

# Question Paper Preview

Question Paper Name: Civil Engineering  
Subject Name: Civil Engineering

Mathematics

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

Question Number : 1 Question Id : 67809417224 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $A = \begin{pmatrix} 2 & -1 & 0 \\ 3 & 4 & 7 \end{pmatrix}$  and  $B = \begin{pmatrix} 5 & 2 & -3 \\ 1 & 0 & -2 \end{pmatrix}$  then  $2A+3B =$

Options :

1.  $\begin{pmatrix} 19 & 4 & -9 \\ 9 & 8 & 8 \end{pmatrix}$

2.  $\begin{pmatrix} -19 & -4 & 9 \\ 9 & 8 & -8 \end{pmatrix}$

3.  $\begin{pmatrix} 18 & 4 & -9 \\ 9 & 8 & 8 \end{pmatrix}$

4.  $\begin{pmatrix} 17 & 5 & -9 \\ 8 & 8 & 9 \end{pmatrix}$

Question Number : 2 Question Id : 67809417225 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $A = \begin{pmatrix} 2 & -3 & 0 \\ 1 & 4 & -1 \end{pmatrix}$  and  $B = \begin{pmatrix} 6 & 1 \\ 3 & 0 \\ 5 & 2 \end{pmatrix}$  then  $(AB)^T =$

Options :

1.  $A^T B^T$

2.  $B^T A^T$

3.  $(BA)^T$

4.  $AB^T$

Question Number : 3 Question Id : 67809417226 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If two rows or two columns of a determinant are identical then the value of the determinant is

Options :

1. 2

2. -1

3. 0

4. -2

Question Number : 4 Question Id : 67809417227 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of  $\begin{vmatrix} 265 & 240 & 219 \\ 240 & 225 & 198 \\ 219 & 198 & 181 \end{vmatrix}$  is

Options :

1. -1

2. 0

3. 1

4. 2

Question Number : 5 Question Id : 67809417228 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The adjoint of the square matrix  $A = \begin{pmatrix} 2 & 5 & 1 \\ 3 & 1 & 2 \\ 4 & 3 & 1 \end{pmatrix}$  is

Options :

1. 
$$\begin{pmatrix} -5 & -2 & 9 \\ 5 & -2 & -1 \\ 5 & 14 & -13 \end{pmatrix}$$

2. 
$$\begin{pmatrix} 5 & 2 & 9 \\ 5 & -2 & -1 \\ 5 & 14 & -13 \end{pmatrix}$$

3. 
$$\begin{pmatrix} -5 & -2 & 9 \\ -5 & -2 & -1 \\ -5 & 14 & -13 \end{pmatrix}$$

4. 
$$\begin{pmatrix} -5 & -2 & -9 \\ 5 & 2 & 1 \\ 5 & 14 & -13 \end{pmatrix}$$

Question Number : 6 Question Id : 67809417229 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Resolve into partial fractions:  $\frac{5}{(2x-1)(3x-1)} =$

Options :

1.  $\frac{8}{2x-1} + \frac{5}{3x-1}$

2.  $\frac{10}{2x-1} - \frac{15}{3x-1}$

3.  $\frac{11}{3x-1} + \frac{7}{2x-1}$

4.  $\frac{1}{2x-1} + \frac{2}{3x-1}$

Question Number : 7 Question Id : 67809417230 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Resolve into partial fractions:  $\frac{3x-1}{(x-1)(x-2)(x-3)} =$

Options :

1.  $\frac{2}{x-1} + \frac{5}{x-2} - \frac{4}{x-3}$

2.  $\frac{-1}{x-1} + \frac{5}{x-2} - \frac{4}{x-3}$

3.  $\frac{1}{x-1} + \frac{5}{x-2} + \frac{4}{x-3}$

4.  $\frac{1}{x-1} - \frac{5}{x-2} + \frac{4}{x-3}$

Question Number : 8 Question Id : 67809417231 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $\tan A = \frac{1}{2}$  and  $\tan B = \frac{1}{3}$  then  $\tan(A - B) =$

Options :

1.  $\frac{1}{7}$

2.  $\frac{-1}{7}$

3.  $\frac{1}{5}$

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

Question Number : 9 Question Id : 67809417232 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of  $\cot 2A + \tan A =$

Options :

1.  $\sin 2A$

2.  $\cos 2A$

3.  $\sec 2A$

4.  $\operatorname{cosec} 2A$

Question Number : 10 Question Id : 67809417233 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of  $\frac{1 - \cos 2A + \sin 2A}{1 + \cos 2A + \sin 2A} =$

Options :

1.  $\sin A$
2.  $\cos A$
3.  $\tan A$
4.  $\cot A$

Question Number : 11 Question Id : 67809417234 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 : 12 Question Id : 67809417235 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of  $\cos 20^\circ + \cos 100^\circ + \cos 140^\circ =$

Options :

1. 0
2. 3
3. 1
4. -3

The value of  $\sum a(b^2 + c^2)\cos A$  is

Options :

1.  $2abc$
2.  $4abc$
3.  $3abc$
4.  $5abc$

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

Options :

1.  $C^3$
2.  $C$
3.  $C^5$
4.  $C^2$

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

Options :

1.  $\pi/4$
2.  $\pi/2$
3.  $\pi/6$
4.  $\pi/3$

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

Options :

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

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

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

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

Question Number : 17 Question Id : 67809417240 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 : 18 Question Id : 67809417241 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 : 19 Question Id : 67809417242 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

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

Options :

1.  $2 \cos n\theta$
2.  $-2 \cos n\theta$
3.  $3 \cos \theta$
4.  $2 \sin n\theta$

Question Number : 20 Question Id : 67809417243 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The centre of the circle:  $x^2 + y^2 - 2x + 6y - 6 = 0$  is

Options :

1. (1,3)
2. (2,3)
3. (1, -3)
4. (-1,3)

Question Number : 21 Question Id : 67809417244 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The radius of the circle:  $5x^2 + 5y^2 - 6x + 8y - 75 = 0$  is

Options :

