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| **Question Paper Name:** | Electrical and Electronics Engineering 30th April 2019 Shift1 |
| **Subject Name:** | Electrical and Electronics Engineering |
| **Share Answer Key With Delivery Engine:** | Yes |
| **Actual Answer Key:** | Yes |

## Mathematics

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| **Number of Questions:** | 50 |
| **Display Number Panel:** | Yes |
| **Group All Questions:** | No |

**Question Number : 1  Question Id : 67809438857  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The adjoint of $A = \begin{pmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{pmatrix}$ is

**Options :**

1. $\begin{pmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{pmatrix}$

2. $\begin{pmatrix} 1 & 4 & -2 \\ -2 & -5 & 4 \\ 1 & -2 & 1 \end{pmatrix}$

3. $\begin{pmatrix} 3 & 0 & 6 \\ 6 & 3 & 0 \\ 9 & 6 & 3 \end{pmatrix}$

4. $\begin{pmatrix} 3 & 2 & 1 \\ 4 & 1 & -1 \\ 0 & 3 & 4 \end{pmatrix}$

**Question Number : 2  Question Id : 67809438858  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If $A$ is a square matrix of order 3 then $(adj\ A).A=$

**Options :**

1. A. (adj A)

2. A× (adj A)

3. A- (adj A)

4. A+ (adj A)

**Question Number : 3  Question Id : 67809438859  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The inverse of $A=\begin{pmatrix} 2 & 3 \\ 2 & 5 \end{pmatrix}$ is

**Options :**

1. $\begin{pmatrix} 5/4 & -3/4 \\ 1/2 & 1/2 \end{pmatrix}$

2. $\begin{pmatrix} 5/4 & 3/4 \\ -1/2 & 1/2 \end{pmatrix}$

3. $\begin{pmatrix} 5/4 & -5/4 \\ -1/2 & 1/2 \end{pmatrix}$

4. $\begin{pmatrix} 5/4 & -3/4 \\ -1/2 & 1/2 \end{pmatrix}$

**Question Number : 4  Question Id : 67809438860  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If $A = \begin{pmatrix} 3 & 2 & x \\ 4 & 1 & -1 \\ 0 & 3 & 4 \end{pmatrix}$ is a singular matrix then the value of $x$ is

**Options :**

1. $11/12$

2. $-11/12$

3. $\dfrac{13}{12}$

4. $\dfrac{5}{4}$

**Question Number : 5 Question Id : 67809438861 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

If A=$\begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$ then $A^2 - 5A + 7I$ is

**Options :**

1. $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

2. $\begin{pmatrix} 0 & 3 \\ 2 & 0 \end{pmatrix}$

3. $\begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix}$

4. $\begin{pmatrix} 2 & 3 \\ 2 & 5 \end{pmatrix}$

**Question Number : 6 Question Id : 67809438862 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Resolve $\dfrac{3x+7}{(x-1)(x-2)}$ into partial fractions

**Options :**

1. $\dfrac{12}{(x-2)} - \dfrac{10}{(x-1)}$

2. $\dfrac{13}{(x-2)} - \dfrac{10}{(x-1)}$

3. $\dfrac{13}{(x-5)} - \dfrac{10}{(x-1)}$

4. $\dfrac{13}{(x-2)} - \dfrac{10}{(x-7)}$

**Question Number : 7 Question Id : 67809438863 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Resolve $\dfrac{5x^2+1}{x^3-1}$ into partial fractions

Options :

1. $\dfrac{12}{(x-2)} - \dfrac{10}{(x-1)}$

2. $\dfrac{13}{(x-2)} - \dfrac{10}{(x-1)}$

3. $\dfrac{13}{(x-5)} - \dfrac{10}{(x-1)}$

4. $\dfrac{2}{(x-1)} + \dfrac{3x+1}{x^2+x+1}$

**Question Number : 8 Question Id : 67809438864 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

If $tan^2\theta + sec\theta = 5$ then the value of $\cos\theta$ is

Options :

1. $-1/3$ or $1/2$

2. $-11/12$ or $1/2$

3. $13/12$ or $-1/3$

4. $5/4$ or $1/2$

**Question Number : 9 Question Id : 67809438865 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The value of $16sin^3\theta + 8cos^3\theta$ is

Options :

1. 3

2. 1

3. $-3$

4. $0$

**Question Number : 10  Question Id : 67809438866  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If $sin\alpha = {}^{15}/_{17}$ , $cos\beta = {}^{12}/_{13}$ then the value of $sin(\alpha + \beta)$ is

**Options :**

1. ${}^{110}/_{105}$

2. $-{}^{121}/_{152}$

3. ${}^{220}/_{221}$

4. ${}^{5}/_{4}$

**Question Number : 11  Question Id : 67809438867  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The value of $cos20^0 cos40^0 cos60^0 cos80^0$ is

**Options :**

1. ${}^{11}/_{12}$

2. ${}^{1}/_{16}$

3. ${}^{13}/_{12}$

4. ${}^{5}/_{4}$

**Question Number : 12  Question Id : 67809438868  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The value of $\frac{cos17^0 + sin17^0}{cos17^0 - sin17^0}$ is

**Options :**

1. $\cos 20^0$

2. $\tan 65^0$

3. $\tan 60^0$

4. $\tan 62^0$

**Question Number : 13 Question Id : 67809438869 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The value of $sin\frac{\pi}{5}sin\frac{2\pi}{5}sin\frac{3\pi}{5}sin\frac{4\pi}{5} =$

Options :

1. $\frac{4}{15}$

2. $\frac{5}{16}$

3. $\frac{-5}{16}$

4. $\frac{7}{15}$

**Question Number : 14 Question Id : 67809438870 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

If $tan^{-1}x + tan^{-1}y + tan^{-1}z = \frac{\pi}{2}$ then the value of $xy + yz + zx$ is

Options :

1. -1

2. 3

3. 5

4. 1

**Question Number : 15 Question Id : 67809438871 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The general solution of $4cos^2x - 3 = 0$ is

Options :

1. $2n\pi \pm \dfrac{\pi}{6}$

2. $2n\pi \pm \dfrac{7\pi}{6}$

3. $3n\pi \pm \dfrac{5\pi}{6}$

4. $2n\pi \pm \dfrac{11\pi}{6}$

**Question Number : 16  Question Id : 67809438872  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The modulus of a complex number $\sqrt{3} + i$ is

**Options :**

1. $-2$

2. $3$

3. $2$

4. $5$

**Question Number : 17  Question Id : 67809438873  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The value of $(a - b)^2 cos^2 \left(\dfrac{C}{2}\right) + (a + b)^2 sin^2 \left(\dfrac{C}{2}\right)$ is

**Options :**

1. $C^3$

2. $C$

3. $C^5$

4. $C^2$

**Question Number : 18  Question Id : 67809438874  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If $x + \dfrac{1}{x} = 2 \cos \theta$ then the value of $x^n + \dfrac{1}{x^n}$ is

**Options :**

1. $2 \cos n\theta$

2. $-2 \cos n\theta$

3. $3 \cos \theta$

4. $2 \sin n\theta$

**Question Number : 19 Question Id : 67809438875 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The value of $2tan^{-1}\left(\frac{1}{3}\right) + tan^{-1}\left(\frac{1}{7}\right)$ is

