

# Andhra Pradesh State Council of Higher Education

## Notations :

- Options shown in green color and with ✓ icon are correct.
- Options shown in red color and with ✗ icon are incorrect.

<b>Question Paper Name :</b>	Electrical and Electronics Engineering 22nd July 2022 Shift 1
<b>Duration :</b>	180
<b>Total Marks :</b>	200
<b>Display Marks:</b>	No
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console?</b>	Yes
<b>Change Font Color :</b>	No
<b>Change Background Color :</b>	No
<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No
<b>Show Progress Bar :</b>	No
<b>Is this Group for Examiner? :</b>	No
<b>Examiner permission :</b>	Cant View
<b>Show Progress Bar? :</b>	No

## Mathematics

Section Id :	722544100
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	50
Section Marks :	50
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 1 Question Id : 7225445002 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $\begin{vmatrix} 2 & x & 3 \\ 4 & 1 & 6 \\ -1 & 2 & 7 \end{vmatrix} = 0$  then the value of  $x$  is

Options :

1. ✘ 6
2. ✘  $5/3$
3. ✔  $1/2$
4. ✘ -6

Question Number : 2 Question Id : 7225445003 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $2A + 3B - 4I = \begin{pmatrix} 3 & 15 \\ 20 & 28 \end{pmatrix}$  and  $A + B + I = \begin{pmatrix} 4 & 6 \\ 8 & 14 \end{pmatrix}$  then  $A =$

Options :

1. ✘  $\begin{pmatrix} 3 & 5 \\ 0 & 8 \end{pmatrix}$

2. ✘  $\begin{pmatrix} 3 & 15 \\ 2 & 8 \end{pmatrix}$

3. ✘  $\begin{pmatrix} 13 & 1 \\ 20 & 2 \end{pmatrix}$

4. ✔  $\begin{pmatrix} 2 & 3 \\ 4 & 7 \end{pmatrix}$

Question Number : 3 Question Id : 7225445004 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The system of the simultaneous linear equations

$$x - y - 2z = 3; \quad 2x + y + z = 5; \quad 4x - y - 2z = 1 \text{ then } z =$$

Options :

1. ✔ -10

2. ✖ 3

3. ✖ 0

4. ✖ -1

Question Number : 4 Question Id : 7225445005 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $A = \begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$  and  $B = \begin{pmatrix} -4 & 6 \\ 2 & -3 \end{pmatrix}$  then  $AB =$

Options :

1. ✖ 1

2. ✖ -8

3. ✖ -4

4. ✔ 0

Question Number : 5 Question Id : 7225445006 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $A$  is a square matrix such that  $A^T = A$  then  $A$  is called \_\_\_\_\_

Options :

1. ✓ symmetric matrix
2. ✘ skew symmetric matrix
3. ✘ singular matrix
4. ✘ scalar matrix

Question Number : 6 Question Id : 7225445007 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\text{If } \frac{10-x}{x^2+x-12} = \frac{A}{x+4} + \frac{B}{x-3} \text{ then } A + B =$$

Options :

1. ✓ -1
2. ✘ 1
3. ✘ -2
4. ✘ 5

Question Number : 7 Question Id : 7225445008 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $\frac{4x^2+5x+8}{(x^2+5)(x+2)} = \frac{Ax+B}{x^2+5} + \frac{C}{x+2}$  then  $B + C =$

Options :

1. ✘  $\frac{12}{7}$

2. ✘  $-\frac{15}{9}$

3. ✔  $\frac{15}{9}$

4. ✘  $\frac{17}{9}$

Question Number : 8 Question Id : 7225445009 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $\sin\theta = \frac{3}{5}$ ,  $\theta$  is acute, then  $2\tan\theta + 3\sec\theta + 4\sec\theta \operatorname{cosec}\theta =$

Options :

1. ✘  $-1$

2. ✔  $\frac{163}{12}$

3. ✘  $\frac{-163}{12}$

4. ✘  $\frac{13}{12}$

Question Number : 9 Question Id : 7225445010 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $x = a \sec \theta$ ,  $y = b \tan \theta$  then  $\frac{x^2}{a^2} - \frac{y^2}{b^2} =$

Options :

1. ✘  $\frac{1}{2}$

2. ✘  $\frac{1}{2}$

3. ✘  $\frac{1}{4}$

4. ✔ 1

Question Number : 10 Question Id : 7225445011 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\tan^2 60^\circ + 2 \tan^2 45^\circ$  is

Options :

1. ✔ 5

2. ✘ 2

3. ✘ -5

4. ✘ -3

**Question Number : 11 Question Id : 7225445012 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The value of  $\tan 20^\circ \tan 40^\circ \tan 60^\circ \tan 80^\circ$  is

**Options :**

1. ✘ -2

2. ✘ 2

3. ✘ -3

4. ✔ 3

**Question Number : 12 Question Id : 7225445013 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $(1 + \tan A)(1 + \tan B) = 2$  then  $A + B =$

**Options :**

1. ✘  $65^\circ$ 2. ✔  $45^\circ$



3. ✘  $35^\circ$

4. ✘  $25^\circ$

Question Number : 13 Question Id : 7225445014 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\sin 20^\circ \sin 40^\circ \sin 60^\circ \sin 80^\circ$  is

Options :

1. ✘  $\frac{-3}{16}$

2. ✘  $\frac{23}{16}$

3. ✘  $\frac{31}{16}$

4. ✔  $\frac{3}{16}$

Question Number : 14 Question Id : 7225445015 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If in a triangle ABC ,  $a = 13$  ,  $b = 14$  ,  $c = 15$  then the area of the triangle is

Options :

1. ✘ 35 sq. units
2. ✘ 56 sq. units
3. ✔ 84 sq. units
4. ✘ 94 sq. units

Question Number : 15 Question Id : 7225445016 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\sin^{-1} \frac{5}{13} + \tan^{-1} \frac{12}{5}$  is

Options :

1. ✘  $-\frac{\pi}{2}$
2. ✘  $\frac{\pi}{4}$
3. ✔  $\frac{\pi}{2}$
4. ✘  $-\frac{\pi}{3}$

Question Number : 16 Question Id : 7225445017 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response

Time : N.A Think Time : N.A Minimum Instruction Time : 0

The general solution of trigonometric equation  $\sec 4\theta - \sec 2\theta = 2$  is

Options :

1. ✓  $\frac{2n\pi}{5} \pm \frac{\pi}{10}$  or  $2n\pi \pm \frac{\pi}{2}$

2. ✗  $\frac{3\pi}{5}$

3. ✗  $\frac{5\pi}{4}$

4. ✗  $\frac{\pi}{4}$

Question Number : 17 Question Id : 7225445018 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\tan^{-1}(2\sin 150^\circ)$  is

Options :

1. ✗  $\pi$

2. ✗  $3\pi$

3. ✘  $\frac{\pi}{2}$

4. ✔  $\frac{\pi}{4}$

**Question Number : 18 Question Id : 7225445019 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The modulus of  $\frac{(1+i)(i-\sqrt{3})i}{1-i}$  is

**Options :**

1. ✔ 2

2. ✘ 6

3. ✘ -2

4. ✘ 4

**Question Number : 19 Question Id : 7225445020 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $1, \omega, \omega^2$  are the cube roots of unity, then  $(1 - \omega)(1 - \omega^2)(1 - \omega^4)(1 - \omega^5) =$

**Options :**

1. ✘ 3

2. ✔ 9

3. ✘ 1

4. ✘ 0

**Question Number : 20 Question Id : 7225445021 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The length of the tangent from  $(-3, 1)$  to the circle  $3x^2 + 3y^2 - 5x - 6y - 12 = 0$  is

**Options :**

1. ✘  $-3$

2. ✔ 3

3. ✘ 4

4. ✘ 9

**Question Number : 21 Question Id : 7225445022 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The eccentricity of an equilateral hyperbola is

Options :

1. ✘ 1

2. ✔  $\sqrt{2}$

3. ✘ 3

4. ✘  $\sqrt{3}$

Question Number : 22 Question Id : 7225445023 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The eccentricity of the hyperbola  $36x^2 - 25y^2 = 900$  is

Options :

1. ✔  $\frac{\sqrt{61}}{5}$

2. ✘  $\frac{9}{2}$

3. ✘  $\frac{3}{2}$

4. ✘  $\frac{5}{2}$

Question Number : 23 Question Id : 7225445024 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The equation of tangent to parabola  $y^2 = 16x$  at an end point of latus rectum is

Options :

1. ✘  $2x - 3y - 4 = 0$

2. ✘  $2x + 2y + 4 = 0$

3. ✔  $x - y + 4 = 0$

4. ✘  $x - y - 4 = 0$

Question Number : 24 Question Id : 7225445025 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $y = 4x + k$  is a tangent to the hyperbola  $\frac{x^2}{64} - \frac{y^2}{49} = 1$  then the value of  $k$  is

Options :

1. ✘  $\pm\sqrt{775}$

2. ✘  $\pm\sqrt{995}$

3. ✘  $\pm\sqrt{275}$

4. ✔  $\pm\sqrt{975}$

Question Number : 25 Question Id : 7225445026 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If the line  $2x + \sqrt{6}y = 2$  touches the hyperbola  $x^2 - 2y^2 = 4$  then the point of contact is

Options :