1. -4
2. 4
3. 2
4. 3

Question Number : 22 Question Id : 67809417245 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 : 67809417246 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 : 24 Question Id : 67809417247 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The focus of the hyperbola:  $\frac{x^2}{25} - \frac{y^2}{144} = 1$  is

Options :

1.  $(-13, 0)$

2.  $(13, 0)$

3.  $(13, -1)$

4.  $(13, 1)$

Question Number : 25 Question Id : 67809417248 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. 8

4. 13

Question Number : 26 Question Id : 67809417249 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of  $\lim_{x \rightarrow 1} \frac{x^3 - 1}{x - 1}$  is

Options :

1. 3

2. -3

3. 2

4. 1

Question Number : 27 Question Id : 67809417250 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 : 28 Question Id : 67809417251 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $y = x^3 e^x$  then  $\frac{dy}{dx}$  is

Options :

1.  $(x - 3)x^2 e^x$

2.  $(x - 2)x^3 e^x$

3.  $(x + 3)x^2 e^x$

4.  $(x - 1)x^3 e^x$

Question Number : 29 Question Id : 67809417252 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $y = \sec x + \tan x$  then  $\frac{dy}{dx}$  is

Options :

1.  $y \cos x$

2.  $y \sec x$

3.  $-y \sin x$

4.  $y \tan x$

Question Number : 30 Question Id : 67809417253 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.  $\frac{5 \cosh x}{(3+2 \sinh x)^2}$

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

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

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

Question Number : 31 Question Id : 67809417254 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $y = \sqrt{\frac{1-\cos x}{1+\cos x}}$  then  $\frac{dy}{dx}$  is

Options :

1.  $\sec^2\left(\frac{x}{2}\right)$

2.  $\cos^2\left(\frac{x}{2}\right)$

3.  $\frac{1}{2}\cos^2\left(\frac{x}{2}\right)$

4.  $\frac{1}{2}\sec^2\left(\frac{x}{2}\right)$

Question Number : 32 Question Id : 67809417255 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 : 33 Question Id : 67809417256 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 : 34 Question Id : 67809417257 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 : 35 Question Id : 67809417258 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  $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} =$

Options :

1.  $-nu$

2.  $n^2u$

3.  $nu$

4.  $nu^2 + u$

Question Number : 36 Question Id : 67809417259 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 : 37 Question Id : 67809417260 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

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

Options :

1.  $\cos^{-1}\left(\frac{x}{a}\right) + c$

2.  $\sin^{-1}\left(\frac{x}{a}\right) + c$

3.  $\sinh^{-1}\left(\frac{x}{a}\right) + c$

4.  $\sin^{-1}\left(\frac{a}{x}\right) + c$

Question Number : 38 Question Id : 67809417261 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of  $\int \frac{dx}{4x^2+4x+17}$  is

Options :

1.  $\frac{1}{8} \tan^{-1}\left(\frac{2x+1}{4}\right) + c$

2.  $\frac{1}{4} \cot^{-1}\left(\frac{2x+1}{4}\right) + c$

3.  $\frac{1}{8} \sin^{-1}\left(\frac{2x+1}{4}\right) + c$

4.  $\frac{1}{3} \tan^{-1}\left(\frac{2x+1}{4}\right) + c$

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

The value of  $\int_1^4 \left( \sqrt{x} + \frac{1}{\sqrt{x}} \right) dx$  is

Options :

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

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

3.  $\frac{10}{3}$

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

The value of  $\int_0^{\pi/2} \sin^2 x \, dx$  is

Options :

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

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

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

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

Question Number : 42 Question Id : 67809417265 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 : 43 Question Id : 67809417266 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The value of  $\lim_{n \rightarrow \infty} \left[ \frac{1}{n+1} + \frac{1}{n+2} + \dots + \frac{1}{n+n} \right]$  is

Options :

1.  $\log 2$

2.  $\log 3$

3.  $-\log 2$

4.  $\log n$

Question Number : 44 Question Id : 67809417267 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.  $\frac{dy}{dx} = \frac{3y}{2x}$

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

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

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

Question Number : 45 Question Id : 67809417268 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The solution of  $\sqrt{1-y^2}dx + \sqrt{1-x^2}dy = 0$  is

Options :

1.  $\cos^{-1}x + \cos^{-1}y = c$

2.  $\sinh^{-1}x + \cosh^{-1}y = c$

3.  $\cos^{-1}x + \sec^{-1}x = c$

4.  $\sin^{-1}x + \sin^{-1}y = c$

Question Number : 46 Question Id : 67809417269 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

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

Options :

1.  $\frac{1}{2}\tan^{-1}\left(\frac{4x+y+1}{2}\right) = x + c$

2.  $\frac{1}{2}\cot^{-1}\left(\frac{4x+y+1}{2}\right) = x + c$

3.  $-\frac{1}{2}\tan^{-1}\left(\frac{4x+y+1}{2}\right) = x + c$

4.  $\frac{1}{2} \tan^{-1} \left( \frac{4x-y-1}{2} \right) = x + c$

Question Number : 47 Question Id : 67809417270 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 : 48 Question Id : 67809417271 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

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

Options :

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

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

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

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

Question Number : 49 Question Id : 67809417272 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.  $\frac{-e^{-x}}{12}$

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

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

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

Question Number : 50 Question Id : 67809417273 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The complementary function of  $(D^2 + 3D + 2)y = 8\sin 5x$  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.  $c_1 e^{2x} + c_2 e^{3x}$

Physics

Number of Questions:

25

Display Number Panel:

Yes

Group All Questions:

No

Question Number : 51 Question Id : 67809417274 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is not the unit of energy?