Options :

1. $\frac{\pi}{4}$

2. $-\frac{\pi}{4}$

3. $\frac{\pi}{6}$

4. $\frac{\pi}{3}$

**Question Number : 20 Question Id : 67809438876 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The length of the major axis of the ellipse: $4x^2 + 3y^2 = 48$ is

Options :

1. 10

2. 11

3. 12

4. 13

**Question Number : 21 Question Id : 67809438877 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The Centre of the ellipse: $9x^2 + 25y^2 - 18x + 100y - 116 = 0$ is

Options :

1. $(2, -1)$

2. $(-1, -2)$

3. $(1, -2)$

4. $(1, 2)$

**Question Number : 22  Question Id : 67809438878  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The equation of the parabola with vertex $(2, -1)$ and focus $(2, -3)$ is

**Options :**

1. $x^2 - 4x + 8y + 12 = 0$

2. $x^2 - 4x - 8y - 12 = 0$

3. $x^2 + 4x - 8y - 12 = 0$

4. $x^2 + 5x - 8y - 11 = 0$

**Question Number : 23  Question Id : 67809438879  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The length of the latus rectum of the hyperbola: $\frac{x^2}{9} - \frac{y^2}{16} = 1$  is

**Options :**

1. 9 units

2. 5 units

3. 6 units

4. 13 units

**Question Number : 24  Question Id : 67809438880  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If the length of latus rectum is $\frac{9}{2}$ and the distance between its foci is 10 then the equation of hyperbola is

**Options :**

$$\frac{x^2}{16} + \frac{y^2}{9} = 1$$

1.

$$\frac{x^2}{18} - \frac{y^2}{9} = 1$$

2.

$$\frac{x^2}{16} - \frac{y^2}{6} = 1$$

3.

$$\frac{x^2}{16} - \frac{y^2}{9} = 1$$

4.

**Question Number : 25 Question Id : 67809438881 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The equation of the parabola with focus at (-3,2) and vertex (-2,2) is

**Options :**

1. $x^2 - 4x + 8y + 12 = 0$

2. $x^2 + 5x - 8y - 11 = 0$

3. $y^2 + 4x - 4y + 12 = 0$

4. $x^2 - 4x - 8y - 12 = 0$

**Question Number : 26 Question Id : 67809438882 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

If $y = \frac{a+bx}{b-ax}$ then the derivative of $y$ with respect to $x$ is

**Options :**

1. $\frac{a^2+b^2}{(b-ax)^2}$

2. $\frac{a^2+b^2}{(b+ax)^2}$

3. $\frac{a^2-b^2}{(b-ax)^2}$

4. $\frac{a+b}{(b-ax)^2}$

**Question Number : 27** **Question Id : 67809438883** **Display Question Number : Yes** **Single Line Question Option : No** **Option Orientation : Vertical**

If $y = \frac{2+3\sinh x}{3+2\sinh x}$ then the derivative of $y$ with respect to $x$ is

**Options :**

1. $\dfrac{5\cosh x}{(3+2\sinh x)^2}$

2. $\dfrac{5\sinh x}{(3+2\sinh x)^2}$

3. $\dfrac{5\sin x}{(3-2\cosh x)^2}$

4. $\dfrac{\sinh^2 x}{(2-3\sinh x)^2}$

**Question Number : 28** **Question Id : 67809438884** **Display Question Number : Yes** **Single Line Question Option : No** **Option Orientation : Vertical**

The range of $x$ for which the function $x^3 - 3x^2 - 45x + 2$ is increasing with $x$ is

**Options :**

1. $(3, -5)$

2. $(-3, -5)$

3. $(3, 5)$

4. $(-3, 5)$

**Question Number : 29** **Question Id : 67809438885** **Display Question Number : Yes** **Single Line Question Option : No** **Option Orientation : Vertical**

If $u$ is a homogeneous function of $x$ and $y$ with degree $n$ then $x\dfrac{\partial u}{\partial x} + y\dfrac{\partial u}{\partial y} =$

**Options :**

1. $-nu$

2. $n^2 u$

3. $nu$

4. $nu^2 + u$

**Question Number : 30  Question Id : 67809438886  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The angle between the curves $y = x^2 + 3x - 7$ and $y^2 = 2x + 5$ at $(2,3)$ is

**Options :**

1. $\tan \theta = 2$

2. $\sec \theta = 2$

3. $\cos \theta = 1$

4. $\sin \theta = 3$

**Question Number : 31  Question Id : 67809438887  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The maximum value of the function $2x^3 - 12x^2 + 18x + 5$ is

**Options :**

1. $13$

2. $12$

3. $10$

4. $15$

**Question Number : 32  Question Id : 67809438888  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The three sides of a trapezium are equal each being 6" long then the area of the trapezium when it is maximum is

**Options :**

1. 27 square units

2. 33 square units

3. $27\sqrt{3}$ square units

4. $29\sqrt{3}$ square units

**Question Number : 33 Question Id : 67809438889 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The interval in which the function $f(x) = x^2 \log x$ is an increasing function is

**Options :**

1. $(1, e^{-1/2})$

2. $(2, e^{-1/2})$

3. $(0, e^{1/2})$

4. $(0, e^{-1/2})$

**Question Number : 34 Question Id : 67809438890 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The stationary points and the corresponding values of the function $f(x) = x^3 - 9x^2 + 15x - 1$ is

**Options :**

1. 6,-26

2. 3,-26

3. 6,26

4. -6,-26

**Question Number : 35 Question Id : 67809438891 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

If $u = \log\left(\frac{x^2+y^2}{x+y}\right)$ then $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} =$

**Options :**

1. 2

2. 4

3. 5

4. 1

**Question Number : 36 Question Id : 67809438892 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

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

Options :

1. $x \log x + x + c$

2. $x^2 \log x - x + c$

3. $x \log x - x + c$

4. $x \log x - \frac{x^2}{2} + c$

**Question Number : 37 Question Id : 67809438893 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The value of $\lim\limits_{n \to \infty} \left[ \frac{1}{n+1} + \frac{1}{n+2} + \cdots .. + \frac{1}{n+n} \right]$ is

Options :

1. $\log 2$

2. $\log 3$

3. $-\log 2$

4. $\log n$

**Question Number : 38 Question Id : 67809438894 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The value of $\int \frac{\cos \sqrt{x}}{\sqrt{x}} dx$ is

Options :

1. $2 \sin \sqrt{x} + c$

2. $3 \sin \sqrt{x} + c$

3. $2 \sin x + c$

4. $\sin \sqrt{x} + c$

**Question Number : 39 Question Id : 67809438895 Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The area enclosed between the curve $y^2 = 4ax$ and the line $x = 2y$ is

**Options :**

1. $\frac{64}{5}$ sq. units

2. $\frac{64}{3}$ sq. units

3. $\frac{65}{4}$ sq. units

4. $\frac{63}{4}$ sq. units

**Question Number : 40 Question Id : 67809438896 Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The value of $\int_{1}^{\frac{\pi}{2}} \sin^2 x \, dx$ is

