions : **(2×10=20)**

a) With neat figure explain the operation of floating drum type bio gas plant. Mention its advantages and disadvantages.

b) With neat figure explain the closed cycle of a tidal plant. Mention the advantages and disadvantages of tidal power plants.

c) What is geo-thermal energy ? Explain how the geo-thermal energy can be used for generation of electrical power.

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SLR-EP – 515

Seat No.	

Set **R**

B.E. (E & E) (Part – I) Examination, 2016
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Thursday, 8-12-2016 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) Fixed done type biogas plant is also called as
   a) Pragati plant b) Janata modal biogas plant
   c) KVIC plant d) None of these

2) HDR is
   a) Heavy Depth Rock b) Hot Dry Rock
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6) The open cycle utilizes _____ as a working fluid.
   a) Ammonia b) Sea-heat c) Hydro carbon d) Halo carbon

7) Ocean tides occur due to
   a) Gravitational attractive forces from sun and moon
   b) Rotation of earth across sun
   c) Gravitational attractive force earth and moon
   d) None of these

8) A lunar month is of _____ days.
   a) 30 b) 29.5 c) 31 d) 28

P.T.O.

9) In a solid storage the hydrogen is stored in the steam of
   a) Non-metal hydrogen b) Metal hydride
   c) Non metal hydrides d) Metal mixture

10) _____ can be used to extract hydrogen and use it to power fuel cells.
   a) Nitrogen b) Methane c) Ethane d) Carbon

11) Which of the following system is an application of solar thermal energy ?
   a) I.C. engine b) Biogas generation
   c) Solar water heating d) Solar lighting

12) Fill factor (FF) for a good silicon cell is about
   a) 1 b) 0.8 c) 0.5 d) 10

13) The following material can be used to fabricate the solar cell
   a) Carbon b) Cadmium sulphide
   c) Chlorine sulphide d) Potassium sulphide

14) The value of solar constant is approximately
   a) 6.5 kw/m^2 b) 1.36 kw/m^2 c) 3.64 kw/m^2 d) 10 kw/m^2

15) Energy pattern factor is always
   a) Less than one b) Equal to one
   c) Greater than one d) None of these

16) Multi blade type wind mill is used for pumping the water because of
   a) High starting characteristic b) Low cost
   c) Easily available d) All of the above

17) Lower speed wind turbine is mainly driven by
   a) Drag factor b) Lift forces
   c) Plash forces d) None of the above

18) Biogas plant converts wet biomass into the biogas by the process of
   a) Anaerobic fermentation b) Aerobic fermentation
   c) Digestion d) All of the above

19) The retention period ranges from _____ days.
   a) 5 to 10 days b) 20 to 40 days c) 30 to 50 days d) 10 to 20 days

20) The biogas generation is not affected by which of the foiling factors ?
   a) Temperature b) Type of plant
   c) Loading rate d) Solid concentration

_____

SLR-EP – 515

Seat No.	

B.E. (E & E) (Part – I) Examination, 2016
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Answer **any four** questions : **(4×5=20)**

a) Explain the difference between renewable and non-renewable energy sources with examples.

b) With neat figure explain the “Solar distillation”.

c) Draw the block diagram and explain the photo voltaic system.

d) Explain the wind energy system with the help of neat block diagram.

e) With neat figure explain the “Solar Drying”.

f) Define :
   i) Pitch and Yaw control
   ii) Cut in speed
   iii) Cut out speed
   iv) Tip speed ratio
   v) Swept area.

3. Answer **any two** questions : **(2×10=20)**

a) What is solar cell ? With neat figure explain the operation and V-I characteristics of solar cell.

b) What are the design considerations of horizontal axis wind machines ? Explain Yaw control and blade design in brief.

c) Derive an expression for forces on the blades and axial thrust on turbines.

SECTION – II

4. Answer **any four** questions : **(4×5=20)**

a) What are the factors to be considered for site selection of bio gas plant ? Explain briefly.

b) Explain various geo-thermal sources and re-sources in brief.

c) With neat figure explain the open cycle OTEC System.

d) Explain the double stage process for bio gas production.

e) What are the types of tidal power plant ? Explain single basic plant.

f) Discuss the various problems associated with storage and transportation of hydrogen gas.