Options :

1. watt second

2. Pascal metre

3. Newton metre

4. Kilowatt hour

Question Number : 52 Question Id : 67809417275 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The height of Mercury barometer is 76 cm and density of Mercury is 13.6 g/cc. The corresponding height of water barometer in SI system is

Options :

1. 10.336 m

2. 103.36 m

3. 3.6m

4. 1.0336 m

Question Number : 53 Question Id : 67809417276 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Angle made by the vector  $(\sqrt{3} \bar{i} + \bar{j})$  with the X-axis is

Options :

1.  $\pi/2$

2.  $\pi/4$

3.  $\pi/3$

4.  $\pi/6$

Question Number : 54 Question Id : 67809417277 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The minimum number of unequal forces in a plane that can keep a particle in equilibrium is

Options :

1. 4

2. 2

3. 3

4. 6

Question Number : 55 Question Id : 67809417278 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A body is thrown with a velocity of  $(4\vec{i} + 3\vec{j})$  m/s. The maximum height attained by the body is ( $g=10 \text{ ms}^{-2}$ )

Options :

1. 2.5 m

2. 4.5 m

3. 0.8 m

4. 0.45 m

Question Number : 56 Question Id : 67809417279 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A person in a lift, which ascends up with acceleration  $10\text{ms}^{-2}$ , drops a stone from a height of 10m. The time of descent is ( $g=10 \text{ ms}^{-2}$ )

Options :

1. 0.5 s

2. 1 s

3. 1.5 s

4. 2 s

Question Number : 57 Question Id : 67809417280 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a projectile, the ratio of maximum height reached to the square of time of flight is

Options :

1. 5:4
2. 5:2
3. 5:1
4. 10:1

Question Number : 58 Question Id : 67809417281 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The ratio of distances travelled by a body, starting from rest and travelling with uniform acceleration, in successive intervals of time of equal duration will be

Options :

1. 1:2:3
2. 1:4:9
3. 1:3:5
4. 1:9:16

Question Number : 59 Question Id : 67809417282 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A force of 12 N acts on a body of mass 4 kg placed on a rough surface. The coefficient of friction between body and surface is 0.2 and take  $g = 10 \text{ ms}^{-2}$ . The acceleration of the body in  $\text{ms}^{-2}$  is

Options :

1. 1
2. 0.5
3. 0.25
4. Zero

Question Number : 60 Question Id : 67809417283 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Brakes stop a train in a certain distance  $d$ . When the braking force is made one fourth, the

brakes will stop the train in a distance which is

Options :

1.  $d/2$
2.  $4d$
3.  $2d$
4.  $d$

Question Number : 61 Question Id : 67809417284 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The product of linear momentum and velocity of a body represents

Options :

1. Kinetic energy of the body
2. Potential energy of the body
3. Half the Kinetic energy of the body
4. Twice the kinetic energy of the body

Question Number : 62 Question Id : 67809417285 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A man weighing 60 kg eats plum cake whose energy content is 9800 calories. If all this energy could be utilised by him, he can ascend to a height of

Options :

1. 17 m
2. 100 m
3. 70 m
4. 60m

Question Number : 63 Question Id : 67809417286 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A crane can lift up 10,000 kg of coal in 1 hour from a mine of depth 180m. If the efficiency of the crane is 80%, its input power must be ( $g=10 \text{ ms}^{-2}$ )

Options :

1. 62.5 kW
2. 6.25 kW
3. 50 kW
4. 5 kW

Question Number : 64 Question Id : 67809417287 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The graph of acceleration as a function of displacement in the case of a body executing simple harmonic motion is

Options :

1. Parabola
2. Hyperbola
3. Straight line with positive slope
4. Straight line with negative slope

Question Number : 65 Question Id : 67809417288 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The pendulum of length 'L' swings from mean position to mean position 'n' times in one second. The value of acceleration due to gravity is

Options :

1.  $\pi^2 n^2 L$
2.  $2\pi^2 n^2 L$



3.  $(\pi^2 n^2 L)/2$

4.  $4\pi^2 n^2 L$

Question Number : 66 Question Id : 67809417289 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When a source of sound is in motion towards a stationary observer, the effect observed is

Options :

1. Decrease in velocity of sound
2. Increase in velocity of sound
3. increase in frequency of sound
4. decrease in frequency of sound

Question Number : 67 Question Id : 67809417290 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The voice of a male person is different from that of a female person because

Options :

1. Two sounds have different phases
2. Two persons are of different size
3. Two sounds travel with different velocities
4. Two sounds have different pitch

Question Number : 68 Question Id : 67809417291 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the sound absorption of a hall is changed by 2%, then the percentage change in the reverberation time is

Options :

1. 2%

2. 4%
3. 1%
4. No change

Question Number : 69 Question Id : 67809417292 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In which of the following process, the internal energy of the system remains constant?

Options :

1. Adiabatic
2. Isothermal
3. Isobaric
4. Isochoric

Question Number : 70 Question Id : 67809417293 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Heat required to raise the temperature of one gram of water through 1 K is

Options :

1. 1.0 Kcal
2. 0.1 Kcal
3. 0.01 Kcal
4. 0.001 Kcal

Question Number : 71 Question Id : 67809417294 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The specific heat of a gas in an isothermal process is

Options :

1. infinity

2. Zero
3. Finite positive
4. Finite negative

Question Number : 72 Question Id : 67809417295 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Specific heat of aluminium is  $0.25 \text{ cal/g/}^\circ\text{C}$ . The water equivalent of an aluminium vessel of mass one kilogram is

Options :

1.  $40 \text{ cal/}^\circ\text{C}$
2.  $400 \text{ cal/}^\circ\text{C}$
3.  $250 \text{ cal/}^\circ\text{C}$
4.  $25 \text{ cal/}^\circ\text{C}$

Question Number : 73 Question Id : 67809417296 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

What should be the percentage increase in the pressure so that the volume of a gas may decrease by 5% at constant temperature?