**Options :**

1. $\frac{\pi}{2}$

2. $-\frac{\pi}{4}$

3. $\frac{\pi}{6}$

4. $\frac{\pi}{4}$

**Question Number : 41 Question Id : 67809438897 Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The value of $\int_{1}^{4} \left( \sqrt{x} + \frac{1}{\sqrt{x}} \right) dx$ is

**Options :**

1. $\frac{20}{3}$

2. $-\dfrac{20}{3}$

3. $\dfrac{10}{3}$

4. $\dfrac{15}{3}$

**Question Number : 42 Question Id : 67809438898 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The value of $\int_0^{\pi/4} \sqrt{1+sin2x}\ dx =$

**Options :**

1. $-1$

2. $-3$

3. $3$

4. $1$

**Question Number : 43 Question Id : 67809438899 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The value of $\int_0^{\pi/2} \dfrac{sinx}{1+cos^2x}\ dx =$

**Options :**

1. $\pi/4$

2. $-\pi/4$

3. $\pi/3$

4. $\pi/2$

**Question Number : 44 Question Id : 67809438900 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The particular integral of $(D^2 + 5D + 6)y = e^x$ is

**Options :**

1. $\dfrac{-e^{-x}}{12}$

2. $\dfrac{e^{2x}}{12}$

3. $\dfrac{e^{x}}{12}$

4. $\dfrac{e^{x}}{6}$

**Question Number : 45 Question Id : 67809438901 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Form the differential equation by eliminating the arbitrary constant $a$ from $ay^2 = x^3$

**Options :**

1. $\dfrac{dy}{dx} = \dfrac{3y}{2x}$

2. $\dfrac{dy}{dx} = \dfrac{2x}{3y}$

3. $\dfrac{dy}{dx} = \dfrac{x}{y}$

4. $\dfrac{dy}{dx} = \dfrac{2y}{x}$

**Question Number : 46 Question Id : 67809438902 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The solution of $\dfrac{dy}{dx} + y = e^{-x}$ is

**Options :**

1. $(x + c)e^{-x}$

2. $(x - c)e^{x}$

3. $(x + c)e^{x}$

4. $(x + c)e^{-2x}$

**Question Number : 47 Question Id : 67809438903 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The complementary function of $(D^2 + 3D + 2)y = 8sin5x$ is

Options :

1. $c_1 e^{-x} + c_2 e^{-2x}$

2. $c_1 e^x + c_2 e^{2x}$

3. $c_1 e^{-x} + c_2 e^{2x}$

4. $c_1 e^{2x} + c_2 e^{3x}$

**Question Number : 48 Question Id : 67809438904 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The solution of exact differential equation $2xy\,dx + x^2 dy = 0$ is

Options :

1. $x^2 y^2 = c$

2. $x^2 y = c$

3. $x^3 y = c$

4. $x^2 y^3 = c$

**Question Number : 49 Question Id : 67809438905 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Form the differential equation representing the family of curves $x^2 = 4ay$ , where a is any arbitrary constant

Options :

1. $x \frac{dy}{dx} - 2y = 0$

2. $x \frac{dy}{dx} + 2y = 0$

3. $x \frac{dy}{dx} - 6y = 0$

4. $x \frac{dy}{dx} - y = 0$

**Question Number : 50  Question Id : 67809438906  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The solution of $\frac{dy}{dx} + y \cot x = \cos x$ is

Options :

1. $y \sin x = \frac{-\cos 2x}{4} + c$

2. $y \sin x = \frac{\cos 2x}{4} + c$

3. $y \sin x = \frac{-\cos 5x}{4} + c$

4. $y \cos x = \frac{-\cos 2x}{4} + c$

Physics

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| Number of Questions: | 25 |
| Display Number Panel: | Yes |
| Group All Questions: | No |

**Question Number : 51  Question Id : 67809438907  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In the equation $\frac{\alpha}{t^2} = Fv + \frac{\beta}{x^2}$ the dimensional formula for $[\alpha]$, $[\beta]$ is (here t = time, F= force, v = velocity, x = distance)

Options :

1. $MLT^{-1}, MLT^{-3}$

2. $ML^2T, ML^4T^2$

3. $ML^2T^{-1}, ML^4T^{-3}$

4. $ML^3T^{-1}, MLT^{-3}$

**Question Number : 52  Question Id : 67809438908  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Which of the following quantities has not been expressed in proper units?

Options :

1. Young's modulus=N/m$^2$

2. Surface tension=N/m

3. Pressure = N/m$^2$

4. Energy=kg m/s

**Question Number : 53 Question Id : 67809438909 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Three vectors A, B and C satisfy the relation A.B=0 and A.C=0. The vector A is parallel to

**Options :**

1. B

2. C

3. B.C

4. BxC

**Question Number : 54 Question Id : 67809438910 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

If three vectors A, B and C are 12, 5 and 13 in magnitude such that C=A+B, then the angle between A and B is

**Options :**

1. $60^0$

2. $90^0$

3. $120^0$

4. $30^0$

**Question Number : 55 Question Id : 67809438911 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

A stone dropped from a certain height, can reach the ground in 5s. It is stopped after 3 seconds of its fall and then allowed to fall again. The time taken by the stone to reach the ground for the remaining distance is

Options :

1. 2 s

2. 6 s

3. 4 s

4. 1 s

**Question Number : 56 Question Id : 67809438912 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The range of projectile fired at an angle of $15^0$ is 50m. If it is fired with the same speed at an angle of $45^0$, its range will be

Options :

1. 25 m

2. 37 m

3. 50 m

4. 100 m

**Question Number : 57 Question Id : 67809438913 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

A freely falling body acquires a velocity 'v' m/s in falling through a distance of 80m. How much further distance should it fall, so as to acquire a velocity of '2v' m/s?(Take g=10 m/s$^2$)

Options :

1. 240 m

2. 200 m

3. 400 m

4. 280 m

**Question Number : 58  Question Id : 67809438914  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A block is projected along a rough horizontal road with a speed of 10 m/s. If the coefficient of kinetic friction is 0.10, how far will it travel before coming to rest ?

**Options :**

1. 50 m

2. 60 m

3. 40 m

4. 10 m

**Question Number : 59  Question Id : 67809438915  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

What force is required to push a 200 N body up a $30^0$ smooth incline with an acceleration of 2 m/s²? The force is to be applied along the plane is (Take g=10 m/s²)

**Options :**

1. 40 N

2. 60 N

3. 80 N

4. 140 N

**Question Number : 60  Question Id : 67809438916  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A block of mass 2 kg rests on a rough inclined plane making an angle of $30^0$ with the horizontal. The coefficient of static friction between the block and the plane is 0.7. The frictional force on the block is

**Options :**

1. 9.8N

2. 0.78 x 9.8 N

3. 9.8 x √3 N

4. 0.7 x 9.8√3 N

**Question Number : 61  Question Id : 67809438917  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A man moves on a straight horizontal road with a block of mass 2 kg in his hand. If he covers a distance of 40 m with an acceleration of 0.5 m/s², the work done by the man on the block during the motion is ( Take g=10 m/s²)

**Options :**

1. 40 J

2. 1 J

3. 80 J

4. 20 J

**Question Number : 62  Question Id : 67809438918  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a factory it is desired to lift 2000 kg of metal through a distance of 12 m in 1 minute. The minimum horse power of the engine to be used is

**Options :**

1. 3.5

2. 5.3

3. 4.3

4. 5.8

**Question Number : 63  Question Id : 67809438919  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Energy harnessed from flowing water is called --------- energy

**Options :**

1. Hydel

2. Solar

3. Tidal

4. Geothermal

**Question Number : 64  Question Id : 67809438920  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

When a particle executing simple harmonic motion passes through the mean position, it has

Options :

1. minimum K.E and maximum P.E.