5. Answer **any two** questions : **(2×10=20)**

a) With neat figure explain the operation of floating drum type bio gas plant. Mention its advantages and disadvantages.

b) With neat figure explain the closed cycle of a tidal plant. Mention the advantages and disadvantages of tidal power plants.

c) What is geo-thermal energy ? Explain how the geo-thermal energy can be used for generation of electrical power.

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SLR-EP – 515

Seat No.	

Set **S**

B.E. (E & E) (Part – I) Examination, 2016
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Thursday, 8-12-2016 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) Multi blade type wind mill is used for pumping the water because of
   a) High starting characteristic b) Low cost
   c) Easily available d) All of the above

2) Lower speed wind turbine is mainly driven by
   a) Drag factor b) Lift forces
   c) Plash forces d) None of the above

3) Biogas plant converts wet biomass into the biogas by the process of
   a) Anaerobic fermentation b) Aerobic fermentation
   c) Digestion d) All of the above

4) The retention period ranges from _____ days.
   a) 5 to 10 days b) 20 to 40 days c) 30 to 50 days d) 10 to 20 days

5) The biogas generation is not affected by which of the foiling factors ?
   a) Temperature b) Type of plant
   c) Loading rate d) Solid concentration

6) Fixed done type biogas plant is also called as
   a) Pragati plant b) Janata modal biogas plant
   c) KVIC plant d) None of these

7) HDR is
   a) Heavy Depth Rock b) Hot Dry Rock
   c) Hard Dry Rock d) High Density Rock

8) The hot molten rock of the mantle is called
   a) Magnetism b) Iron c) Valcones d) Magma

P.T.O.

9) The binary cycle system is basically an
   a) Rankin cycle b) Claude cycle c) Hybrid system d) Bar jot cycle

10) The close cycle is called as
   a) Steam cycle b) Claude cycle c) Anderson cycle d) Rankin cycle

11) The open cycle utilizes _____ as a working fluid.
   a) Ammonia b) Sea-heat c) Hydro carbon d) Halo carbon

12) Ocean tides occur due to
   a) Gravitational attractive forces from sun and moon
   b) Rotation of earth across sun
   c) Gravitational attractive force earth and moon
   d) None of these

13) A lunar month is of _____ days.
   a) 30 b) 29.5 c) 31 d) 28

14) In a solid storage the hydrogen is stored in the steam of
   a) Non-metal hydrogen b) Metal hydride
   c) Non metal hydrides d) Metal mixture

15) _____ can be used to extract hydrogen and use it to power fuel cells.
   a) Nitrogen b) Methane c) Ethane d) Carbon

16) Which of the following system is an application of solar thermal energy ?
   a) I.C. engine b) Biogas generation
   c) Solar water heating d) Solar lighting

17) Fill factor (FF) for a good silicon cell is about
   a) 1 b) 0.8 c) 0.5 d) 10

18) The following material can be used to fabricate the solar cell
   a) Carbon b) Cadmium sulphide
   c) Chlorine sulphide d) Potassium sulphide

19) The value of solar constant is approximately
   a) 6.5 kw/m^2 b) 1.36 kw/m^2 c) 3.64 kw/m^2 d) 10 kw/m^2

20) Energy pattern factor is always
   a) Less than one b) Equal to one
   c) Greater than one d) None of these

_____

SLR-EP – 515

Seat No.	

B.E. (E & E) (Part – I) Examination, 2016
RENEWABLE ENERGY SOURCES (Elective – I)

Day and Date : Thursday, 8-12-2016 Marks : 80
Time : 3.00 p.m. to 6.00 p.m.

SECTION – I

2. Answer **any four** questions : **(4×5=20)**

a) Explain the difference between renewable and non-renewable energy sources with examples.

b) With neat figure explain the “Solar distillation”.

c) Draw the block diagram and explain the photo voltaic system.

d) Explain the wind energy system with the help of neat block diagram.

e) With neat figure explain the “Solar Drying”.

f) Define :
   i) Pitch and Yaw control
   ii) Cut in speed
   iii) Cut out speed
   iv) Tip speed ratio
   v) Swept area.