Options :

1. 5%
2. 5.26%
3. 10%
4. 4.26%

Question Number : 74 Question Id : 67809417297 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the maximum kinetic energy of emitted photo electrons from a metal is 0.9 eV and work function is 2.2 eV, then the wavelength of incident radiation is

Options :

1. 4000Å
2. 8000Å
3. 3000Å
4. 2000Å

Question Number : 75 Question Id : 67809417298 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the angle of incidence of a ray is greater than the critical angle at the core – cladding interface in an optical fiber, then the ray travels

Options :

1. in the core
2. in the cladding
3. in the buffer
4. along the interface

Chemistry

Number of Questions:  
Display Number Panel:  
Group All Questions:

25  
Yes  
No

Question Number : 76 Question Id : 67809417299 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Pauli's Exclusion principle states that two electrons in same orbital have

Options :

1. same spins
2. different spins
3. opposite spins
4. vertical spins

Question Number : 77 Question Id : 67809417300 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Orbits in which electrons move according to Bohr are

Options :

1. elliptical
2. cylindrical
3. circular
4. oval

Question Number : 78 Question Id : 67809417301 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Phosphorus has an atomic number of 15. A stable phosphorus atom has an electronic configuration of

Options :

1.  $1s^2 2s^2 2p^6 3p^5$
2.  $1s^2 2s^2 2p^6 3s^2 3p^3$
3.  $1s^2 2s^2 2p^6 3s^2 3p^1 4s^2$
4.  $1s^2 1p^6 1d^7$

Question Number : 79 Question Id : 67809417302 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

NaCl is classified as having what kind of bonds in the solid phase?

Options :

1. Covalent
2. Ionic
3. Polar
4. vander Waals

Question Number : 80 Question Id : 67809417303 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The Bond formed due to sharing of electrons is

Options :

1. Ionic bond
2. Metallic bond
3. Polar bond
4. Covalent bond

Question Number : 81 Question Id : 67809417304 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The normality of solution obtained by dissolving 5.3 grams of  $\text{Na}_2\text{CO}_3$  in 1 litre solution is

Options :

1. 1N
2. 0.1N
3. 0.05N
4. 0.5N

Question Number : 82 Question Id : 67809417305 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The following solution has same molarity and normality

Options :

1.  $\text{Na}_2\text{CO}_3$
2.  $\text{NaCl}$
3.  $\text{H}_2\text{SO}_4$
4.  $\text{K}_2\text{Cr}_2\text{O}_7$

Question Number : 83 Question Id : 67809417306 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

5 moles of a solute is dissolved in 10 litres of solution. What is its molarity?

Options :

1. 5 M
2. 2M
3. 0.5M
4. 0.2M

Question Number : 84 Question Id : 67809417307 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Process in which acids ( $\text{H}^+$ ) and bases ( $\text{OH}^-$ ) react to form salts and water is called

Options :

1. Neutralization
2. Halogenation
3. Hydrogenation
4. Hydrolysis

Question Number : 85 Question Id : 67809417308 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A substance that donates a pair of electrons to form coordinate covalent bond is called

Options :

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

Question Number : 86 Question Id : 67809417309 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

One Faraday is equal to

Options :

1. 99650 C
2. 93100 C
3. 96500 C
4. 94500 C

Question Number : 87 Question Id : 67809417310 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The cell reaction of a cell is  $\text{Mg(s)} + 2 \text{H}^+(\text{aq}) \rightarrow \text{Mg}^{2+}(\text{aq}) + \text{H}_2(\text{g})$ . If the standard reduction potential of Zn is  $-2.372 \text{ V}$ , then the emf of the cell is

Options :

1.  $+2.372 \text{ V}$
2.  $-2.372 \text{ V}$
3.  $0.00 \text{ V}$
4.  $-1.372 \text{ V}$

Question Number : 88 Question Id : 67809417311 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical



Galvanic cells are the cells which convert

Options :

1. Electrical energy to chemical energy
2. Chemical energy to electrical energy
3. Chemical energy to free energy
4. Potential energy to kinetic energy

Question Number : 89 Question Id : 67809417312 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Mass of substance produced at electrode is directly proportional to the quantity of electricity passed. This is known as

Options :

1. Faraday's second law
2. Faraday's first law
3. Newton's third law
4. Newton's first law

Question Number : 90 Question Id : 67809417313 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Hardness of water is expressed in terms of equivalent of

Options :

1.  $\text{Na}_2\text{CO}_3$
2.  $\text{K}_2\text{CO}_3$
3.  $\text{MgCO}_3$
4.  $\text{CaCO}_3$

Temporary hardness is caused by

Options :

1. Carbonates of calcium and magnesium
2. Chlorides of calcium and magnesium
3. Sulphates of calcium and magnesium
4. Nitrates of Calcium

The exhausted zeolite bed can be regenerated by washing with

Options :

1. NaCl
2. dil. NaOH
3. dil. HCl
4. Distilled water

Corrosion is an example of

Options :

1. Oxidation
2. Reduction
3. Electrolysis
4. Halogenation

The composition of rust is

Options :

1.  $\text{Fe}(\text{OH})_3$
2.  $\text{FeCl}_3$
3.  $\text{FeO}$
4.  $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$

Which one of the following statement is not true?

Options :

1. Natural rubber has the trans-configuration at every double bond
2. Buna-S is a copolymer of butadiene and styrene
3. Natural rubber is a 1, 4-polymer of isoprene

In vulcanization, the formation of sulphur bridges between different chains makes rubber harder and stronger

4.

The monomers of Buna-S rubber are

Options :

1. Styrene and butadiene
2. Styrene and 2-propene
3. Isoprene and butadiene

#### 4. Styrene and sulphur

Question Number : 97 Question Id : 67809417320 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The plastics which soften when heat is applied with or without pressure, but require cooling to set them to shape are called as

Options :

1. Thermosofting materials
2. Thermosetting materials
3. Thermoplastic materials
4. Thermostatting materials

Question Number : 98 Question Id : 67809417321 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which one of the following statement is not true about ideal fuel?