2. maximum K.E and maximum P.E.

3. maximum K.E and minimum P.E.

4. mimimum K.E. and mimimum P.E.

**Question Number : 65  Question Id : 67809438921  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A particle of mass 200 g executes a simple harmonic motion. The restoring force is provided by a spring of spring constant 80 N/m. The time period is

Options :

1. 0.2 s

2. 0.41 s

3. 0.31 s

4. 0.5 s

**Question Number : 66  Question Id : 67809438922  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The temperature at which the speed of sound will be double of its value at $0^0$C is

Options :

1. $819^0$ C

2. $850^0$C

3. $919^0$C

4. $900^0$C

**Question Number : 67  Question Id : 67809438923  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If the source of sound moves towards an observer, then

**Options :**

1. The frequency of the source is increased

2. The velocity of sound in the medium is increased

3. The wavelength of sound in the medium towards the observer is decreased

4. The amplitude of vibration of the particles is increased.

**Question Number : 68 Question Id : 67809438924 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

A cinema hall has a volume of 7500 m$^3$. The total absorption in the hall if the reverberation time of 1.5 s is to be maintained is

**Options :**

1. 800 OWU

2. 925 OWU

3. 950 OWU

4. 825 OWU

**Question Number : 69 Question Id : 67809438925 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

One mole of oxygen is heated at constant pressure starting at 0$^0$C. The heat energy that must be supplied to the gas to double its volume is

**Options :**

1. 2.5 x 273 x R

2. 3.5 x 273 x R

3. 2.5 x 546 x R

4. 3.5 x 546 x R

**Question Number : 70 Question Id : 67809438926 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

A vessel contains a gas at a temperature of 27⁰C and a pressure of 20 atm. If one half of the gas is released and the temperature of the remaining gas is raised by 50⁰C, the new pressure will be

**Options :**

1. 12.24 atm

2. 11.67 atm

3. 13.79 atm

4. 11 atm

**Question Number : 71 Question Id : 67809438927 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The temperature of 5 gm of air is raised from $0^0$ C to $1^0$ C. The increase in the internal energy of air is ($C_v$ = 0.172 cal/gm/$^0$ C and J = 4.18 x $10^7$ erg/cal)

**Options :**

1. 3.595 x $10^7$ erg

2. 3 x $10^7$ erg

3. 4.5 x $10^7$ erg

4. 2.595 x $10^7$ erg

**Question Number : 72 Question Id : 67809438928 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

In all reversible processes entropy of the system

**Options :**

1. decreases

2. increases

3. remains constant

4. remains zero

**Question Number : 73 Question Id : 67809438929 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

If one mole of a monoatomic gas ('Y'=5/3) is mixed with one mole of a diatomic gas ('Y'=7/5), the value of 'Y' for the mixture is

**Options :**

1. 1.40

2. 1.50

3. 1.53

4. 3.07

**Question Number : 74  Question Id : 67809438930  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Electrons are emitted with zero velocity from a certain metal surface when it is exposed to radiations of wavelength 7000 A$^0$. The work function of the metal is

**Options :**

1. 1 eV

2. 1.52 eV

3. 2.52 eV

4. 1.77 eV

**Question Number : 75  Question Id : 67809438931  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A superconducting material exhibits

**Options :**

1. zero conductivity and complete diamagnetism

2. zero resistivity and complete paramagnetism

3. infinite conductivity and complete paramagnetism

4. zero resistivity and complete diamagnetism

**Question Number : 76  Question Id : 67809438932  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The splitting of spectral lines in a strong magnetic field is called

**Options :**

1. Stark effect

2. Pauli Exclusion Principle

3. Zeeman effect

4. Aufbau Principle

**Question Number : 77  Question Id : 67809438933  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Bohr's model can explain

**Options :**

1. The spectrum of hydrogen atom only

2. The spectrum of hydrogen molecule

3. The solar spectrum

4. Spectrum of an atom or ion containing one electron only

**Question Number : 78  Question Id : 67809438934  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The maximum number of electrons that a d-orbital can accommodate is

**Options :**

1. 2

2. 6

3. 10

4. 14

**Question Number : 79 Question Id : 67809438935 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Magnesium Atomic number is 12, which of the following is the electronic configuration

Options :

1. $1S^2\ 2S^1\ 2P^6\ 3S^2$

2. $1S^2\ 2S^2\ 2P^5\ 3S^2$

3. $1S^2\ 2S^2\ 2P^6\ 3S^2$

4. $1S^2\ 2S^2\ 2P^6\ 3S^1 3d^1$

**Question Number : 80 Question Id : 67809438936 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

$N_2$ molecule contains

Options :

1. Covalent bond

2. Ionic bond

3. Hydrogen bond

4. Metalic bond

**Question Number : 81 Question Id : 67809438937 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

One mole of any of the particles contains

Options :

1. $6.023 \times 10^{-23}$

2. $6.022 \times 10^{23}$

3. $60.23 \times 10^{23}$

4. $6.023 \times 10^{25}$

**Question Number : 82 Question Id : 67809438938 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The normality of the solution obtained by dissolving 4 gm of NaOH in 1Litre is

Options :

1. 1N

2. 0.1N

3. 0.5N

4. 0.02N

**Question Number : 83  Question Id : 67809438939  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Molecular weight of $H_2SO_4$ is

Options :

1. 92

2. 96

3. 98

4. 99

**Question Number : 84  Question Id : 67809438940  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A Lewis acid is a substance which

Options :

1. Accept protons

2. Accept a lone pair of electrons

3. Donate protons

4. Donate a lone pair of electrons

**Question Number : 85  Question Id : 67809438941  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

$P^H$ of a solution is 9.5, the solution is

Options :

1. Basic

2. Acidic

3. Neutral

4. Amphoteric

**Question Number : 86 Question Id : 67809438942 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Laws of electrolysis were given by

**Options :**

1. Ostwald

2. Faraday

3. Arrhenius

4. Volta

**Question Number : 87 Question Id : 67809438943 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Common electrolyte used in the salt bridge is

**Options :**

1. NaOH

2. $NaCO_3$

3. KCl

4. KOH

**Question Number : 88 Question Id : 67809438944 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Standard Reduction Potential of an element is equal to

**Options :**

1. 1 X Its reduction potential

2. -1 X Its standard oxidation potential

3. -1 X Its reduction potential

4. 1 X Its standard oxidation potential

The standard emf for the cell reaction, $Zn+Cu^{+2} \rightarrow Cu + Zn^{2+}$ is 1.10 V at

25°C. The emf of the cell reaction when 0.1 M $Cu^{+2}$ and 0.1 M $Zn^{+2}$

solutions are used  at 25°C is

**Options :**

1. 1.10V

2. 0.11V

3. -1.10V

4. -0.11V

Which chemical is responsible for permanent hardness of water?