1.  $(4, \sqrt{6})$

1. ✘

2.  $(4, -\sqrt{6})$

2. ✔

3.  $(-4, 6)$

3. ✘

4.  $(5, 7)$

4. ✘

Question Number : 26 Question Id : 7225445027 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\lim_{x \rightarrow 2} \left( \frac{x^3 - 3x - 2}{2x^2 - 5x + 2} \right)$  is

Options :

1.  $\frac{1}{3}$

1. ✘

2. 3

2. ✔



3. ✘  $\frac{1}{5}$

4. ✘  $\frac{1}{2}$

Question Number : 27 Question Id : 7225445028 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $2x^2 - 3xy + 4y^2 = 1$  then  $\frac{dy}{dx} =$

Options :

1. ✔  $\frac{4x-3y}{3x-8y}$

2. ✘  $\frac{4x-7y}{3x-8y}$

3. ✘  $\frac{4x-3y}{3x+8y}$

4. ✘  $\frac{4x-3y}{3x-18y}$

Question Number : 28 Question Id : 7225445029 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $x = a \sin^2 t$  and  $y = a \cos^2 t$  then  $\frac{dy}{dx} =$

Options :

1. ✘  $-2$

2. ✘  $\tan t$

3. ✘  $\sin t$

4. ✔  $-1$

Question Number : 29 Question Id : 7225445030 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The curve  $xy^2 = 16$  at the point where the ordinate is  $-2$  then the equation of tangent is

Options :

1. ✘  $x + 4y - 12 = 0$

2. ✘  $2x - 4y - 12 = 0$

3. ✔  $x - 4y - 12 = 0$

4. ✘  $x - 5y - 12 = 0$

Question Number : 30 Question Id : 7225445031 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The equation of the normal to the curve  $y^2 = \frac{x^3}{2a-x}$  at the point  $(a, a)$  is

Options :

1. ✓  $x + 2y = 3a$
2. ✗  $x - 2y = 4a$
3. ✗  $2x + y = 2a$
4. ✗  $3x - 4y = 5a$

Question Number : 31 Question Id : 7225445032 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The angle between the curves  $xy = 2$  and  $y^2 = 4x$  is

Options :

1. ✗  $-\tan^{-1}(3)$
2. ✓  $\tan^{-1}(3)$
3. ✗  $\sin^{-1}(3)$
4. ✗  $\cos^{-1}(3)$

Question Number : 32 Question Id : 7225445033 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The maximum value of  $xe^{-x}$  is

Options :

1. ✓  $\frac{1}{e}$

2. ✘  $-\frac{1}{e}$

3. ✘  $2e$

4. ✘  $e$

Question Number : 33 Question Id : 7225445034 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The height of the right circular cylinder of greatest volume which is inscribed in a sphere of radius  $a$  is

Options :

1. ✘  $\frac{-2a}{7}$

2. ✘  $-\frac{a}{2}$

3. ✓  $\frac{2a}{\sqrt{3}}$

4. ✗  $\frac{1}{2}$

Question Number : 34 Question Id : 7225445035 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The volume of a spherical ball is increasing at the rate of  $4\pi$  cc/s, then the rate of increase of the radius, when the volume is  $288\pi$  cc is

Options :

1. ✗ 36 cm/sec

2. ✗ 6 cm/sec

3. ✓  $\frac{1}{36}$  cm/sec

4. ✗  $\frac{1}{6}$  cm/sec

Question Number : 35 Question Id : 7225445036 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $z = e^{(ax+by)} f(ax - by)$  then  $b \frac{\partial z}{\partial x} + a \frac{\partial z}{\partial y} =$

Options :

1. ✘  $-2abz$

2. ✘  $3abz$

3. ✔  $2abz$

4. ✘  $5abz$

Question Number : 36 Question Id : 7225445037 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\int \frac{e^x - e^{-x}}{e^x + e^{-x}} dx$  is

Options :

1. ✘  $\log(e^{2x} - 1) - x + c$

2. ✘  $-\log(e^{2x} + 1) - x + c$

3. ✘  $\log(e^{2x} + 7) - x + c$

4. ✓  $\log(e^{2x} + 1) - x + c$

Question Number : 37 Question Id : 7225445038 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\int \frac{dx}{\sqrt{4x^2 - 4x + 2}}$  is

Options :

1. ✗  $-\frac{1}{2} \sinh^{-1}(x - 1) + c$

2. ✗  $\frac{1}{2} \sinh^{-1}(2x + 1) + c$

3. ✓  $\frac{1}{2} \sinh^{-1}(2x - 1) + c$

4. ✗  $\frac{1}{2} \sinh^{-1}(3x - 1) + c$

Question Number : 38 Question Id : 7225445039 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\int \log x \, dx$  is

Options :

1. ✗  $\log x - x + c$

2. ✓  $x \log x - x + c$

3. ✗  $2x \log x + x + c$

4. ✗  $-x \log x + x + c$

Question Number : 39 Question Id : 7225445040 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\int_0^{\pi/4} \sqrt{1 + \sin 2x} dx$  is

Options :

1. ✓ 1

2. ✗ 2

3. ✗ -1

4. ✗  $\pi$

Question Number : 40 Question Id : 7225445041 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The area enclosed between the curves  $y^2 = 4x$  and  $x^2 = 4y$  is



Options :

1. ✓  $\frac{16}{3}$  square units

2. ✘  $\frac{5}{2}$  square units

3. ✘  $\frac{3}{2}$  square units

4. ✘  $\frac{9}{2}$  square units

Question Number : 41 Question Id : 7225445042 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The mean value of  $\frac{1}{4+x^2}$  on  $[-2,2]$  is

Options :

1. ✘  $\frac{\pi}{12}$

2. ✘  $-\frac{\pi}{2}$

3. ✘  $\frac{\pi}{2}$

4. ✓  $\frac{\pi}{4}$

Question Number : 42 Question Id : 7225445043 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\int \frac{1}{1+4x^2} dx$  on R is

Options :

1. ✘  $-\frac{1}{2}\tan^{-1}(2x) + c$

2. ✘  $\frac{1}{2}\tan^{-1}(5x) + c$

3. ✘  $-\frac{1}{2}\tan^{-1}(x) + c$

4. ✓  $\frac{1}{2}\tan^{-1}(2x) + c$

Question Number : 43 Question Id : 7225445044 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\int_0^1 \frac{x \sin^{-1} x}{\sqrt{1-x^2}} dx$  is

Options :

1. ✘ -1

2. ✘ 0

3. ✔ 1

4. ✘ 5

Question Number : 44 Question Id : 7225445045 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The order and degree of the differential equation  $\left(\frac{dy}{dx}\right)^2 + 3\left(\frac{dy}{dx}\right) + 2 = 0$  is

Options :

1. ✘ Order=2, degree=2

2. ✘ Order=2, degree=1

3. ✔ order = 1, degree = 2

4. ✘ Order=3, degree=1

Question Number : 45 Question Id : 7225445046 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The general solution of the differential equation  $\frac{dy}{dx} + y \cot x = 4x \operatorname{cosec} x$  is

Options :

1. ✘  $y \cos x = 2x^2 + c$

2. ✔  $y \sin x = 2x^2 + c$

3. ✘  $y \sin x = -2x^2 + c$

4. ✘  $y \sin x = 3x^2 + c$

Question Number : 46 Question Id : 7225445047 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The general solution of the linear differential equation  $\frac{dy}{dx} - \frac{y}{x+1} = e^{3x}(x+1)$  is

Options :

1. ✘  $y / \sin x = -\frac{e^{4x}}{4} + c$

2. ✔  $\frac{y}{x+1} = \frac{e^{3x}}{3} + c$

3. ✘  $y e^{3x} x = -\frac{\cos 2x}{4} + c e^{3x}$

4. ✘  $y \sin x = \frac{e^{3x}}{4} + c$

**Question Number : 47 Question Id : 7225445048 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

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

**Options :**

1. ✘  $-\frac{e^x}{6}$

2. ✘  $\frac{e^x}{16}$

3. ✘  $\frac{e^x}{9}$

4. ✔  $\frac{e^x}{6}$

**Question Number : 48 Question Id : 7225445049 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The particular integral for the differential equation  $(D^2 + 4D + 3)y = \sin 3x$  is

**Options :**

1. ✘  $\sin x + 3\cos 2x$

2. ✘  $\cos 3x - 2\sin 4x$

3. ✘  $\frac{2}{30}(2\cos 2x + \sin x)$

4. ✔  $\frac{-1}{30}(2\cos 3x + \sin 3x)$

**Question Number : 49 Question Id : 7225445050 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The general solution of the differential equation  $\frac{dy}{dx} + \frac{y}{x} = y^2x$  is

**Options :**

1. ✔  $\frac{1}{xy} = -x + c$

2. ✘  $\frac{-1}{xy} = -x + c$

3. ✘  $\frac{2}{xy} = x + c$

4. ✘  $\frac{1}{y} = -x + c$

**Question Number : 50 Question Id : 7225445051 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The general solution of the differential equation  $(2x + y + 1)dx + (x + 2y + 1)dy = 0$  is