Options :

1. High calorific value
2. High moisture content
3. Low cost
4. Moderate ignition temperature

Question Number : 99 Question Id : 67809417322 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Environmental pollution affects

Options :

1. Humans only
2. Plants only

3. Biotic components

4. Both abiotic and biotic components

Question Number : 100 Question Id : 67809417323 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Layer of atmosphere in which ozone layer lies is

Options :

1. Troposphere

2. Stratosphere

3. Exosphere

4. Mesosphere

Civil Engineering

Number of Questions:

100

Display Number Panel:

Yes

Group All Questions:

No

Question Number : 101 Question Id : 67809417324 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The property of material which can undergo considerable deformation before failure is called

Options :

1. Ductility

2. Brittle

3. Plastic

4. Malleability

A uniform solid circular bar of length  $L$ , cross sectional area  $A$  and self weight  $W$  is hanging vertically from the upper end. It is also subjected to a downward load of  $W$  at the free end. The elongation of the bar is

Options :

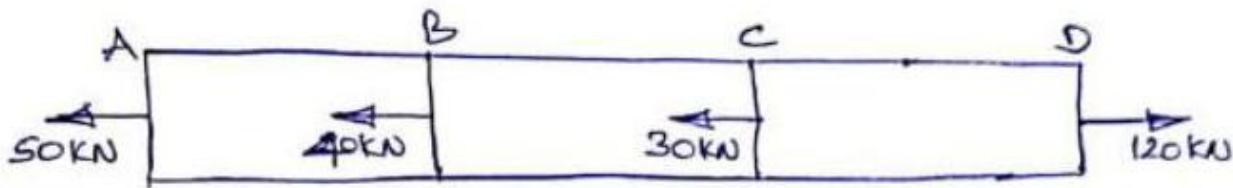
1.  $\frac{2WL}{AE}$

2.  $\frac{3}{2} \frac{WL}{AE}$

3.  $\frac{WL}{AE}$

4.  $\frac{1}{2} \frac{WL}{AE}$

A composite bar ABCD is subjected to loads as show in figure. The force in the bar BC is



Options :

1. 40 kN (Tensile)

2. 30 kN (Compressive)

3. 90 kN (Compressive)

4. 90 kN (Tensile)

A mild steel bar of square section  $10 \text{ mm} \times 10 \text{ mm}$  and length  $1 \text{ m}$  is subjected to an axial pull of  $20 \text{ kN}$ . If  $E = 2 \times 10^5 \text{ N/mm}^2$ , the change in length of the bar due to the axial pull is

Options :

1.  $0.1 \text{ mm}$
2.  $1 \text{ mm}$
3.  $2 \text{ mm}$
4.  $4 \text{ mm}$

Question Number : 105 Question Id : 67809417328 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For an isotropic material, the relationship between modulus of elasticity ( $E$ ), Bulk modulus ( $K$ ) and Poisson's ratio ( $\mu$ ) is

Options :

1.  $K = \frac{E}{2(1-\mu)}$
2.  $K = \frac{E}{2(1+\mu)}$
3.  $K = \frac{E}{3(1-2\mu)}$
4.  $K = \frac{E}{3(1+\mu)}$

Question Number : 106 Question Id : 67809417329 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The strain energy stored in a body within the elastic limit due to externally applied loads is

Options :

1. Resilience

2. Proof resilience

3. Modulus of resilience

4. Modulus of rupture

Question Number : 107 Question Id : 67809417330 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A simply supported beam of span  $2L$  is subjected to a concentrated load of  $W$  at mid span. The bending moment under the concentrated load is

Options :

1.  $2WL$

2.  $WL$

3.  $\frac{WL}{2}$

4.  $\frac{WL}{4}$

Question Number : 108 Question Id : 67809417331 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A cantilever beam AB of length 2 m is fixed at A and free at B. It is subjected to a downward uniformly distributed load of 24 kN/m over the span. If the resultant bending moment at A is equal to zero, the magnitude of the concentrated load to be applied at the free end B is

Options :

1. 24 kN (upward)

2. 24 kN (Downward)

3. 48kN (upward)



4. 48 kN (Downward)

Question Number : 109 Question Id : 67809417332 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A simply supported beam AB of span 4 m is subjected to a uniformly distributed load of 24 kN/m over the left half of the span. The bending moment at mid-span is

Options :

1. 12 kNm (Hogging)

2. 12 kNm (Sagging)

3. 24 kNm (Sagging)

4. 24 kNm (Hogging)

Question Number : 110 Question Id : 67809417333 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

An over hanging beam ABC of length 8 m is supported by hinges at A and B such that AB = 6 m and BC=2m. It is subjected to a concentrated load of 48 kN at the free end C. The reaction at the support A is

Options :

1. 16 kN (upward)

2. 16 kN (downward)

3. 24 kN (upward)

4. 24 kN (downward)

Question Number : 111 Question Id : 67809417334 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The bending stress in a T beam section is maximum at

Options :

1. the top fibre
2. the bottom fibre
3. the neutral axis
4. mid point

Question Number : 112 Question Id : 67809417335 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

At the neutral axis of a beam cross section

Options :

1. Shear stress is zero
2. Bending stress is zero
3. Shear stress is minimum
4. Bending stress is maximum

Question Number : 113 Question Id : 67809417336 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A rectangular beam of width 100 mm and depth 200 mm is subjected to a bending moment of 40 kNm. The maximum bending stress developed in the section is

Options :

1.  $30 \text{ N/mm}^2$
2.  $60 \text{ N/mm}^2$
3.  $90 \text{ N/mm}^2$
4.  $120 \text{ N/mm}^2$

Question Number : 114 Question Id : 67809417337 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a beam of circular cross section subjected to shear force, the ratio of maximum shear stress to the average shear stress is

Options :

1. 5:4
2. 4:3
3. 3:4
4. 3:2

Question Number : 115 Question Id : 67809417338 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The shear stress distribution across a rectangular cross section of beam is

Options :

1. Linear
2. Circular
3. Parabolic
4. Elliptic

Question Number : 116 Question Id : 67809417339 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The shear stress on a rectangular beam cross section is maximum at

Options :

1. the neutral axis
2. the extreme surface fibres
3. one-fourth of depth from neutral axis
4. one-third of depth from neutral axis

The shear stress at the center of a circular shaft subjected to twisting moment is

Options :

1. zero
2. Maximum
3. 1.5 times the average shear stress
4. 1.33 times the average shear stress

A solid circular shaft rotates at 160 rpm and is subjected to a torque of 1500 Nm. The power, in kW transmitted by the shaft is

Options :

1.  $4\pi$
2.  $8\pi$
3.  $16\pi$
4.  $32\pi$

The torsional rigidity of a circular shaft of diameter  $D$  is proportional to

Options :