3. Answer **any two** questions : **(2×10=20)**

a) What is solar cell ? With neat figure explain the operation and V-I characteristics of solar cell.

b) What are the design considerations of horizontal axis wind machines ? Explain Yaw control and blade design in brief.

c) Derive an expression for forces on the blades and axial thrust on turbines.

SECTION – II

4. Answer **any four** questions : **(4×5=20)**

a) What are the factors to be considered for site selection of bio gas plant ? Explain briefly.

b) Explain various geo-thermal sources and re-sources in brief.

c) With neat figure explain the open cycle OTEC System.

d) Explain the double stage process for bio gas production.

e) What are the types of tidal power plant ? Explain single basic plant.

f) Discuss the various problems associated with storage and transportation of hydrogen gas.

5. Answer **any two** questions : **(2×10=20)**

a) With neat figure explain the operation of floating drum type bio gas plant. Mention its advantages and disadvantages.

b) With neat figure explain the closed cycle of a tidal plant. Mention the advantages and disadvantages of tidal power plants.

c) What is geo-thermal energy ? Explain how the geo-thermal energy can be used for generation of electrical power.

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SLR-EP – 520

Seat No.	

Set **P**

B.E. (Part – II) (Electrical and Electronics) (New) Examination, 2016
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Thursday, 24-11-2016 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) 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) When the current lags the voltage in an alternating current system it is caused mainly due to
a) Resistive load b) Capacitive load
c) Inductive load d) None of the above

5) 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

6) An energy policy provides the _____ for setting performance goal and integrating energy management into an organization's culture.
a) Budget b) Delivery mechanism
c) Action plan d) Foundation

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) One unit of Electricity is equivalent to _____ kcal heat units.
   a) 800 b) 860 c) 400 d) 680

9) 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

10) The ratio of current year's production to the reference year's production is
   a) Demand factor b) Production factor
   c) Utilization factor d) Load factor

11) The major source of electrical power generation in India is
   a) Thermal b) Hydel c) Nuclear d) Wind

12) The legal framework 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

13) The simplest technique for scheduling of tasks and tracking the progress is
   a) Gantt Chart b) CPM c) PERT d) WBS

14) The objective of energy management includes
   a) Minimizing energy costs b) Minimizing waste
   c) Minimizing environmental degradation d) All of the above

15) 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

16) 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

17) The country that accounts for nearly 25% of world energy consumption
   a) USA b) Russia c) India d) China

18) One tonne of oil equivalent is
   a) 10000 kcal b) 1000 kcal c) 1000 kg of oil d) 10000 Mkcal

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) Star rating is part of
   a) DSM b) BLY c) S and L d) None of the above

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SLR-EP – 520

Seat No.	

B.E. (Part – II) (Electrical and Electronics) (New) Examination, 2016
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Thursday, 24-11-2016 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 commercial and non-commercial energy ? Give examples.
   2) Explain the Bachat Lamp Yojana Scheme.
   3) A 10 kW rated motor has a full load efficiency of 85%. Actual input measurement at a particular loading shows 415 volt, 10 Amps and power factor of 0-68. Find the motor loading in percentage.
   4) What is meant by energy bench marking ? How it is helpful for energy audit ?
   5) Explain the difference between energy conservation and energy efficiency with a suitable example.

3. Solve **any two** : **(2×10=20)**
   1) List ten strategic measures for meeting the future energy requirements in India.
   2) Explain the difference between Standards and Labelling.
   3) Write short note on :
      a) Thermography b) Smart metering

SECTION – II

4. Answer **any four** : **(4×5=20)**
   1) Explain ways by which employees can be motivated on energy management.
   2) Explain briefly the operation of ESCO.
   3) What is the essential difference between CPM and PERT ?
   4) List atleast five involved in CUSUM analysis.
   5) Explain the steps involved in project development cycle.

5. Answer **any two** : **(2×10=20)**
   1) List the duties and responsibilities of an energy manager.
   2) Explain the project budget planning.
   3) Explain what do you understand by energy monitoring and targeting.

Set P

Set P

SLR-EP – 520

Seat No.	