**Options :**

1. ✘  $x^2 + xy + 3y^2 + 2x + y = c$

2. ✔  $x^2 + xy + y^2 + x + y = c$

3. ✘  $2x^2 + xy + 2y^2 + x + y = c$

4. ✘  $x^2 - xy + 2y^2 + x + y = c$

## Physics

<b>Section Id :</b>	722544101
<b>Section Number :</b>	2
<b>Mandatory or Optional :</b>	Mandatory
<b>Number of Questions :</b>	25
<b>Section Marks :</b>	25
<b>Enable Mark as Answered Mark for Review and Clear Response :</b>	Yes

Maximum Instruction Time :

0

Question Number : 51 Question Id : 7225445052 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The dimensions of permeability is

Options :

1. ✓  $MLT^{-2}A^{-2}$

2. ✗  $MLT^{-1}A^{-2}$

3. ✗  $MLT^{-2}A^{-1}$

4. ✗  $MLT^{-1}A^{-1}$

Question Number : 52 Question Id : 7225445053 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If velocity (V), force (F) and energy (E) are taken as fundamental units, then dimensional formula for mass will be

Options :

1. ✗  $V^0FE^2$

2. ✗  $VF^{-2}E^0$

3. ✗  $V^{-2}F^0E$



4. ✓  $V^{-2}F^0E$

Question Number : 53 Question Id : 7225445054 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Vector A extends from the origin to a point having polar coordinates  $(7, 70^\circ)$  and vector B extends from the origin to a point having polar coordinates  $(4, 130^\circ)$ . Find  $A \cdot B$

Options :

1. ✗ 28

2. ✓ 14

3. ✗ 0

4. ✗ 7

Question Number : 54 Question Id : 7225445055 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If two vectors  $2\hat{i} + 3\hat{j} - \hat{k}$  and  $-4\hat{i} - 6\hat{j} - \lambda\hat{k}$  are parallel to each other then value of  $\lambda$  be

Options :

1. ✗ 2

2. ✓ 4

3. ✘ 0

4. ✘ 6

**Question Number : 55 Question Id : 7225445056 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The coefficient of static friction between contact surfaces of two bodies is 1. The contact surface of one body supports the other till the inclination is less than

**Options :**

1. ✘  $30^0$ 2. ✔  $45^0$ 3. ✘  $60^0$ 4. ✘  $90^0$ 

**Question Number : 56 Question Id : 7225445057 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A smooth block is released from rest on a  $45^0$  inclined plane and it slides a distance 'd'. The time taken to slide is 'n' times that on a smooth inclined plane. The coefficient of friction is

**Options :**

1. ✓  $\mu_k = 1 - \frac{1}{n^2}$

2. ✘  $\mu_k = \sqrt{1 - \frac{1}{n^2}}$

3. ✘  $\mu_k = \frac{1}{1-n^2}$

4. ✘  $\mu_k = \sqrt{\frac{1}{1-n^2}}$

**Question Number : 57 Question Id : 7225445058 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A body is projected at an angle other than  $90^0$  with the horizontal with some velocity. If the time of ascent of the body is 1second, then the maximum height it can reach is (Take  $g=10\text{ms}^{-2}$ )

**Options :**

1. ✓ 5 m

2. ✘ 10 m

3. ✘ 2.5 m

4. ✘ 75 m

**Question Number : 58 Question Id : 7225445059 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A bullet fired from a gun falls at a distance half of its maximum range. The angle of projection of the bullet is

**Options :**

1. ✘  $45^0$

2. ✘  $60^0$

3. ✘  $30^0$

4. ✔  $15^0$

**Question Number : 59 Question Id : 7225445060 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A body is thrown vertically upwards with a velocity. Select the incorrect statements from the following

- I. Both velocity and acceleration are zero at its highest point.
- II. Velocity is maximum and acceleration is zero at the highest point
- III. Velocity is maximum and acceleration is 'g' downwards at its highest point

Options :

1. ✓ I,II and III

2. ✗ II and III

3. ✗ I and II

4. ✗ I and III

Question Number : 60 Question Id : 7225445061 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A person standing on a tower of height 60 m throws an object upwards with velocity of 40 m/s at an angle  $30^0$  to the horizontal. Find the total time taken by the object to gain maximum height and fall on the ground (take  $g= 10 \text{ m/s}^2$ ).

Options :

1. ✗ 3 s

2. ✗ 20 s

3. ✓ 6 s

4. ✗ 16 s

Question Number : 61 Question Id : 7225445062 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A bucket full of water is drawn up by a person. In this case the work done by the gravitational force is

Options :

1. ✓ Negative because the force and displacement are in opposite directions
2. ✗ Positive because the force and displacement are in the same direction
3. ✗ Negative because the force and displacement are the same direction
4. ✗ Positive because the force and displacement are in opposite direction

Question Number : 62 Question Id : 7225445063 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

When a long spring is stretched by  $x$  cm, its potential energy is  $U$ . If the spring is stretched by  $Nx$  cm, the potential energy stored in it will be

Options :

1. ✗  $U/N$
2. ✗  $NU$
3. ✓  $N^2U$
4. ✗  $U/N^2$

**Question Number : 63 Question Id : 7225445064 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is a non-renewable source of energy?

**Options :**

1. ✓ Coal
2. ✗ Solar
3. ✗ Geothermal
4. ✗ Tidal

**Question Number : 64 Question Id : 7225445065 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If a class room has dimensions  $20 \times 15 \times 5 \text{ m}^3$  and reverberation time 1.5 sec, the total absorption of all surfaces and the average absorption coefficient will be

**Options :**

1. ✗ 0.7 and 69
2. ✓ 69 and 0.07
3. ✗ 6.9 and 0.7

4. ✘ 0.69 and 0.7

**Question Number : 65 Question Id : 7225445066 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A source of sound of frequency 450 cycles/sec is stationary but an observer is moving towards the source with 34 m/sec speed. If the speed of sound is 340 m/sec, the apparent frequency will be

**Options :**

1. ✘ 410 cycles/sec

2. ✘ 500 cycles/sec

3. ✘ 550 cycles/sec

4. ✔ 495 cycles/sec

**Question Number : 66 Question Id : 7225445067 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A simple pendulum has a time period  $T$  in vacuum. Its time period when it is completely immersed in a liquid of density one-eighth of the density of material of the bob is

**Options :**

1. ✘  $\sqrt{\frac{7}{8}}T$



2. ✘  $\sqrt{\frac{5}{8}}T$

3. ✘  $\sqrt{\frac{3}{8}}T$

4. ✔  $\sqrt{\frac{8}{7}}T$

Question Number : 67 Question Id : 7225445068 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A particle executes simple harmonic motion represented by displacement function as  $x(t) = A \sin(\omega t + \phi)$ . If the position and velocity of the particle at  $t = 0$  s are 2 cm and  $2\omega$  cm s<sup>-1</sup> respectively, then its amplitude is  $x\sqrt{2}$  cm where the value of x is

Options :

1. ✔ 2

2. ✘  $2\sqrt{2}$

3. ✘ 4

4. ✘ 1

**Question Number : 68 Question Id : 7225445069 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

An observer standing between two parallel cliffs emits an intense sound note. If two successive echoes are heard after 5 s and 7 s, then distance between the cliffs is (velocity of sound is 340 m/s)

**Options :**

1. ✘ 850 m
2. ✘ 1190 m
3. ✔ 2040 m
4. ✘ 340 m

**Question Number : 69 Question Id : 7225445070 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

M grams of steam at  $100^{\circ}\text{C}$  is mixed with 200 g of ice at its melting point in a thermally insulated container. If it produced liquid water at  $40^{\circ}\text{C}$  [heat of vaporization of water is 540 cal/g and heat of fusion of ice is 80 cal/g] the value of M is

**Options :**

1. ✘ 20
2. ✘ 80
3. ✔ 40

4. ✘ 10

**Question Number : 70 Question Id : 7225445071 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which type of ideal gas will have the largest value for  $C_p - C_v$ ?

**Options :**

1. ✘ Polyatomic

2. ✘ Diatomic

3. ✘ Monoatomic

4. ✔ The value will be the same for all

**Question Number : 71 Question Id : 7225445072 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In thermodynamics, heat and work are

**Options :**

1. ✔ Path functions

2. ✘ Intensive thermodynamic state variables

Extensive thermodynamic state variables

3. ✘

Point functions

4. ✘

**Question Number : 72 Question Id : 7225445073 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For an adiabatic expansion of an ideal gas, the fractional change in its pressure is equal to  
(where  $\gamma$  is the ratio of specific heats):

Options :

1. ✘  $-\gamma \frac{V}{dV}$

2. ✔  $-\gamma \frac{dV}{V}$

3. ✘  $-\frac{1}{\gamma} \frac{V}{dV}$

4. ✘  $-\frac{1}{\gamma} \frac{dV}{V}$

**Question Number : 73 Question Id : 7225445074 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following processes must violate the first law of thermodynamics?

Options :

1. ✓  $W > 0, Q > 0, \text{ and } \Delta E_{\text{int}} < 0$
2. ✗  $W > 0, Q < 0, \text{ and } \Delta E_{\text{int}} > 0$
3. ✗  $W < 0, Q > 0, \text{ and } \Delta E_{\text{int}} < 0$
4. ✗  $W > 0, Q < 0, \text{ and } \Delta E_{\text{int}} = 0$

Question Number : 74 Question Id : 7225445075 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The critical angle for total internal reflection is maximum for

Options :

1. ✗ Red light
2. ✗ Blue light
3. ✗ Ultraviolet rays
4. ✓ Infrared rays

Question Number : 75 Question Id : 7225445076 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Photon of frequency (  $f$  ) has a momentum (  $p$  ) associated with it. If  $c$  is the velocity of light, the momentum is

Options :

1. ✓  $hf/c$

2. ✘  $f/c$

3. ✘  $hfc$

4. ✘  $hf/c^2$

## Chemistry

Section Id :	722544102
Section Number :	3
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 76 Question Id : 7225445077 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Bohr's theory can be applied to which of the following ions?