1.  $D$
2.  $D^2$
3.  $D^3$
4.  $D^4$

Polar moment of Inertia of a solid circular shaft of diameter  $D$  is

Options :

1.  $\frac{\pi D^3}{16}$

2.  $\frac{\pi D^3}{32}$

3.  $\frac{\pi D^4}{32}$

4.  $\frac{\pi D^2}{32}$

For a flexural member, the equation connecting the Bending Moment and Deflection is

Options :

1.  $M = EI \frac{dy}{dx}$

2.  $M = EI \frac{d^2 y}{dx^2}$

3.  $M = EI \frac{d^3 y}{dx^3}$

4.  $EI = M \frac{d^2 y}{dx^2}$

If both the width and the depth of a simply supported beam are doubled and the remaining parameters unchanged, the maximum deflection for a given loading will be

Options :

1. increased by 8 times
2. reduced by 8 times
3. increased by 16 times
4. reduced by 16 times

Question Number : 123 Question Id : 67809417346 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a simply supported beam subjected to transverse loading, the maximum deflection occurs at

Options :

1. the point of contraflexure
2. the mid span
3. the point of zero slope
4. The point of zero shear force

Question Number : 124 Question Id : 67809417347 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A cantilever beam AB of span  $L$  is fixed at A and free at B is subjected to a concentrated load of  $W$  at the free end B. The slope of the point A is

Options :

1. Zero
2.  $\frac{WL^2}{2EI}$

3.  $\frac{WL^3}{2EI}$

4.  $\frac{WL^3}{3EI}$

Question Number : 125 Question Id : 67809417348 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a long column of length  $L$  and flexural rigidity  $EI$  fixed at both the ends, the

Euler's buckling load is

Options :

1.  $\frac{4\pi^2 EI}{L^2}$

2.  $\frac{2\pi^2 EI}{L^2}$

3.  $\frac{\pi^2 EI}{L^2}$

4.  $\frac{\pi^2 EI}{4L^2}$

Question Number : 126 Question Id : 67809417349 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Euler's formula for buckling load is valid for

Options :

1. Short columns

2. Long columns

3. Very short columns

#### 4. Short and long columns

Question Number : 127 Question Id : 67809417350 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Four vertical columns of same material, height and weight have the same end conditions. Which one of the cross sections will carry the maximum compressive load?

Options :

1. Solid circular section
2. Solid square section
3. Solid rectangular section
4. Thin hollow circular section

Question Number : 128 Question Id : 67809417351 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Radius of gyration of a section is proportional to the square root of the

Options :

1. sectional area
2. depth of the section
3. inverse of the sectional area
4. inverse of the moment of inclination

Question Number : 129 Question Id : 67809417352 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A long column fails by

Options :

1. Tension
2. Shearing



3. Buckling

4. Crushing

Question Number : 130 Question Id : 67809417353 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A fixed beam of span  $L$  is subjected to a concentrated load of  $W$  at mid span. If the flexural rigidity of the beam is  $2EI$ , the deflection at mid span of the beam is

Options :

1.  $\frac{1}{192} \cdot \frac{WL^3}{EI}$

2.  $\frac{1}{384} \cdot \frac{WL^3}{EI}$

3.  $\frac{5}{384} \cdot \frac{WL^3}{EI}$

4.  $\frac{1}{48} \cdot \frac{WL^3}{EI}$

Question Number : 131 Question Id : 67809417354 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a fixed beam, at the fixed end

Options :

1. Slope is zero and deflection is maximum

2. Slope is maximum and deflection is zero

3. Both slope and deflection are zero

4. Both slope and deflection are maximum

Question Number : 132 Question Id : 67809417355 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A propped cantilever AB of span L is fixed at A and supported by a prop at B and is subjected to a uniformly distributed downward load of w per metre length throughout. The reaction of the prop is

Options :

1.  $\frac{3}{8} \cdot w \cdot L$  (Downward)

2.  $\frac{3}{8} \cdot w \cdot L$  (Upward)

3.  $\frac{5}{16} \cdot wL$  (Upward)

4.  $\frac{5}{16} \cdot wL$  (Downward)

Question Number : 133 Question Id : 67809417356 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The total lateral pressure per meter length on a vertical wall of height h, retaining water is

Options :

1.  $\gamma h$

2.  $\frac{\gamma h}{2}$

3.  $\frac{\gamma h^2}{2}$

4.  $\frac{\gamma h^2}{4}$

Question Number : 134 Question Id : 67809417357 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a retaining wall of width  $b$ , the limiting value of eccentricity for no tension to occur is

Options :

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

2.  $\frac{b}{3}$

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

4.  $\frac{b}{8}$

Question Number : 135 Question Id : 67809417358 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following structure is determinate?

Options :

1. Overhanging beam

2. Propped cantilever

3. Fixed beam

4. Continuous beam

Question Number : 136 Question Id : 67809417359 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The factor of safety against sliding for retaining wall is

Options :

1. 1.25

2. 1.50

3. 1.75

4. 2.00

Question Number : 137 Question Id : 67809417360 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Mohr's theorems are used for computing

Options :

1. Shear force and Bending moment

2. Shear force and Deflection

3. Slope and Bending moment

4. Slope and Deflection

Question Number : 138 Question Id : 67809417361 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $n$  is number of members and  $j$  is number of joints, the condition for perfect pin jointed framed structure is

Options :

1.  $n = 2j + 3$

2.  $n = 2j - 3$

3.  $n = 3j + 2$

4.  $n = 3j - 2$

Question Number : 139 Question Id : 67809417362 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The triangular shape of a pin jointed framed structure is

Options :

1. Perfect

2. Imperfect

3. Deficient

4. Redundant

Question Number : 140 Question Id : 67809417363 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The kern of a circular section is a

Options :

1. circle of diameter equal to half of its diameter
2. circle of diameter equal to half of its radius
3. circle of radius equal to half of its diameter
4. circle of radius equal to half of its radius

Question Number : 141 Question Id : 67809417364 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The flexural strength of M25 grade concrete is