**Options :**

1. KCl

2. $MgCl_2$

3. NaCl

4. AgCl

Permutit is chemically

**Options :**

1. Sodium Silicate

2. Aluminium Silicate

3. Hydrated Sodium alumino silicate

4. Calicium silicate

**Question Number : 92  Question Id : 67809438948  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The cation exchange resin possesses

**Options :**

1. Acidic group

2. Basic group

3. Amphoteric group

4. Benzo group

**Question Number : 93  Question Id : 67809438949  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Chemically the rust is

**Options :**

1. $Fe_2O_3$

2. $Fe_2O_3. FeO$

3. $Fe_2O_3.XH_2O$

4. $Fe_2O_3 . NH_3$

**Question Number : 94  Question Id : 67809438950  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Galvanizing is the process of coating iron with

**Options :**

1. Mg

2. Cu

3. Au

4. Zn

**Question Number : 95  Question Id : 67809438951  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Which of the following is not a thermoplastic ?

**Options :**

1. Bakelite

2. Polystyrene

3. Polythene

4. Nylon

**Question Number : 96  Question Id : 67809438952  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Isoprene is a monomer of

**Options :**

1. Starch

2. Cellulose

3. Natural rubber

4. Lignin

**Question Number : 97  Question Id : 67809438953  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Buna-S is a copolymer of

**Options :**

1. Butadiene and Styrene

2. Butadiene and Acrylonitrile

3. Butadiene and Isoprene

4. Formaldehyde and Styrene

**Question Number : 98  Question Id : 67809438954  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Main constituent of natural gas is

**Options :**

1. Ethane

2. Methane

3. Butane

4. Carbon Monoxide

**Question Number : 99  Question Id : 67809438955  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Ozone layer is present at

**Options :**

1. Staratosphere

2. Inosphere

3. Thermosphere

4. Atmosphere

**Question Number : 100  Question Id : 67809438956  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The amount of DO required to aerobically decompose biodegradable organic matter of a given volume of water is

**Options :**

1. Biochemical Oxygen Demand

2. Biological Oxygen Demand

3. Chemical Oxygen demand

4. Biomagnification

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| | |
|---|---|
| **Number of Questions:** | 100 |
| **Display Number Panel:** | Yes |
| **Group All Questions:** | No |

**Question Number : 101  Question Id : 67809438957  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Superposition theorem is not applicable for _____

**Options :**

1. voltage calculations

2. bilateral elements

3. power calculations

4. passive elements

**Question Number : 102  Question Id : 67809438958  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Which one of the following materials cannot be used for permanent magnets?

**Options :**

1. Alnico

2. barium ferrite

3. Carbon-Steel

4. Iron-Cobalt alloy

**Question Number : 103  Question Id : 67809438959  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

For a given dielectric, with increase in temperature the ionic polarizability____

**Options :**

1. increases

2. decreases

3. remains same

4. fluctuates

**Question Number : 104  Question Id : 67809438960  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Two bulbs of 100 W/250 V and 150 W/250 V are connected in series across a supply of 250 V. The power consumed by the circuit is _____

**Options :**

1. 30 W

2. 60 W

3. 100 W

4. 250 W

**Question Number : 105  Question Id : 67809438961  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Three 30Ω resistors are connected in parallel across an ideal 40 V source. What would be the equivalent resistance seen by the load connected across the circuit?

**Options :**

1. 0 Ω

2. 10 Ω

3. 20 Ω

4. 30 Ω

**Question Number : 106  Question Id : 67809438962  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The maximum power will be transferred from a voltage source to a load when__

**Options :**

1. the source impedance is half that of the load impedance

2. the source impedance is equal to that of the load impedance

3. the source impedance is twice that of the load impedance

4. both source and load impedances must be zero

**Question Number : 107  Question Id : 67809438963  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Which of the following is not a conducting material?

**Options :**

1. Copper

2. Tungstun

3. Germanium

4. Platinum

Question Number : 108  Question Id : 67809438964  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The armature of a DC machine is laminated to reduce _____

Options :

1. The hysterisis loss

2. Eddy current loss

3. the mass

4. the inductance

Question Number : 109  Question Id : 67809438965  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A lap wound DC machine has 400 conductors and 8 poles. The voltage induced per conductor is 2V. The machine generates a voltage of _____

Options :

1. 100V

2. 200V

3. 400V

4. 800V

Question Number : 110  Question Id : 67809438966  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A 250V DC generator is run at rated speed with no excitation. The open circuit voltage will be

Options :

1. Zero

2. About 2 to 3V

3. 100 V

4. 250V

**Question Number : 111  Question Id : 67809438967  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The simplest way of shifting load from one shunt generator to the other operating in parallel is by _____

Options :

1. Adjustment of speeds

2. Adjustment of armature resistances

3. Adjustment of field rheostats

4. Using equalizer connections

**Question Number : 112  Question Id : 67809438968  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

With the increase in speed of a DC motor_____

Options :

1. Both back emf as well as line current increase

2. Both back emf as well as line current fall

3. Back emf increases but line current falls

4. Back emf falls and line current increases

**Question Number : 113  Question Id : 67809438969  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The direction of rotation of a DC motor can be determined by _____

Options :

1. Fleming's right hand rule

2. Fleming's left hand rule

3. Lenz's law

4. Ampere law

**Question Number : 114  Question Id : 67809438970  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If the applied voltage to a DC machine is 230 V, then the back emf for maximum power developed is _____

Options :

1. 115V

2. 200V

3. 230V

4. 460V

**Question Number : 115  Question Id : 67809438971  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a DC series motor, the torque developed is _____

Options :

1. Inversely proportional to armature current

2. Directly proportional to armature current

3. Proportional to the square of armature current

4. Proportional to the square root of the armature current

**Question Number : 116  Question Id : 67809438972  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If one of the control springs of a Permanent Magnet Moving Coil ammeter is broken then, when connected it will read_____

Options :

1. zero

2. half of the correct value

3. twice the correct value

4. an infinite value

**Question Number : 117  Question Id : 67809438973  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The principle of operation of an LVDT is based on variation of _____

**Options :**

1. Self-inductance

2. Mutual inductance

3. Reluctance

4. Permeance

**Question Number : 118  Question Id : 67809438974  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The major cause of creeping in an energy meter is _____

**Options :**

1. over compensation for friction

2. mechanical vibrations

3. excessive voltage across the potential coil

4. stray magnetic fields

**Question Number : 119  Question Id : 67809438975  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A current transformer has a phase error of $+3^0$. The phase angle between the primary and secondary currents is _____

**Options :**

1. $3^0$

2. $177^0$

3. $180^0$

4. $183^0$

**Question Number : 120  Question Id : 67809438976  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Unit of reactive power is _____

**Options :**

1. VA

2. Watt

3. VAR

4. Ohm

**Question Number : 121  Question Id : 67809438977  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A series RLC circuit will have unity power factor if operated at a frequency of