Set **Q**

B.E. (Part – II) (Electrical and Electronics) (New) Examination, 2016
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Thursday, 24-11-2016 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) 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

2) The country that accounts for nearly 25% of world energy consumption
   a) USA b) Russia c) India d) China

3) One tonne of oil equivalent is
   a) 10000 kcal b) 1000 kcal c) 1000 kg of oil d) 10000 Mkcal

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) Star rating is part of
   a) DSM b) BLY c) S and L 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) 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

P.T.O.

9) 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

10) 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

11) An energy policy provides the _____ for setting performance goal and integrating energy management into an organization's culture.
   a) Budget b) Delivery mechanism
   c) Action plan d) Foundation

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) One unit of Electricity is equivalent to _____ kcal heat units.
   a) 800 b) 860 c) 400 d) 680

14) 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

15) 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

16) The major source of electrical power generation in India is
   a) Thermal b) Hydel c) Nuclear d) Wind

17) The legal framework 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

18) The simplest technique for scheduling of tasks and tracking the progress is
   a) Gantt Chart b) CPM c) PERT d) WBS

19) The objective of energy management includes
   a) Minimizing energy costs b) Minimizing waste
   c) Minimizing environmental degradation d) All of the above

20) 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

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SLR-EP – 520

Seat No.	

B.E. (Part – II) (Electrical and Electronics) (New) Examination, 2016
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Thursday, 24-11-2016 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 commercial and non-commercial energy ? Give examples.
   2) Explain the Bachat Lamp Yojana Scheme.
   3) A 10 kW rated motor has a full load efficiency of 85%. Actual input measurement at a particular loading shows 415 volt, 10 Amps and power factor of 0-68. Find the motor loading in percentage.
   4) What is meant by energy bench marking ? How it is helpful for energy audit ?
   5) Explain the difference between energy conservation and energy efficiency with a suitable example.

3. Solve **any two** : **(2×10=20)**
   1) List ten strategic measures for meeting the future energy requirements in India.
   2) Explain the difference between Standards and Labelling.
   3) Write short note on :
      a) Thermography b) Smart metering

SECTION – II

4. Answer **any four** : **(4×5=20)**
   1) Explain ways by which employees can be motivated on energy management.
   2) Explain briefly the operation of ESCO.
   3) What is the essential difference between CPM and PERT ?
   4) List atleast five involved in CUSUM analysis.
   5) Explain the steps involved in project development cycle.

5. Answer **any two** : **(2×10=20)**
   1) List the duties and responsibilities of an energy manager.
   2) Explain the project budget planning.
   3) Explain what do you understand by energy monitoring and targeting.

Set Q

Set Q

SLR-EP – 520

Seat No.	

Set **R**

B.E. (Part – II) (Electrical and Electronics) (New) Examination, 2016
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Thursday, 24-11-2016 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 major source of electrical power generation in India is
a) Thermal b) Hydel c) Nuclear d) Wind

2) The legal framework 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

3) The simplest technique for scheduling of tasks and tracking the progress is
a) Gantt Chart b) CPM c) PERT d) WBS

4) The objective of energy management includes
a) Minimizing energy costs b) Minimizing waste
c) Minimizing environmental degradation d) All of the above

5) Name plate KW or HP rating of a motor indicates
a) Input KW to the motor b) Output KW of the motor
c) Minimum input KW to the motor d) Maximum input KW to the motor

6) 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

7) The country that accounts for nearly 25% of world energy consumption
a) USA b) Russia c) India d) China

8) One tonne of oil equivalent is
a) 10000 kcal b) 1000 kcal c) 1000 kg of oil d) 10000 Mkcal

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) Star rating is part of
a) DSM b) BLY c) S and L 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) 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) 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

15) 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

16) An energy policy provides the _____ for setting performance goal and integrating energy management into an organization's culture.
a) Budget b) Delivery mechanism
c) Action plan d) Foundation

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) One unit of Electricity is equivalent to _____ kcal heat units.
a) 800 b) 860 c) 400 d) 680

19) 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

20) 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

_____

SLR-EP – 520

Seat No.	