Options :

1.  $1.5 \text{ N/mm}^2$
2.  $1.8 \text{ N/mm}^2$
3.  $2.8 \text{ N/mm}^2$
4.  $3.5 \text{ N/mm}^2$

Question Number : 142 Question Id : 67809417365 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The acceptable limit for the safety and serviceability requirements before failure occurs is called

Options :

1. Failure point
2. Breaking point
3. Limit state
4. Yield point

The limiting depth of neutral axis for Fe500 grade steel is

Options :

1.  $x_{u,\text{lim}} = 0.43d$

2.  $x_{u,\text{lim}} = 0.46d$

3.  $x_{u,\text{lim}} = 0.48d$

4.  $x_{u,\text{lim}} = 0.53d$

If the stress in steel reaches its permissible value early than the stress in concrete reaches its permissible value, the beam section is called

Options :

1. Under-reinforced section

2. Over-reinforced section

3. Balanced section

4. Economic section

For a doubly reinforced beam, the maximum strain in compression steel is

Options :

1. 0.002

2. 0.0035

3.  $0.002 \left( \frac{x_u - d'}{x_u} \right)$

4.  $0.0035 \left( \frac{x_u - d'}{x_u} \right)$

Question Number : 146 Question Id : 67809417369 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The effective width ( $b_f$ ) of a T beam as per IS:456 is

Options :

1.  $b_f = \frac{l_0}{6} + 3b_w + 6D_f$

2.  $b_f = \frac{l_0}{6} + b_w + 6D_f$

3.  $b_f = \frac{l_0}{6} + b_w + 3D_f$

4.  $b_f = \frac{l_0}{12} + b_w + 3D_f$

Question Number : 147 Question Id : 67809417370 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A rectangular beam of width 200 mm and effective depth 300 mm is subjected to a shear force of 60 kN.

If the permissible shear stress is  $0.2 \text{ N/mm}^2$ , the design shear force to be resisted by vertical stirrups is

Options :

1. 12 kN

2. 24 kN

3. 48 kN

4. 60 kN

As per IS:456, for beams without shear reinforcement, the permissible shear stress in concrete is related to

Options :

1. Grade of concrete and percentage of tension reinforcement
2. Grade of concrete and diameter of tension reinforcement
3. Clear cover to concrete and grade of steel reinforcement
4. Grade of concrete and grade of steel reinforcement

The length of bar beyond the theoretical cut off point is known as

Options :

1. Bond length
2. Dowel length
3. Development length
4. Anchorage length

If  $\phi$  is the diameter of the bar, the anchorage value for  $90^\circ$  standard bend is

Options :

1.  $2\phi$
2.  $4\phi$
3.  $8\phi$
4.  $16\phi$



Question Number : 151 Question Id : 67809417374 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For Fe415 grade of steel reinforcement to be used in RC slab, the minimum percentage area of reinforcement is

Options :

1. 0.20%
2. 0.15%
3. 0.12%
4. 0.1%

Question Number : 152 Question Id : 67809417375 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In a two way slab, lifting of corners occurs due to

Options :

1. Resultant stress at the ends
2. Unbalanced moment of the slab
3. Resultant shear at the ends
4. Torsional moment in the slab

Question Number : 153 Question Id : 67809417376 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The main reinforcement in RCC cantilever beam subjected to downward loading is provided at

Options :

1. Top face in length direction
2. Top face perpendicular to the length
3. Bottom face in length direction

4. Bottom face perpendicular to the length

Question Number : 154 Question Id : 67809417377 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The load carrying capacity of a helically reinforced column as compared to that of a laterally tied column is about

Options :

1. 5% less
2. 5% more
3. 10% less
4. 10% more

Question Number : 155 Question Id : 67809417378 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The purpose of lateral ties in a short RC column is to

Options :

1. facilitate construction
2. facilitate compaction of concrete
3. avoid buckling of longitudinal bars
4. increase the load carrying capacity of the column

Question Number : 156 Question Id : 67809417379 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

When a RCC short column is loaded axially, the concrete inside the core is subjected to

Options :

1. Uniaxial compression
2. Biaxial compression

3. Bending and compression

4. Tension

Question Number : 157 Question Id : 67809417380 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The critical section for bending moment in an isolated footing occurs

Options :

1. at the center of the column

2. at the face of the column

3. at a distance of  $d/2$  from the face of column

4. at a distance of  $d$  from the face of column

Question Number : 158 Question Id : 67809417381 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The factor of safety for concrete in working stress method of design is

Options :

1. 1.15

2. 1.50

3. 2.00

4. 3.00

Question Number : 159 Question Id : 67809417382 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $m$  is the modular ratio, the equivalent modular ratio for compression zone is

Options :

1.  $1.2m$

2.  $1.25m$

3.  $1.5m$

4.  $1.5m-1$

Question Number : 160 Question Id : 67809417383 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

As compared to working stress method of design, limit state method takes concrete to

Options :

1. the same stress level

2. a lower stress level

3. a higher stress level

4. a higher or lower stress level

Question Number : 161 Question Id : 67809417384 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The line joining some fixed points on the main survey line is known as

Options :

1. Contour line

2. Base line

3. Tie line

4. Check line

Question Number : 162 Question Id : 67809417385 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Which of the following is an obstacle to both chaining and ranging?