**Options :**

1. 1/LC

2. $1/\omega\sqrt{LC}$

3. $1/\omega^2 LC$

4. $1/2\pi\sqrt{LC}$

**Question Number : 122  Question Id : 67809438978  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The form factor of sinusoidal alternating current is _____

**Options :**

1. 1

2. 0

3. 1.11

4. 1.15

**Question Number : 123  Question Id : 67809438979  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If the reading of two wattmeters are equal and positive in two watt meter method, the load pf in a balanced 3-phase, 3-wire circuit will be ____

**Options :**

1. Zero

2. 0.5

3. 0.866

4. 1

**Question Number : 124  Question Id : 67809438980  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

An RLC series circuit has $f_1$ and $f_2$ as the half power frequencies and $f_0$ as the resonant frequency. The Q-factor of the circuit is _____

**Options :**

1. $(f_1+f_2)/2f_0$

2. $f_1-f_0/f_2-f_0$

3. $f_0/f_1-f_2$

4. $f_1-f_2/f_0$

**Question Number : 125  Question Id : 67809438981  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a transformer, zero voltage regulation at full load is _____

**Options :**

1. Not possible

2. Possible at leading power factor load

3. Possible at lagging power factor load

4. Possible at unity power factor load

**Question Number : 126  Question Id : 67809438982  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The transformer efficiency at relatively light loads is quite low. This is due to __

**Options :**

1. Small copper losses

2. Small secondary output

3. High fixed loss in comparison to the output

4. Poor power factor


**Question Number : 127 Question Id : 67809438983 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

In order to reduce the hysterisis loss_____

Options :

1. Core may be laminated

2. Silicon steel may be used as the core material

3. Core may be constructed with any permanent magnet material such as Alnico

4. Core may be impregnated with varnish


**Question Number : 128 Question Id : 67809438984 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Transformers are rated in kVA instead of kW because _____

Options :

1. Load power factor is often not known

2. kVA is fixed where kW depends on load pf

3. Total transformer loss depends on volt-amperes

4. It has become customary


**Question Number : 129 Question Id : 67809438985 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Which of the following connection of transformer will give the highest secondary voltage?

Options :

1. Delta primary, delta secondary

2. Delta primary, star secondary

3. Star primary, star secondary

4. Star primary, delta secondary

**Question Number : 130  Question Id : 67809438986  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

For successful parallel operation of two single phase transformers, the most essential condition is that their _____

**Options :**

1. percentage impedances are equal

2. polarities are properly connected

3. turn-ratios are exactly equal

4. kVA ratings are equal

**Question Number : 131  Question Id : 67809438987  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In an auto transformer, power is transferred through _____

**Options :**

1. Conduction process only

2. Induction process only

3. Both conduction and Induction processes

4. Mutual coupling

**Question Number : 132  Question Id : 67809438988  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Distributed winding is preferred over concentrated winding as it _____

**Options :**

1. reduces noise

2. reduces the machine size

3. reduces the amount of copper required

4. improves the generated emf waveform and adds rigidity and mechanical strength to the winding

**Question Number : 133  Question Id : 67809438989  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The short circuit characteristic of an alternator is _____

Options :

1. Always linear

2. Always non-linear

3. Always triangular

4. Always circular

**Question Number : 134  Question Id : 67809438990  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The maximum possible speed at which an alternator can be driven to generate 50 Hz and 4000V is _____

Options :

1. 400 rpm

2. 3600 rpm

3. 3000 rpm

4. 1500 rpm

**Question Number : 135  Question Id : 67809438991  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

An ideal synchronous motor has no starting torque because the ___

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 : 136  Question Id : 67809438992  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a synchronous machine, damper windings are used to _____

Options :

1. help in starting as a motor

2. run it as an induction motor

3. help in starting as a motor and to reduce hunting

4. increase efficiency

Question Number : 137  Question Id : 67809438993  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

Armature reaction in a synchronous motor at rated voltage and zero power factor (lead) is _____

Options :

1. magnetising

2. cross-magnetising

3. both magnetising and cross-magnetising

4. demagnetising

Question Number : 138  Question Id : 67809438994  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

The principle of operation of a 3-phase induction motor is almost similar to that of

Options :

1. synchronous motor

2. repulsion start induction motor

3. transformer with a shorted secondary

4. capacitor start induction motor

Question Number : 139  Question Id : 67809438995  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical

A three phase 6-pole, 50 Hz, induction motor is running at 5% slip. What is the speed of the motor?

Options :

1. 850 rpm

2. 900 rpm

3. 950 rpm

4. 1000 rpm

**Question Number : 140  Question Id : 67809438996  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In an induction motor under running condition, the rotor reactance per phase is _____ its standstill phase reactance.

Options :

1. s times

2. equal to

3. 1/s times

4. (1-s) times

**Question Number : 141  Question Id : 67809438997  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a three phase induction motor, the starting torque will be maximum when____

Options :

1. $R_2 = 1/X_2$

2. $R_2 = X_2$

3. $R_2 = X_2^2$

4. $R_2 = \sqrt{X_2}$

**Question Number : 142  Question Id : 67809438998  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

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 : 143  Question Id : 67809438999  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A universal motor is one which has _____

**Options :**
1. constant speed

2. constant output

3. capability of operating both on ac and dc with comparable performance

4. maximum efficiency

**Question Number : 144  Question Id : 67809439000  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Which of the following power plants is free from environmental problems?

**Options :**
1. Diesel engine

2. Nuclear

3. Hydroelectric

4. Steam

**Question Number : 145  Question Id : 67809439001  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Diversity factor is the ratio of _____

**Options :**
1. sum of maximum demands of consumers/system maximum demand

2. maximum demand of consumers/average demand

3. demand of all consumers/average demand

4. Average demand/system maximum demand

**Question Number : 146  Question Id : 67809439002  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Flat rate tariff can be charged on the basis of _____

**Options :**

1. connected load

2. units consumed

3. maximum demand

4. minimum demand

**Question Number : 147  Question Id : 67809439003  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a power plant, a reverse generating capacity, which is in operable condition and available for service, but not in operation is called the _____

**Options :**

1. spinning reverse

2. firm reverse

3. cold reverse

4. hot reverse

**Question Number : 148  Question Id : 67809439004  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Advantages of the improved power factor are _____

**Options :**

1. increase in operating efficiency of the power system

2. improvement in voltage regulation

3. reduction in overall cost per unit

4. better utilization of kW capacities of prime movers, transformers, switchgear and the lines

**Question Number : 149  Question Id : 67809439005  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A circuit breaker normally operates _____

Options :

1. when the power is to be supplied

2. when the line is to be tested

3. when the switch is to be put on

4. whenever fault occurs in the line

**Question Number : 150  Question Id : 67809439006  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The RRRV depends upon the _____

Options :

1. type of the circuit breaker

2. capacitance of the system only

3. inductance of the system only

4. inductance and capacitance of the system

**Question Number : 151  Question Id : 67809439007  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Threshold characteristics of a plain impedance relay in a complex Z plane is a __

Options :

1. circle passing through origin

2. circle with the centre at the origin

3. straight line passing through the origin

4. straight line offset from the origin

**Question Number : 152  Question Id : 67809439008  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Buchholz relay is _____

Options :

1. located in the conservator tank

2. located in the transformer tank itself

3. connected in the pipe connecting main tank of transformer and conservator

4. installed in the circuit breaker

**Question Number : 153 Question Id : 67809439009 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

For the protection of stator winding of an alternator against internal fault involving ground, the relay used is a _____

Options :

1. biased differential relay

2. directional over current relay

3. plain impedance relay

4. Buchholz relay

**Question Number : 154 Question Id : 67809439010 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

For a medium length transmission line, A is _____

Options :

1. equal to B

2. equal to C

3. equal to D

4. not equal to B,C,D

**Question Number : 155 Question Id : 67809439011 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

When is the Ferranti effect on long overhead lines experienced?