Options :



2. ✘  $\text{Be}^{2+}$

3. ✘  $\text{Li}^+$

4. ✔  $\text{Li}^{2+}$

Question Number : 77 Question Id : 7225445078 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the correct orbital designation of an electron with the quantum number ,  $n=4$ ,  
 $l=3$ ,  $m=2$ ,  $s=1/2$ ?

Options :

1. ✘ 3d

2. ✔ 4f

3. ✘ 5p

4. ✘ 6s

Question Number : 78 Question Id : 7225445079 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The Two electrons present in an orbital are distinguished by

Options :

1. ✘ Principal Quantum number
2. ✘ Azimuthal Quantum number
3. ✘ Magnetic Quantum number
4. ✔ Spin Quantum number

Question Number : 79 Question Id : 7225445080 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Favorable conditions for the formation of an ionic bond are

Options :

1. ✘ Small cation, large anion, high charge on both the ions.
2. ✔ Large cation, small anion, low charge on both the ions
3. ✘ Large cation, large anion, high charge on both the ions.



Small cation, small anion, high charge on both the ions

4. ✘

Question Number : 80 Question Id : 7225445081 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The maximum covalent character is observed in

Options :

1. ✘ LiCl

2. ✘ BeCl<sub>2</sub>

3. ✘ LiF

4. ✔ BeBr<sub>2</sub>

Question Number : 81 Question Id : 7225445082 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In a reaction of H<sub>2</sub>SO<sub>4</sub> with NaOH, NaHSO<sub>4</sub> is formed. Equivalent weight of H<sub>2</sub>SO<sub>4</sub> is

Options :

1. ✘ 49 grams

2. ✔ 98 grams

3. ✘ 98 amu

4. ✘ 49 amu

**Question Number : 82 Question Id : 7225445083 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If 5.85 grams of NaCl are dissolved in water and the solution is made up to 0.5 litre, the molarity of solution will be:

**Options :**

1. ✔ 0.2

2. ✘ 0.4

3. ✘ 1.0

4. ✘ 0.1

**Question Number : 83 Question Id : 7225445084 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The solution of Mercury with other metals is called

**Options :**

1. ✘ Saturated solutions

2. ✘ Unsaturated solutions

3. ✔ Amalgam

4. ✘ Supersaturated solutions.

**Question Number : 84 Question Id : 7225445085 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A strong acid has a

**Options :**

1. ✘ Weak conjugate acid

2. ✔ Weak conjugate base

3. ✘ Strong conjugate base

4. ✘ Strong conjugate acid

**Question Number : 85 Question Id : 7225445086 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Electron pair donor is

**Options :**

1. ✘ Lowry- Bronsted base
2. ✘ Lowry- Bronsted acid
3. ✘ Lewis acid
4. ✔ Lewis base

**Question Number : 86 Question Id : 7225445087 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The poor conductor of the electricity among the following is:

**Options :**

1. ✘ Copper
2. ✘ Aluminium
3. ✘ Silver
4. ✔ Pure water

Question Number : 87 Question Id : 7225445088 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The amount of electricity that can deposit 108 g of silver from  $\text{AgNO}_3$  solution is

Options :

1. ✘ 1 ampere
2. ✘ 1 coulomb
3. ✔ 1 faraday
4. ✘ 1 siemen

Question Number : 88 Question Id : 7225445089 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is false regarding galvanic cells?

Options :

1. ✘ It converts chemical energy into electrical energy
2. ✘ The electrolytes taken in the two beakers are different
3. ✔ The reactions taking place are non-spontaneous

4. ✘ To set up this cell, a salt bridge is required

**Question Number : 89 Question Id : 7225445090 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the standard reduction potential of cathode of a galvanic cell if the standard EMF of the cell and standard reduction potential of the anode are 2.71 volts and -2.37 volts respectively?

Options :

1. ✘ 0.68 volts

2. ✘ -0.68 volts

3. ✘ -0.34 volts

4. ✔ 0.34 volts.

**Question Number : 90 Question Id : 7225445091 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Hardness of water is conventionally expressed in terms of equivalent amount of

Options :

1. ✘  $\text{MgCO}_3$

2. ✓  $\text{CaCO}_3$

3. ✗  $\text{Na}_2\text{CO}_3$

4. ✗  $\text{K}_2\text{CO}_3$

**Question Number : 91 Question Id : 7225445092 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Zero hardness of water is achieved by

**Options :**

1. ✗ Using Lime soda process

2. ✗ Excess lime treatment

3. ✗ Using excess alum dosage

4. ✓ Ion-Exchange method

**Question Number : 92 Question Id : 7225445093 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the hardness of water in terms of  $\text{CaCO}_3$  equivalent if water contains 27.6 mg/L of  $\text{MgSO}_4$

Options :

1. ✓ 23 mg/L
2. ✗ 2.3 mg/L
3. ✗ 28 mg/L
4. ✗ 12 mg/L

Question Number : 93 Question Id : 7225445094 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Electrochemical corrosion in acidic environment is carried with

Options :

1. ✗ Evolution of oxygen
2. ✗ Absorption of oxygen
3. ✓ Evolution of hydrogen



#### 4. ✘ Absorption of hydrogen

**Question Number : 94 Question Id : 7225445095 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following metal oxide film is protective from corrosion?

**Options :**

- 1. ✘ Porous
- 2. ✔ Non- porous
- 3. ✘ Volatile
- 4. ✘ Unstable

**Question Number : 95 Question Id : 7225445096 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is thermosetting plastic?

**Options :**

- 1. ✘ PVC
- 2. ✘ Teflon

3. ✘ Polystyrene

4. ✔ Bakelite

**Question Number : 96 Question Id : 7225445097 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Ebonite is

**Options :**

1. ✔ highly vulcanized rubber

2. ✘ PVC

3. ✘ Synthetic rubber

4. ✘ polystyrene

**Question Number : 97 Question Id : 7225445098 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Buna-S rubber is made up of the monomers of

**Options :**

1. ✘ 1,3 butadiene and acrylonitrile

- 2. ✓ 1,3 butadiene and styrene
- 3. ✗ 1,3 butadiene and formaldehyde
- 4. ✗ 1,3 butadiene and phenol

**Question Number : 98 Question Id : 7225445099 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Composition of water gas is

Options :

- 1. ✗  $\text{CO} + \text{N}_2$
- 2. ✗  $\text{CO} + \text{CH}_4$
- 3. ✓  $\text{CO} + \text{H}_2$
- 4. ✗  $\text{CH}_4 + \text{N}_2$

**Question Number : 99 Question Id : 7225445100 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is not a green house gas

Options :

1. ✓ Hydrogen

2. ✗ Carbon monoxide

3. ✗ Methane

4. ✗ Nitrous oxide

Question Number : 100 Question Id : 7225445101 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Photochemical smog is due to the presence of

Options :

1. ✗ Oxide of carbon

2. ✗ Lead

3. ✗ Oxide of sulphur

4. ✓ Oxide of nitrogen

## Electrical and Electronics Engineering

Section Id :	722544103
Section Number :	4
Mandatory or Optional :	Mandatory
Number of Questions :	100
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0

Question Number : 101 Question Id : 7225445102 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Two copper conductors have equal length. The cross sectional area of one conductor is four times that of the other. If the conductor having smaller cross sectional area has a resistance of 40 ohms, the resistance of other conductor will be \_\_\_\_\_

Options :

1. ✘ 80 ohm
2. ✘ 40 ohm
3. ✘ 20 ohm
4. ✔ 10 ohm

**Question Number : 102 Question Id : 7225445103 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

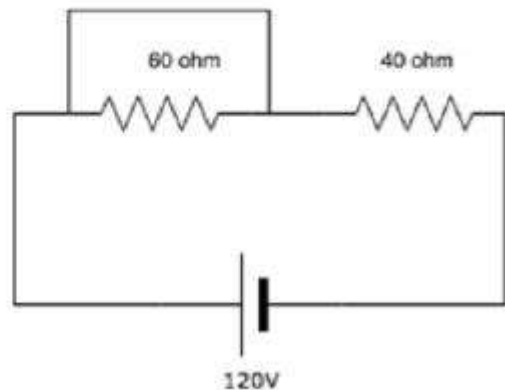
What will be the direction of the drift velocity of electrons change in semiconductors with respect to the electric field?

**Options :**

1. ✘ Same as that of electric field
2. ✔ opposite to that of electric field
3. ✘ perpendicular to that of the electric field in a positive direction
4. ✘ perpendicular to that of the electric field in a negative direction

**Question Number : 103 Question Id : 7225445104 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Voltage across 60 ohm resistor is \_\_\_\_\_



Options :

1. ✘ 120V
2. ✘ 60V
3. ✘ 40V
4. ✔ 0 V

Question Number : 104 Question Id : 7225445105 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

An EMF produced in a moving conductor coil is in accordance with the following law

Options :

1. ✔ Faraday's law

2. ✖ Ampere's law
3. ✖ Lenz's law
4. ✖ Coulomb's law

**Question Number : 105 Question Id : 7225445106 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following statements is TRUE for series and parallel operation of DC circuit?