B.E. (Part – II) (Electrical and Electronics) (New) Examination, 2016
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Thursday, 24-11-2016 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 commercial and non-commercial energy ? Give examples.
   2) Explain the Bachat Lamp Yojana Scheme.
   3) A 10 kW rated motor has a full load efficiency of 85%. Actual input measurement at a particular loading shows 415 volt, 10 Amps and power factor of 0-68. Find the motor loading in percentage.
   4) What is meant by energy bench marking ? How it is helpful for energy audit ?
   5) Explain the difference between energy conservation and energy efficiency with a suitable example.

3. Solve **any two** : **(2×10=20)**
   1) List ten strategic measures for meeting the future energy requirements in India.
   2) Explain the difference between Standards and Labelling.
   3) Write short note on :
      a) Thermography b) Smart metering

SECTION – II

4. Answer **any four** : **(4×5=20)**
   1) Explain ways by which employees can be motivated on energy management.
   2) Explain briefly the operation of ESCO.
   3) What is the essential difference between CPM and PERT ?
   4) List atleast five involved in CUSUM analysis.
   5) Explain the steps involved in project development cycle.

5. Answer **any two** : **(2×10=20)**
   1) List the duties and responsibilities of an energy manager.
   2) Explain the project budget planning.
   3) Explain what do you understand by energy monitoring and targeting.

Set R

Set R

SLR-EP – 520

Seat No.	

Set **S**

B.E. (Part – II) (Electrical and Electronics) (New) Examination, 2016
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Thursday, 24-11-2016 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) An energy policy provides the _____ for setting performance goal and integrating energy management into an organization's culture.
   a) Budget b) Delivery mechanism
   c) Action plan d) Foundation

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) One unit of Electricity is equivalent to _____ kcal heat units.
   a) 800 b) 860 c) 400 d) 680

4) 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

5) The ratio of current year's production to the reference year's production is
   a) Demand factor b) Production factor
   c) Utilization factor d) Load factor

6) The major source of electrical power generation in India is
   a) Thermal b) Hydel c) Nuclear d) Wind

7) The legal framework 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

8) The simplest technique for scheduling of tasks and tracking the progress is
   a) Gantt Chart b) CPM c) PERT d) WBS

P.T.O.

9) The objective of energy management includes
   a) Minimizing energy costs
   b) Minimizing waste
   c) Minimizing environmental degradation
   d) All of the above

10) Name plate KW or HP rating of a motor indicates
   a) Input KW to the motor
   b) Output KW of the motor
   c) Minimum input KW to the motor
   d) Maximum input KW to the motor

11) 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

12) The country that accounts for nearly 25% of world energy consumption
   a) USA b) Russia c) India d) China

13) One tonne of oil equivalent is
   a) 10000 kcal b) 1000 kcal c) 1000 kg of oil d) 10000 Mkcal

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) Star rating is part of
   a) DSM b) BLY c) S and L 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) 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) 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

20) 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

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SLR-EP – 520

Seat No.	

B.E. (Part – II) (Electrical and Electronics) (New) Examination, 2016
Elective – II : ENERGY CONSERVATION AND AUDITING

Day and Date : Thursday, 24-11-2016 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 commercial and non-commercial energy ? Give examples.
   2) Explain the Bachat Lamp Yojana Scheme.
   3) A 10 kW rated motor has a full load efficiency of 85%. Actual input measurement at a particular loading shows 415 volt, 10 Amps and power factor of 0-68. Find the motor loading in percentage.
   4) What is meant by energy bench marking ? How it is helpful for energy audit ?
   5) Explain the difference between energy conservation and energy efficiency with a suitable example.

3. Solve **any two** : **(2×10=20)**
   1) List ten strategic measures for meeting the future energy requirements in India.
   2) Explain the difference between Standards and Labelling.
   3) Write short note on :
      a) Thermography b) Smart metering

SECTION – II

4. Answer **any four** : **(4×5=20)**
   1) Explain ways by which employees can be motivated on energy management.
   2) Explain briefly the operation of ESCO.
   3) What is the essential difference between CPM and PERT ?
   4) List atleast five involved in CUSUM analysis.
   5) Explain the steps involved in project development cycle.

5. Answer **any two** : **(2×10=20)**
   1) List the duties and responsibilities of an energy manager.
   2) Explain the project budget planning.
   3) Explain what do you understand by energy monitoring and targeting.

Set S

Set S