Options :

1. The line is lightly loaded

2. The line is heavily loaded

3. The line is fully loaded

4. The power factor is unity

**Question Number : 156  Question Id : 67809439012  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Hollow conductors are used in transmission lines to _____

Options :

1. reduce weight of copper

2. improve stability

3. reduce corona

4. increases power transmission capacity

**Question Number : 157  Question Id : 67809439013  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The sag of a transmission line is least affected owing to _____

Options :

1. weight of the conductor

2. current through the conductor

3. atmospheric temperature

4. ice deposition on the conductor

**Question Number : 158  Question Id : 67809439014  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

If the frequency of a transmission system is changed from 50 Hz to 100 Hz, the string efficiency _____

Options :

1. will increase

2. will decrease

3. remain unchanged

4. may increase or decrease depending on the line parameters

**Question Number : 159 Question Id : 67809439015 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

HVDC transmission is preferred to EHV AC because _____

**Options :**

1. HVDC terminal equipment are inexpensive

2. VAR compensation is not required in HVDC system

3. system stability can be improved

4. harmonics problem is avoided

**Question Number : 160 Question Id : 67809439016 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The inductance of a transmission line is minimum when_____

**Options :**

1. GMD is high

2. GMR is high

3. both GMD and GMR are high

4. GMD is low and GMR is high

**Question Number : 161 Question Id : 67809439017 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Transmission lines are transposed to _____

**Options :**

1. reduce corona loss

2. reduce skin effect

3. prevent interference with neighboring telephone lines

4. prevent short circuit between any two lines

**Question Number : 162  Question Id : 67809439018  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The main criterion for selection of the size of a distributor for a radial distribution system is _____

**Options :**

1. voltage drop

2. corona loss

3. temperature rise

4. capital cost

**Question Number : 163  Question Id : 67809439019  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Capacitance grading of cable means_____

**Options :**

1. use of dielectrics in different concentrations

2. introduction of capacitances at various lengths of cable to counter the effect of inductance

3. use of dielectrics of different permittivities

4. grading according to capacitance per km length of the cable

**Question Number : 164  Question Id : 67809439020  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The composite system (single phase AC to DC system) has been chosen for all future track electrification in India as _____

**Options :**

1. it needs light overhead catenary

2. it needs less number of substations

3. it combines the advantages of high voltage AC distribution at 50 Hz with DC series traction motors

4. It provides flexibility in the location of substations

**Question Number : 165  Question Id : 67809439021  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The maximum speed at which trains run on main line railway service is _____

**Options :**

1. 160 kmph

2. 120 kmph

3. 100 kmph

4. 200 kmph

**Question Number : 166  Question Id : 67809439022  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The speed – time curve for urban service has no _____

**Options :**

1. coasting period

2. free running period

3. breaking period

4. acceleration period

**Question Number : 167  Question Id : 67809439023  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Trapezoidal speed-time curve pertains to _____

**Options :**

1. main line service

2. urban service

3. suburban service

4. urban/suburban service

**Question Number : 168  Question Id : 67809439024  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Specific energy consumptions becomes _____

**Options :**

1. more when distance between stops is more

2. more with the higher values of acceleration

3. more with high train resistance

4. less with the increase in crest speed

**Question Number : 169 Question Id : 67809439025 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The DC series motor is most suitable for traction services but more particularly for urban/suburban services because _____

Options :

1. DC series motors are suitable for regenerative breaking

2. DC series motors are capable of withstanding rapid fluctuations in supply Voltage

3. DC series motors are capable of developing high torque at start

4. DC series motors are capable of withstanding temporary interruption of supply without undue rush of current

**Question Number : 170 Question Id : 67809439026 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Free running and costing periods are generally long in case of _____

Options :

1. city service

2. suburban service

3. main line service

4. outer suburban service

**Question Number : 171 Question Id : 67809439027 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Tractive effort of an electric locomotive can be increased by _____

Options :

1. using low output motors

2. Increasing the supply voltage

3. decreasing dead weight over the driving axles

4. using high output motors and increasing dead weight over driving axles

**Question Number : 172  Question Id : 67809439028  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The earth wire should be _____

Options :

1. good conductor of electricity

2. mechanically strong

3. good conductor and mechanically strong

4. mechanically strong but bad conductor of electricity

**Question Number : 173  Question Id : 67809439029  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The short length of the conductor used to connect the line conductor on one side of the terminal pole to the line conductor on the other side of the pole is known as

Options :

1. Jumper

2. Petticoat

3. Guard

4. Guy

**Question Number : 174  Question Id : 67809439030  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

Inside the earth or pit, the earthing electrode should be placed _____

Options :

1. horizontally

2. vertically

3. inclined at $45^0$

4. in any position


**Question Number : 175  Question Id : 67809439031  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The cheapest system of internal wiring is _____ wiring

Options :

1. cleat

2. casing-capping

3. CTS or TRS

4. conduit


**Question Number : 176  Question Id : 67809439032  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

For a NPN bipolar transistor, what is the main stream of current in the base region?

Options :

1. Drift of holes

2. Diffusion of holes

3. Drift of electrons

4. Diffusion of electrons


**Question Number : 177  Question Id : 67809439033  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

For a junction FET in the pinch off region, as the drain voltage is increased, the drain current _____

Options :

1. becomes  zero

2. abruptly decreases

3. abruptly increases

4. remains constant

**Question Number : 178 Question Id : 67809439034 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

In a centre tap full wave rectifier, 100 V is the peak voltage between the centre tap and one end of the secondary. What is the maximum voltage across the reverse biased diode?