**Options :**

1. ✔ Powers are additive
2. ✖ Voltages are additive
3. ✖ Currents are additive
4. ✖ Elements have individual currents.

**Question Number : 106 Question Id : 7225445107 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Inside of a conducting sphere, which of the following is constant?

**Options :**



1. ✘ Electric flux

2. ✘ Charge

3. ✘ Electric intensity.

4. ✔ Potential

**Question Number : 107 Question Id : 7225445108 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In semiconductors, the conduction of electricity is due to the movement of which of the following?

**Options :**

1. ✘ positive ions only

2. ✘ negative ions only

3. ✘ positive and negative ions

4. ✔ electrons and holes

**Question Number : 108 Question Id : 7225445109 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the number of turns and length of a solenoid are doubled, its axial magnetizing field will be \_\_\_\_\_.

Options :

- 1. ✘ Doubled
- 2. ✔ Unaffected
- 3. ✘ halved
- 4. ✘ quadrupled

Question Number : 109 Question Id : 7225445110 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A Commutator in DC generator can,

- 1. Provide half-wave rectification
- 2. Provides full-wave rectification
- 3. converts ac to dc
- 4. Converts dc to ac
- 5. provide controlled full-wave rectification.

Options :

- 1. ✘ 2
- 2. ✔ 2,3

3. ✘ 2,3,5

4. ✘ 2,3,4,5

**Question Number : 110 Question Id : 7225445111 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If suppose OCC is conducted at speed  $N_1$  speed, where  $N_1 < N_{rated}$ , OCC will lie

Options :

1. ✘ Above OCC at  $N_{rated}$

2. ✘ On OCC at  $N_{rated}$

3. ✔ Below OCC at  $N_{rated}$

4. ✘ Independent of the speed

**Question Number : 111 Question Id : 7225445112 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In dc machines, the field flux and armature-mmf axis are respectively along the

Options :

1. ✘ Direct axis and indirect axis
2. ✔ Direct axis and interpolar axis
3. ✘ Quadrature axis and direct axis
4. ✘ Quadrature axis and interpolar axis.

**Question Number : 112 Question Id : 7225445113 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a D.C. machine, iron losses are independent of variations in

**Options :**

1. ✘ Speed
2. ✔ Load
3. ✘ Voltage
4. ✘ Speed and voltage

**Question Number : 113 Question Id : 7225445114 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If a DC shunt motor is working at full load and if shunt field circuit suddenly opens

---

Options :

1. ✓ Will make armature to take heavy current, possibly burning it
2. ✗ Will result in excessive speed, possibly destroying armature due to excessive centrifugal stresses
3. ✗ Nothing will happen to motor
4. ✗ Motor will act as d.c series motor

Question Number : 114 Question Id : 7225445115 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In D.C. generators on no-load, the air gap flux distribution in space is

Options :

1. ✗ Sinusoidal
2. ✗ Triangular
3. ✗ Pulsating

4. ✓ Flat topped

**Question Number : 115 Question Id : 7225445116 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

No load speed of the DC shunt motor is 1322 rpm while full load speed is 1182 rpm.  
What will be the speed regulation?

**Options :**

1. ✗ 12.82 %

2. ✓ 11.8 %

3. ✗ 16.6 %

4. ✗ 14.2 %

**Question Number : 116 Question Id : 7225445117 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is not the method of electrical braking?

**Options :**

1. ✗ Plugging or counter-current

2. ✘ Dynamic or rheostatic

3. ✘ Regenerative

4. ✔ Eddy current

**Question Number : 117 Question Id : 7225445118 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A moving-coil permanent-magnet instrument can be used as \_\_\_\_\_ by using a low resistance shunt.

**Options :**

1. ✔ Ammeter

2. ✘ Voltmeter

3. ✘ Flux-meter

4. ✘ Ballistic galvanometer

**Question Number : 118 Question Id : 7225445119 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Induction type instruments are used for

Options :

1. ✘ Resistance measurement
2. ✘ Voltage measurement
3. ✔ AC measurement
4. ✘ DC measurement

Question Number : 119 Question Id : 7225445120 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If at one end, the two wires made of different metals are joined together then a voltage will get produced between the two wires due to difference of temp between the two ends of wires. This effect is observed in \_\_\_\_\_

Options :

1. ✔ Thermocouples
2. ✘ Thermistors
3. ✘ RTD
4. ✘ Ultrasonics



**Question Number : 120 Question Id : 7225445121 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The errors in current transformers can be reduced by designing them with:

**Options :**

1. ✓ high permeability and low loss core materials, avoiding any joints in the core and also keeping the flux density to a low value
2. ✗ using primary and secondary windings as close to each other as possible
3. ✗ using large cross-sections for both primary and secondary winding conductors
4. ✗ Low resistance coils at primary and secondary

**Question Number : 121 Question Id : 7225445122 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the magnitude of the voltage developed across the capacitor in a series RLC circuit at resonance?

**Options :**

1. ✗ Zero
2. ✗ Less than the input voltage.

3. ✓ Can be greater than the input voltage, with  $90^\circ$  out of phase with the input voltage.
4. ✘ Can be greater than the input voltage, and is in phase with the input voltage

**Question Number : 122 Question Id : 7225445123 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A capacitor has capacitance  $C$  and reactance  $X$ , if capacitance and frequency become double, then reactance will be

**Options :**

1. ✘  $4X$
2. ✘  $X$
3. ✓  $X/4$
4. ✘  $2X$

**Question Number : 123 Question Id : 7225445124 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a L-C series circuit, if  $X_L > X_C$ . Then the current is

**Options :**

1. ✓ lags behind the voltage by  $\pi/2$  in phase

- 2. ✘ leads the voltage by  $\pi/2$  in phase
- 3. ✘ leads the voltage by  $\pi$  in phase
- 4. ✘ lags behind the voltage by  $\pi$  in phase

**Question Number : 124 Question Id : 7225445125 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a two wattmeter method of measuring the power in a 3-phase balanced system, what is the power factor of the load when one wattmeter reads twice the other.

**Options :**

- 1. ✘ 0.0
- 2. ✘ 0.500
- 3. ✔ 0.866
- 4. ✘ 1.00

**Question Number : 125 Question Id : 7225445126 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Current of  $50/\pi$  Hz frequency is passing through an A.C. circuit having series combination of resistance  $R = 100\Omega$  and  $L = 1$  H, then phase difference between voltage and current is \_\_\_\_\_.

Options :

1. ✘  $60^\circ$
2. ✔  $45^\circ$
3. ✘  $30^\circ$
4. ✘  $90^\circ$

Question Number : 126 Question Id : 7225445127 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the magnitude of mutually induced emf,  $E_2$  in a transformer?

Options :

1. ✔ Directly proportional to rate of change of flux and number of secondary turns
2. ✘ Inversely proportional to rate of change of flux and number of secondary turns
3. ✘ Proportional to rate of change of flux and inversely proportional to number of secondary turns

4. ✘ Inversely proportional to the rate of change of flux and proportional to number of secondary turn

**Question Number : 127 Question Id : 7225445128 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following current is drawn by the primary circuit of an ideal transformer when the secondary is open?

**Options :**

1. ✘ Secondary current
2. ✘ Leakage current
3. ✔ Magnetizing current
4. ✘ Working on current.

**Question Number : 128 Question Id : 7225445129 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The no-load power factor of a practical transformer is around

**Options :**

1. ✘ Unity

- 2. ✓ 0.2 lagging
- 3. ✗ 0.2 leading
- 4. ✗ Zero

**Question Number : 129 Question Id : 7225445130 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If number of turns in primary and secondary coils of a transformer increased to two times each, the mutual inductance \_\_\_\_\_

**Options :**

- 1. ✓ Becomes four times
- 2. ✗ Becomes two times
- 3. ✗ Becomes ten times
- 4. ✗ Remains unchange

**Question Number : 130 Question Id : 7225445131 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a transformer, zero voltage regulation at full load is

**Options :**

1. ✘ Not possible
2. ✘ Possible at unity power factor load
3. ✔ Possible at leading power factor load
4. ✘ Possible at lagging power factor load

**Question Number : 131 Question Id : 7225445132 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A 400/200V transformer has total resistance of 0.02 pu on its LV side. This resistance when referred to HV side would be

**Options :**

1. ✔ 0.02
2. ✘ 0.04
3. ✘ 0.01
4. ✘ 0.004

**Question Number : 132 Question Id : 7225445133 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the functionality of a breather in a transformer?

**Options :**

1. ✓ It absorbs the moisture of air during breathing
2. ✗ Passes cold air to the transformer
3. ✗ It is the transformer oil filter
4. ✗ To improve cooling

**Question Number : 133 Question Id : 7225445134 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a synchronous alternator, which of the following coils will have emf closer to sine wave form?

**Options :**

1. ✗ Concentrated winding in full pitch coils.
2. ✗ Concentrated winding in short pitch coils.
3. ✗ Distributed winding in full pitch coils.



### Distributed winding in short pitch coils

4. ✓

**Question Number : 134 Question Id : 7225445135 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

When an alternator designed for operation at 60 Hz is operated at 50 Hz

**Options :**

kVA rating will increase in the ratio of 1.2.

1. ✗

Operating voltage will reduce in the ratio of 5/6.

2. ✓

Operating voltage will increase in the ratio of 1.2

3. ✗

Operating voltage will reduce in the ratio of  $(5/6)^2$ .

4. ✗

**Question Number : 135 Question Id : 7225445136 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Two alternators are operating in parallel. For taking one of the alternators out from the system

**Options :**

Load shared by this alternator is transferred to the other by adjusting the power fed to the prime mover before opening OCB.

1. ✓

2. ✘ Power fed to the prime-mover is stopped.
3. ✘ OCB is switched off.
4. ✘ Load connected to the bus-bar is reduced.

**Question Number : 136 Question Id : 7225445137 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A synchronous motor has no starting torque because of \_\_\_\_\_

**Options :**

1. ✘ Rotor is made up of salient poles.
2. ✔ Relative velocity between the stator and the rotor mmfs is zero.
3. ✘ Relative velocity between the stator and rotor mmfs is not zero.
4. ✘ Rotor winding is highly reactive.

**Question Number : 137 Question Id : 7225445138 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A synchronous motor can be used as a synchronous capacitor when it is

**Options :**

1. ✘ Under-loaded
2. ✘ over-loaded
3. ✘ under-excited
4. ✔ over-excited

**Question Number : 138 Question Id : 7225445139 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A 10 pole, 25 Hz alternator is directly coupled to and is driven by 60 Hz synchronous motor. What is the number of poles for the synchronous motor?

**Options :**

1. ✘ 48
2. ✘ 12
3. ✔ 24
4. ✘ 16

**Question Number : 139 Question Id : 7225445140 Display Question Number : Yes Is Question Mandatory : No Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A 3-phase squirrel cage induction motor designed to operate with stator in star, needs W kg of copper for its stator winding. Now if this motor is to be designed to operate with stator in delta, then weight of copper required for stator would be

**Options :**

1. ✘  $\sqrt{3} W$  kg
2. ✔  $W/\sqrt{3}$  kg
3. ✘  $3W$  kg
4. ✘  $W/3$  kg

**Question Number : 140 Question Id : 7225445141 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The effect of leakage flux in case of 3-phase induction motor is \_\_\_\_\_

**Options :**

1. ✔ Reduce the torque produced.
2. ✘ Increase the torque produced.
3. ✘ Increase the operating power factor.

4. ✘ Reduce the power factor.

**Question Number : 141 Question Id : 7225445142 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Air gap of a poly-phase induction motor is kept small to \_\_\_\_\_

**Options :**

1. ✘ Reduce the possibility of crawling.
2. ✘ Reduce the noise.
3. ✔ Reduce magnetizing current.
4. ✘ Obtain high starting torque.

**Question Number : 142 Question Id : 7225445143 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The value of operating power factor of a 3-phase induction motor is high when \_\_\_\_\_

**Options :**

1. ✘ Closed slots are used both on stator and rotor.

2. ✓ Semi-closed slots are used both on stator and rotor.
3. ✗ Open slots are used both on stator and rotor.
4. ✗ Open and closed slots are used on stator and rotor respectively.

**Question Number : 143 Question Id : 7225445144 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Pick the correct statements regarding 1-phase induction motors?

Options :

1. ✗ It needs only one winding
2. ✗ It rotates in one direction only
3. ✗ It can self-start
4. ✓ It cannot self-start

**Question Number : 144 Question Id : 7225445145 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The type of single-phase induction motor having the highest power factor at full-load is

**Options :**

1. ✘ Shaded pole type
2. ✘ Split-phase type
3. ✘ Capacitor-start type
4. ✔ Capacitor-run type

**Question Number : 145 Question Id : 7225445146 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The most economical power factor for a consumer is \_\_\_\_\_

**Options :**

1. ✘ 0.8 lagging
2. ✘ 0.9 lagging
3. ✔ 0.95 lagging
4. ✘ 0.95 leading

**Question Number : 146 Question Id : 7225445147 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following is the essential requirement of peak load plant?

**Options :**

1. ✘ It should run at high speed
2. ✘ It should produce high voltage
3. ✘ It should be small in size
4. ✔ It should be capable of starting quickly

**Question Number : 147 Question Id : 7225445148 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The area under the load curve gives

**Options :**

1. ✔ Energy consumed
2. ✘ Average demand
3. ✘ Maximum demand



4. ✘ Installed load

**Question Number : 148 Question Id : 7225445149 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The efficiency of a thermal power plant improves with

Options :

1. ✘ Increased quantity of coal burnt

2. ✘ Larger quantity of water used

3. ✘ Lower load in the plant

4. ✔ Use of high steam pressures.

**Question Number : 149 Question Id : 7225445150 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following place is not associated with the nuclear power plants in India

Options :

1. ✘ Narora

2. ✔ Talcher

3. ✘ Kota

4. ✘ Tarapur

**Question Number : 150 Question Id : 7225445151 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Skin effect is proportional to \_\_\_\_\_

**Options :**

1. ✘ Diameter of conductor

2. ✘ (Diameter of conductor)<sup>1/2</sup>

3. ✔ (Diameter of conductor)<sup>2</sup>

4. ✘ (Diameter of conductor)<sup>3</sup>.

**Question Number : 151 Question Id : 7225445152 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In overhead transmission lines the effect of capacitance can be neglected when the length of line is less than \_\_\_\_\_

**Options :**

1. ✘ 200 km
2. ✘ 160 km
3. ✘ 100 km
4. ✔ 80 km.

**Question Number : 152 Question Id : 7225445153 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Corona usually occurs when the electrostatic stress in the air around the conductor succeeds \_\_\_\_\_

**Options :**

1. ✔ 30 kV (maximum value)/cm
2. ✘ 22 kV (maximum value)/cm
3. ✘ 11 kV (rms value)/cm
4. ✘ 6.6 kv (rms value)/cm.

**Question Number : 153 Question Id : 7225445154 Display Question Number : Yes Is Question Mandatory : No Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The characteristic impedance of a transmission line depends upon \_\_\_\_\_

**Options :**

1. ✘ Shape of the conductor
2. ✘ Surface treatment of the conductors
3. ✘ Conductivity of the material
4. ✔ Geometrical configuration of the conductors

**Question Number : 154 Question Id : 7225445155 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The resistance of an electric arc can be increased by \_\_\_\_\_

**Options :**

1. ✘ Increasing the concentration of ionised particles
2. ✘ Reducing the arc length
3. ✔ Splitting the arc.
4. ✘ Increasing the arc cross section.

**Question Number : 155 Question Id : 7225445156 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Pin insulators are normally used up to voltage of about \_\_\_\_\_

**Options :**

1. ✘ 100kV

2. ✘ 66 kV

3. ✔ 33 kV

4. ✘ 132 kV.

**Question Number : 156 Question Id : 7225445157 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Circuit breakers usually operate under \_\_\_\_\_

**Options :**

1. ✔ Transient state of short-circuit current

2. ✘ Sub-transient state of short-circuit current

3. ✘ Steady state of short-circuit current

4. ✘ After D.C. component has ceased

**Question Number : 157 Question Id : 7225445158 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A differential relay measures the vector difference between \_\_\_\_\_

**Options :**

1. ✘ Two currents

2. ✘ Two voltages

3. ✔ Two or more similar electrical quantities

4. ✘ One current and one voltage

**Question Number : 158 Question Id : 7225445159 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The inductance of a single phase two wire line is given by (D is the distance between conductors and '2r' is the diameter of conductor)

**Options :**

1. ✔  $0.4 \log_e (D/r) \text{ mH/km}$

- 2. ✘  $0.55 \log_e (D/r) \text{ mH/km}$
- 3. ✘  $0.4 \log_e (r/D) \text{ mH/km}$
- 4. ✘  $0.55 \log_e (r/D) \text{ mH/km.}$

**Question Number : 159 Question Id : 7225445160 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The maximum demand of a consumer is 2kW and his daily energy consumption is 20 units. His load factor is \_\_\_\_\_

**Options :**

- 1. ✘ 10%
- 2. ✔ 41.6%
- 3. ✘ 50%
- 4. ✘ 45%

**Question Number : 160 Question Id : 7225445161 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The most economical load on an overhead line is \_\_\_\_\_

**Options :**

1. ✓ Greater than the natural load
2. ✘ Less than the natural load
3. ✘ Equal to the natural load
4. ✘ Either greater or less than the natural load

**Question Number : 161 Question Id : 7225445162 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In case the height of transmission tower is increased \_\_\_\_\_

**Options :**

1. ✘ the line capacitance and inductance will not change
2. ✘ the line capacitance will decrease but line inductance will decrease
3. ✘ the line capacitance will decrease and line inductance will increase
4. ✓ the line capacitance will decrease but line inductance will remain unaltered



Question Number : 162 Question Id : 7225445163 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A 70/6 ACSR conductor is an aluminium conductor steel reinforced, having

Options :

1. ✘ Cross sectional area of aluminium as 70 mm<sup>2</sup> and the cross-sectional area of steel as 6 mm<sup>2</sup>
2. ✘ Cross-sectional area of steel as 70 mm<sup>2</sup> and the cross-sections area of aluminium as 6 mm<sup>2</sup>
3. ✔ 70 aluminium conductors and 6 steel conductors
4. ✘ 80 steel conductors and 6 aluminium conductors

Question Number : 163 Question Id : 7225445164 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Out of the following systems of distribution, which system offers the best economy?