Options :

1. 200 V

2. 141 V

3. 100 V

4. 86 V

**Question Number : 179 Question Id : 67809439035 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

If the differential and common mode gains of a differential amplifier are 50 and 0.2 respectively, then the CMRR will be _____

Options :

1. 10

2. 49.8

3. 50.2

4. 250

**Question Number : 180 Question Id : 67809439036 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

An ideal amplifier has_____

Options :

1. Positive feedback

2. uniform frequency response

3. Infinite voltage gain
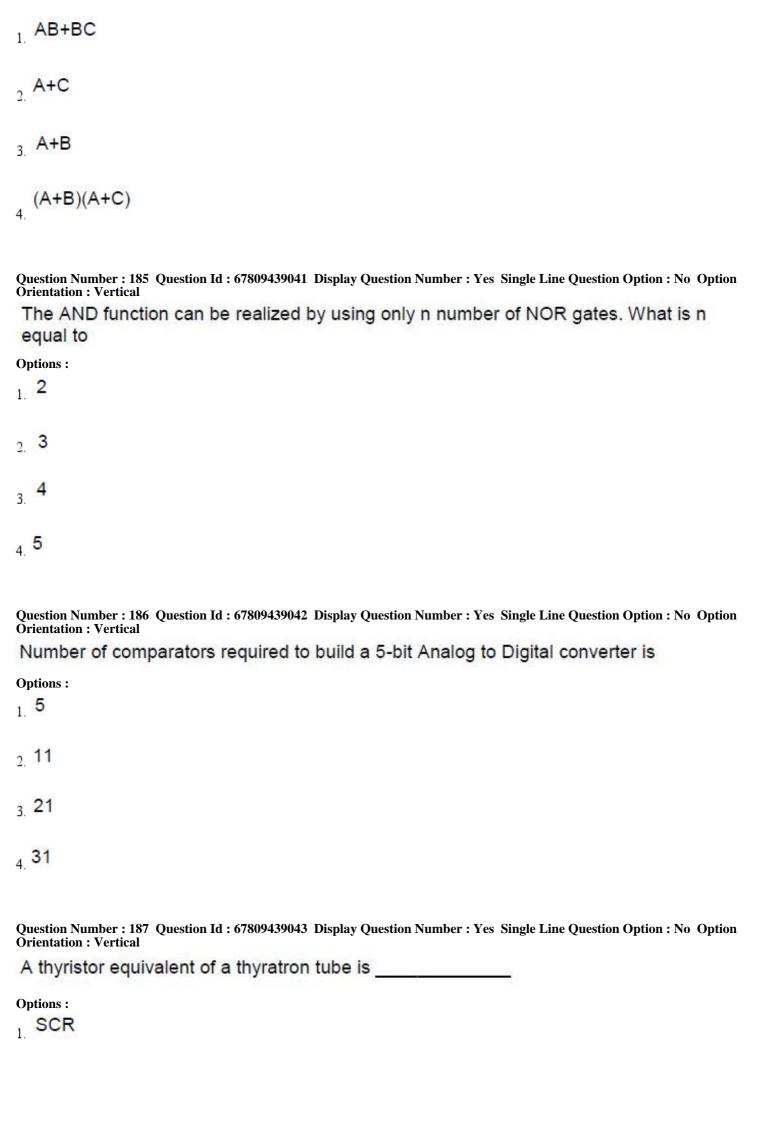
4. responds only to signals at its input terminals

**Question Number : 181 Question Id : 67809439037 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The Barkhausen criterion for sustained oscillation is given by _____

**Options :**

1. $A\beta=1$

2. $|A\beta|\geq1$

3. $|A\beta|<1$

4. $\angle A\beta=180^0$

**Question Number : 182  Question Id : 67809439038  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a Wien bridge oscillator, the positive feedback attenuation  is _____

**Options :**

1. 1/3

2. 1/29

3. -29

4. 3

**Question Number : 183  Question Id : 67809439039  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The binary equivalent of hexadecimal number 4F2D is _____

**Options :**

1. 0101 1111 0010 1100

2. 0100 1111 0010 1100

3. 0100 1110 0010 1101

4. 0100 1111 0010 1101

**Question Number : 184  Question Id : 67809439040  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The logic function A+BC is the simplified form of which of the following?

**Options :**

1. AB+BC

2. A+C

3. A+B

4. (A+B)(A+C)

---

**Question Number : 185 Question Id : 67809439041 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The AND function can be realized by using only n number of NOR gates. What is n equal to

**Options :**

1. 2

2. 3

3. 4

4. 5

---

**Question Number : 186 Question Id : 67809439042 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Number of comparators required to build a 5-bit Analog to Digital converter is

**Options :**

1. 5

2. 11

3. 21

4. 31

---

**Question Number : 187 Question Id : 67809439043 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

A thyristor equivalent of a thyratron tube is _____

**Options :**

1. SCR

2. UJT

3. Diac

4. Triac

**Question Number : 188  Question Id : 67809439044  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

For an SCR, dv/dt protection is achieved through the use of _____

**Options :**

1. R-L in series with SCR

2. R-C across SCR

3. L in series with SCR

4. R-C in series with SCR

**Question Number : 189  Question Id : 67809439045  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The TRIAC is equivalent to _____

**Options :**

1. Two SCRs connected in parallel

2. Two SCRs connected in antiparallel

3. One SCR, one diode connected in parallel

4. One diode, one SCR connected in antiparallel

**Question Number : 190  Question Id : 67809439046  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

A Gate Turn Off (GTO) thyriostor has capacity to _____

**Options :**

1. Amplify the gate current

2. Turn-off when positive current pulse is given at the gate

3. Turn-off when a gate pulse is given at the gate even though it is reverse biased

4. Turn-off when a negative current pulse is given at the gate

**Question Number : 191 Question Id : 67809439047 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

Commutation overlap in the phase-controlled AC to DC converter is due to _____

**Options :**

1. load inductance

2. harmonic content of load current

3. switching operation in the converter

4. source inductance

**Question Number : 192 Question Id : 67809439048 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

The advantage of using a freewheeling diode with bridge type AC/DC converter is

**Options :**

1. regenerative breaking

2. reliable speed control

3. improved power factor

4. reduced cost of the system

**Question Number : 193 Question Id : 67809439049 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical**

A power chopper converts _____

**Options :**

1. AC to DC

2. DC to DC

3. DC to AC

4. AC to AC

**Question Number : 194  Question Id : 67809439050  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

AC voltage regulators are widely used in _____

Options :
1. traction drives

2. fan drives

3. synchronous motor drives

4. slip power recovery scheme of slip-ring induction motor


**Question Number : 195  Question Id : 67809439051  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The phase controlled rectifiers used in speed control of DC motors converts fixed AC supply voltage into _____ output voltage

Options :
1. variable DC

2. variable AC

3. variable frequency AC

4. full rectified AC


**Question Number : 196  Question Id : 67809439052  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

In a UPS, the solid state switch normally transfer supply within _____

Options :
1. 4 ms

2. 30 ms

3. 48 ms

4. 30 s


**Question Number : 197  Question Id : 67809439053  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The internal RAM memory of the 8051 is _____

**Options :**

1. 32 bytes

2. 64 bytes

3. 128 bytes

4. 256 bytes

**Question Number : 198  Question Id : 67809439054  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The 8051 has _____ 16-bit counter/timers

**Options :**

1. 1

2. 2

3. 3

4. 4

**Question Number : 199  Question Id : 67809439055  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The 8051 can handle _____ interrupt sources

**Options :**

1. 3

2. 4

3. 5

4. 6

**Question Number : 200  Question Id : 67809439056  Display Question Number : Yes  Single Line Question Option : No  Option Orientation : Vertical**

The I/O ports that are used as address and data for external memory are _____

**Options :**

1. Ports 1 and 2

2. Ports 1 and 3

3. Ports 0 and 2

4. Ports 0 and 3