Options :

1. ✔ Direct current system
2. ✘ AC single phase system
3. ✘ AC 3 phase 3 wire system

4. ✘ AC 3 phase 4 wire system.

Question Number : 164 Question Id : 7225445165 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In terms of constants A, B, C and D for short transmission lines, which of the following relation is valid?

Options :

1. ✘  $A = B = 1$

2. ✘  $B = D = 0$

3. ✘  $A = C = 1$

4. ✔  $C = 0$ .

Question Number : 165 Question Id : 7225445166 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Long distance railways use \_\_\_\_\_ supply

Options :

1. ✘ 200 V DC

2. ✔ 25 kV Single phase AC

- 3. ✘ 25 kV Two phase AC
- 4. ✘ 25 kV Three phase AC

**Question Number : 166 Question Id : 7225445167 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following services uses the quadrilateral type of speed-time operations?

Options :

- 1. ✘ Main line service
- 2. ✘ Urban service
- 3. ✘ Sub-urban service
- 4. ✔ Urban and sub-urban service

**Question Number : 167 Question Id : 7225445168 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The air resistance to the movement of the train is proportional to \_\_\_\_\_.

Options :

- 1. ✘ Speed

2. ✓ Speed<sup>2</sup>

3. ✗ 1/speed

4. ✗ 1/speed<sup>2</sup>

**Question Number : 168 Question Id : 7225445169 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The coefficient of adhesion is highest when \_\_\_\_\_

**Options :**

1. ✓ The rails are dry

2. ✗ The rails are oiled

3. ✗ The rails are wet with dew

4. ✗ The rails are dusty.

**Question Number : 169 Question Id : 7225445170 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Single-phase to three-phase system in electric traction is also called as

**Options :**

1. ✓ Kando System
2. ✘ Synchronous System
3. ✘ Diesel System
4. ✘ Steam System

**Question Number : 170 Question Id : 7225445171 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

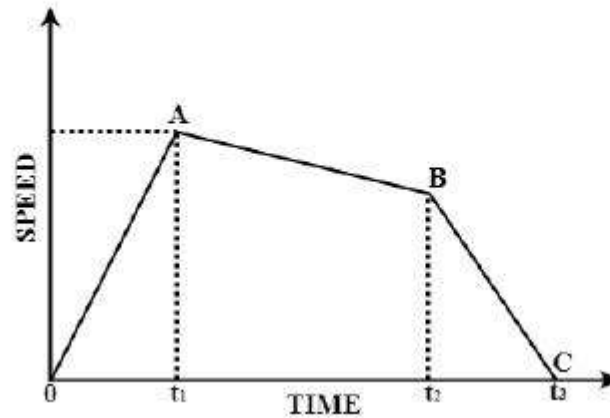
A train has a schedule speed of 36 km per hour on a level track. If the distance between the stations is 2 km and the stoppage is 30 seconds the actual time of run will be

**Options :**

1. ✘ 260 seconds
2. ✘ 230 seconds
3. ✘ 200 seconds
4. ✓ 170 seconds.

Question Number : 171 Question Id : 7225445172 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The speed time curve for a local train is shown in Figure. In this AB represents \_\_\_\_\_



Options :

1. ✓ Coasting
2. ✗ Acceleration
3. ✗ Braking
4. ✗ Regeneration.

Question Number : 172 Question Id : 7225445173 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In electric traction system, quadrilateral speed-time curve is the closer approximation for

**Options :**

1. ✘ Main line service only
2. ✘ Suburban service only
3. ✘ Urban service only
4. ✔ Urban and suburban service only

**Question Number : 173 Question Id : 7225445174 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Under the influence of fluorescent lamps sometimes the wheels of rotating machinery appear to be stationary. This is due to the

**Options :**

1. ✘ Fluctuations
2. ✘ Luminescence effect
3. ✔ Stroboscopic effect
4. ✘ Low power factor

Question Number : 174 Question Id : 7225445175 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The size of the earth or ground wire is based on \_\_\_\_\_

Options :

1. ✘ Maximum fault current carrying through the ground wire only
2. ✘ Rated current carrying capacity of the service line only
3. ✘ Depends on soil resistance only
4. ✔ Maximum fault current carrying through the ground wire and soil resistance only

Question Number : 175 Question Id : 7225445176 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What should be the value of earthing resistance for large power stations?

Options :

1. ✘ 1  $\Omega$
2. ✔ 0.5  $\Omega$
3. ✘ 2  $\Omega$



4. ✘  $5 \Omega$

**Question Number : 176 Question Id : 7225445177 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the formula used to calculate the number of poles required in LT line distribution?

**Options :**

1. ✔ Length/span+1

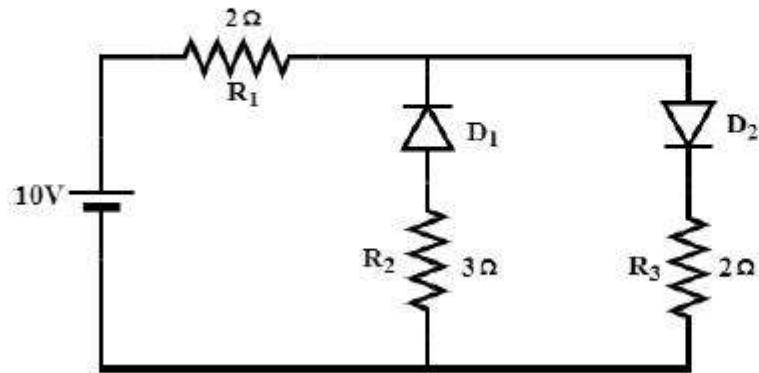
2. ✘ Length/span+10

3. ✘ Span/Length+1

4. ✘ Span/Length+10

**Question Number : 177 Question Id : 7225445178 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The current passing through the resistance  $R_1$  in the following circuit is \_\_\_\_\_ when the diodes are ideal devices

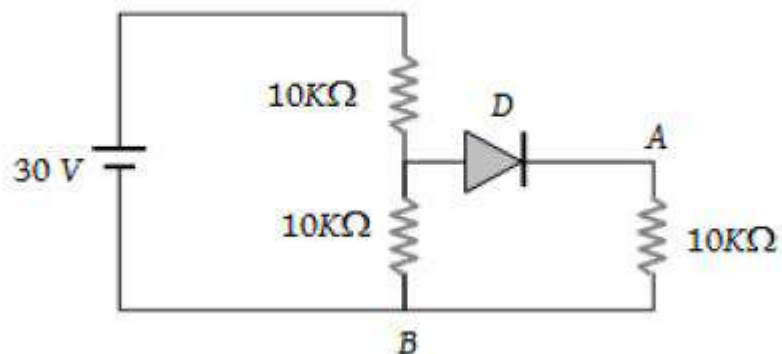


Options :

1. ✘ 10 A
2. ✔ 2.5 A
3. ✘ 5A
4. ✘ 3.5 A

Question Number : 178 Question Id : 7225445179 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

What is the potential difference between A and B terminals of the given circuit



Options :

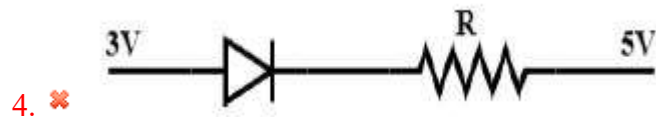
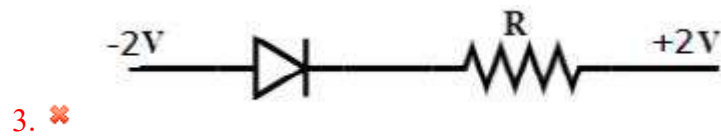
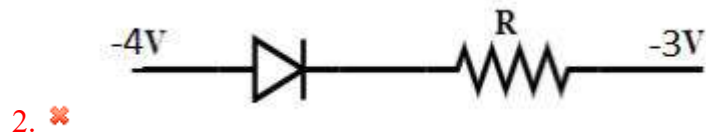
1. ✘ 0V
2. ✘ 20V
3. ✔ 10V
4. ✘ 15 V

Question Number : 179 Question Id : 7225445180 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following represents forward biased circuit?

Options :

1. ✔



Question Number : 180 Question Id : 7225445181 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In order to prevent distortion in the output signal after amplification, the input signal must be

Options :

1. ✘ Higher than the positive saturation level of the amplifier
2. ✘ Lower than the negative saturation level of the amplifier
3. ✔ Must lie with the negative and the positive saturation level of the amplifier
4. ✘ Both higher than the positive saturation level of the amplifier and lower than the negative saturation level of the amplifier

Question Number : 181 Question Id : 7225445182 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

One of the condition for oscillation is

Options :

1. ✓ A phase shift around the feedback loop of  $0^\circ$
2. ✗ A phase shift around the feedback loop of  $180^\circ$
3. ✗ A gain around the feedback loop of one-third
4. ✗ A gain around the feedback loop of less than 1

Question Number : 182 Question Id : 7225445183 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In order to start up, a feedback oscillator requires

Options :

1. ✗ negative feedback less than 1.
2. ✓ positive feedback greater than 1.
3. ✗ unity feedback equal to 1.
4. ✗ no feedback.

Question Number : 183 Question Id : 7225445184 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

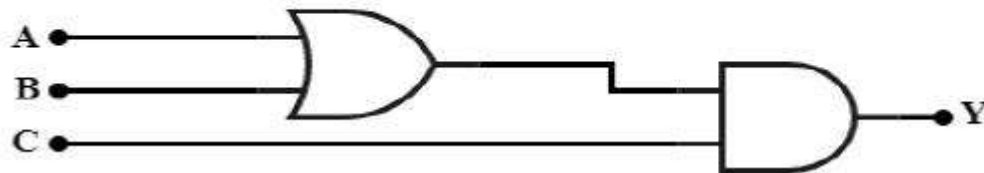
One condition for positive feedback is that the phase shift around the feedback loop must be \_\_\_\_\_°.

Options :

1. ✓ 0
2. ✗ 90
3. ✗ 180
4. ✗ 45

Question Number : 184 Question Id : 7225445185 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

To get the output 1 for the following circuit, the correct choice of the inputs are :



Options :

1. ✗ A = 1, B=0, C=0

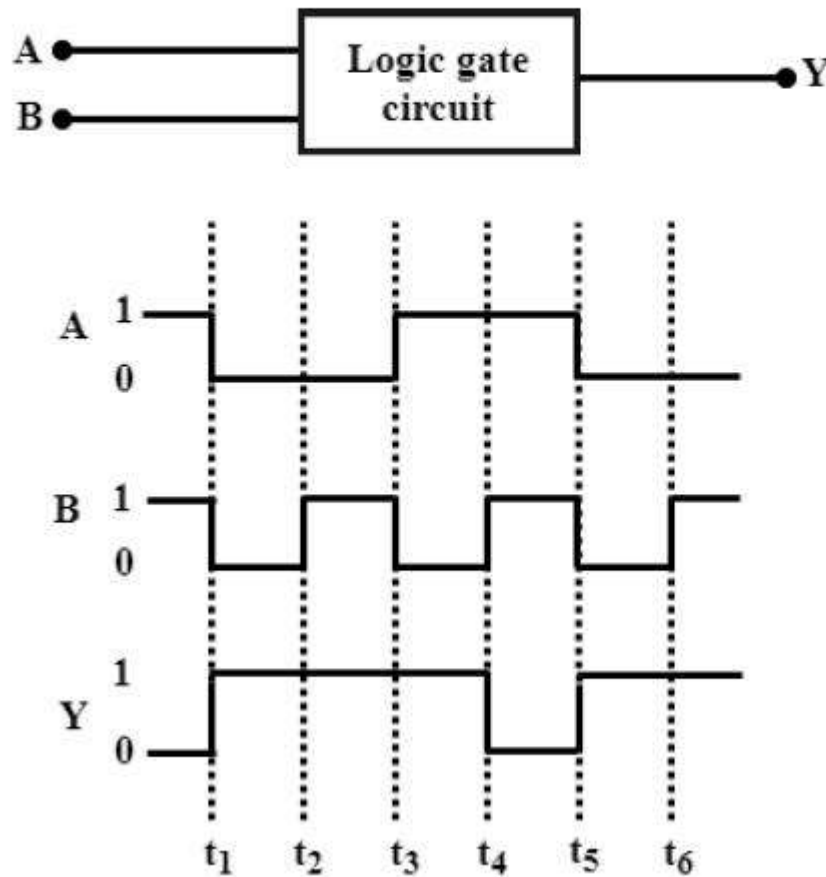
2. ✘  $A = 1, B = 1, C = 0$

3. ✔  $A = 1, B = 0, C = 1$

4. ✘  $A = 0, B = 1, C = 0$

**Question Number : 185 Question Id : 7225445186 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The following figure shows a logic gate circuit with the two inputs A and B and the output Y. The voltage waveforms of A, B and Y are as given below, the logic gate is



Options :

OR gate

1. ✘

NOR gate

2. ✘

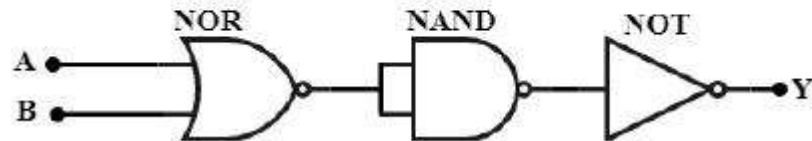


3. ✘ AND gate

4. ✔ NAND gate

Question Number : 186 Question Id : 7225445187 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The following circuit is equivalent to \_\_\_\_\_



Options :

1. ✘ OR gate

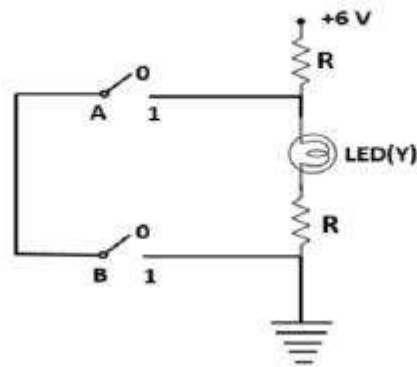
2. ✘ AND gate

3. ✔ NOR gate

4. ✘ NAND gate

Question Number : 187 Question Id : 7225445188 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The correct Boolean operation represented by the circuit diagram drawn is \_\_\_\_\_



Options :

1. ✘ NOR gate
2. ✔ NAND gate
3. ✘ AND gate
4. ✘ OR gate

Question Number : 188 Question Id : 7225445189 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

How many bytes of bit addressable memory is present in 8051 based microcontrollers?

Options :

1. ✘ 8 bytes
2. ✔ 16 bytes
3. ✘ 32 bytes
4. ✘ 128 bytes

**Question Number : 189 Question Id : 7225445190 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which out of the four ports of 8051 needs a pull-up resistor for using it is as an input or an output port?

**Options :**

1. ✔ PORT 0
2. ✘ PORT 1
3. ✘ PORT 2
4. ✘ PORT 3

**Question Number : 190 Question Id : 7225445191 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which addressing mode is used in pushing or popping any element on or from the stack?

Options :

1. ✘ Immediate
2. ✔ Direct
3. ✘ Indirect
4. ✘ Register

Question Number : 191 Question Id : 7225445192 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Function of EA pin in 8051 is

Options :

1. ✔ Used to enable/disable external memory interfacing
2. ✘ Used for latching address and data bus
3. ✘ Used for Power Supply

4. ✘ Used for ground

**Question Number : 192 Question Id : 7225445193 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the turn on time of an SCR is 15microseconds, then what is the width of the gate pulse which is required to trigger the SCR reliably?

**Options :**

- 1. ✘ 15 microseconds
- 2. ✔ More than 15 microseconds
- 3. ✘ Less than 15 micro seconds
- 4. ✘ either less than or more than 15 micro seconds

**Question Number : 193 Question Id : 7225445194 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

What is the latching current of a SCR?

**Options :**

- 1. ✔ The minimum anode current required to maintain the ON condition even after removal of the gate current

2. ✘ The maximum anode current required to maintain the ON condition even after removal of the gate current
3. ✘ The minimum anode current below which the SCR will go to forward blocking state
4. ✘ The maximum anode current above which the SCR will go to forward blocking state

**Question Number : 194 Question Id : 7225445195 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following device is latching device?

**Options :**

1. ✘ Power MOSFET
2. ✘ Power BJT
3. ✘ IGBT
4. ✔ SCR

**Question Number : 195 Question Id : 7225445196 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following device does not have gate terminal?

**Options :**

1. ✘ IGBT

2. ✘ TRIAC

3. ✔ DIAC

4. ✘ JFET

**Question Number : 196 Question Id : 7225445197 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In single phase fully controlled rectifier, if the firing angle is 90 degrees for RL load under continuous conduction, then the average voltage of the load is \_\_\_\_\_

**Options :**

1. ✘ Increases

2. ✘ Decreases

3. ✔ Zero

4. ✘ Constant

Question Number : 197 Question Id : 7225445198 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A three phase fully controlled converter, if delay angle is 30 degrees and power factor angle between its input voltage and current is 45 degrees, then the converter operates in \_\_\_\_\_ mode

Options :

1. ✘ Discontinuous conduction mode
2. ✔ continuous conduction mode
3. ✘ both continuous and discontinuous conduction modes
4. ✘ neither continuous nor discontinuous conduction mode

Question Number : 198 Question Id : 7225445199 Display Question Number : Yes Is Question Mandatory : No Calculator : None  
Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In dc choppers, if the input voltage is 100V and output voltage is 50 V, for the switching frequency of 1.0 kHz, what is the ON period of the Thyristor switch?

Options :

1. ✘ 1.0 ms
2. ✔ 0.5 ms



3. ✘ 0.25ms

4. ✘ 0.1ms

**Question Number : 199 Question Id : 7225445200 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following device is the most suitable for high-frequency conversion in SMPS?

**Options :**

1. ✘ BJT

2. ✘ Thyristor

3. ✔ MOSFET

4. ✘ GTO

**Question Number : 200 Question Id : 7225445201 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For single-phase step-up cyclo-converter \_\_\_\_\_ type of commutation is required for thyristor switches

**Options :**

1. ✘ Natural commutation

2. ✘ Load commutation
3. ✘ Line commutation
4. ✔ Forced commutation