Options :

1. Building

2. Lake

3. Pond

4. River

Question Number : 163 Question Id : 67809417386 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The most accurate method for the measurement of the base line is

Options :

1. Invar tape

2. Chain

3. Tacheometry

4. EDM

Question Number : 164 Question Id : 67809417387 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The correction for sag in measurement of base line by chain is

Options :

1. always additive

2. always negative

3. always zero

4. additive or negative

Question Number : 165 Question Id : 67809417388 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the fore bearings of the sides of a triangle are  $45^\circ$ ,  $165^\circ$  and  $285^\circ$  respectively, the triangle is

Options :

1. an equilateral

2. an isosceles

3. a right angled

4. an obtuse angled

Question Number : 166 Question Id : 67809417389 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The magnetic bearing of a line AB is  $64^{\circ}30'$  and the magnetic declination is  $4^{\circ}30'$  East. The true bearing of the line AB is

Options :

1.  $69^{\circ}0'$

2.  $66^{\circ}45'$

3.  $64^{\circ}30'$

4.  $60^{\circ}0'$

Question Number : 167 Question Id : 67809417390 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Turning of the theodolite telescope in vertical plane by  $180^{\circ}$  about the horizontal axis is known as

Options :

1. Swinging

2. Transiting

3. Centering

4. Setting

Question Number : 168 Question Id : 67809417391 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The most accurate method of plotting a theodolite traverse is by

Options :

1. Tangent method

2. Included angles

3. Consecutive coordinates

4. Independent coordinates

Question Number : 169 Question Id : 67809417392 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the reduced bearing and departure of the line AB are N  $30^\circ$  E and 100 m respectively, the length of the line AB is

Options :

1. 300 m

2. 200 m

3. 100 m

4. 50 m

Question Number : 170 Question Id : 67809417393 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The latitude and departure of a line AB are +100m and -100m respectively. The reduced bearing of the line AB is

Options :

1. N  $45^\circ$  E

2. N  $45^\circ$  W

3. S  $45^\circ$  E

4. N  $45^\circ$  W

Question Number : 171 Question Id : 67809417394 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In levelling, the sum of all back sights and sum of all fore sights are 8.575m and 8.495 m respectively. The reduced level of initial bench mark is 100.000 m. The reduced level of the last point where the staff is held will be

Options :

1. 108.575m
2. 108.495m
3. 100.080m
4. 99.920m

Question Number : 172 Question Id : 67809417395 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If the distance between the instrument station and the staff station is 1 km, the combined correction due to curvature and refraction as applied to the staff reading is

Options :

1.  $-0.0673$  m
2.  $+0.0673$  m
3.  $-0.0785$  m
4.  $+0.673$  m

Question Number : 173 Question Id : 67809417396 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A set of closed contours with higher values inward indicates

Options :

1. Uniform slope
2. Depression
3. Hill



4. Overhanging cliff

Question Number : 174 Question Id : 67809417397 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Let  $f$  be the focal length of the objective,  $i$  be the stadia hair interval and  $d$  be the horizontal distance from objective to the vertical axis of the instrument . The additive constant for a tachometer is

Options :

1.  $f + i$

2.  $f + d$

3.  $f / i$

4.  $f / d$

Question Number : 175 Question Id : 67809417398 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The minimum number of satellites required for determining latitude, longitude and altitude of a point in GPS are

Options :

1. One

2. Two

3. Three

4. Four

Question Number : 176 Question Id : 67809417399 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Newton's law of viscosity for a fluid states that the shear stress is proportional to

Options :

1. Viscosity

2. Pressure
3. Angular deformation
4. Rate of angular deformation

Question Number : 177 Question Id : 67809417400 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The unit of kinematic viscosity is

Options :

1.  $\text{m}^2/\text{sec}$
2.  $\text{kg m}/\text{sec}^2$
3.  $\text{N m}/\text{sec}^2$
4.  $\text{N m}^2/\text{sec}$

Question Number : 178 Question Id : 67809417401 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a vertical plane immersed in a liquid, the centre of pressure is always

Options :

1. above centroid
2. below centroid
3. at centroid
4. at one-third of height

Question Number : 179 Question Id : 67809417402 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Weight of the substance per unit volume is

Options :

1. Mass density

2. Specific weight

3. Specific gravity

4. Specific volume

Question Number : 180 Question Id : 67809417403 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The pitot static tube measures

Options :

1. Static pressure

2. Dynamic pressure

3. Difference in static and dynamic pressure

4. Difference in total and static pressure

Question Number : 181 Question Id : 67809417404 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Tracing of the motion of any one fluid particle is known as

Options :

1. Stream line

2. Streak line

3. Path line

4. Equipotential line

Question Number : 182 Question Id : 67809417405 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

In a pipe flow, when a venturimeter is changed from horizontal position to inclined position, the reading

Options :

1. increases
2. decreases
3. remains same
4. varies depending on the inclination

Question Number : 183 Question Id : 67809417406 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $H$  is the height of the water surface above the crest of a rectangular notch, the discharge of flow through it is proportional to

Options :

1.  $H$
2.  $H^2$
3.  $H^{3/2}$
4.  $H^{5/2}$

Question Number : 184 Question Id : 67809417407 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The difference between the Total Energy Line (TEL) and Hydraulic Grade Line (HGL) is equal to

Options :

1. Pressure head
2. Velocity head
3. Datum head
4. Static head

Question Number : 185 Question Id : 67809417408 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

As per Darcy-Weisbach equation, the head loss due to friction in pipes is directly proportional to

Options :

1. square of the diameter of the pipe
2. square of the length of the pipe
3. square of the velocity of the flow
4. the velocity of the flow

Question Number : 186 Question Id : 67809417409 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a laminar flow in a pipe, the shear stress is maximum at

Options :

1. the centre and decreases linearly towards the wall
2. the centre and decreases parabolically towards the wall
3. the wall and decreases linearly towards the centre
4. the wall and decreases parabolically towards the centre

Question Number : 187 Question Id : 67809417410 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A pump is a device which converts

Options :

1. Mechanical energy to Hydraulic energy
2. Hydraulic energy to Mechanical energy
3. Kinetic energy to Hydraulic energy
4. Mechanical energy to Electrical energy

Question Number : 188 Question Id : 67809417411 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Kaplan turbine is suitable for

Options :

1. High head, high discharge
2. High head, low discharge
3. Low head, low discharge
4. Low head, high discharge

Question Number : 189 Question Id : 67809417412 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A rectangular open channel section is most economical when width is equal to

Options :

1. twice the depth of flow
2. the depth of flow
3. half the depth of flow
4. one third the depth of flow

Question Number : 190 Question Id : 67809417413 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

If  $A$  : Cross sectional area of flow,  $P$  : Wetted perimeter,  $R$  : Hydraulic mean depth,  $D$  :

Hydraulic depth,  $C$  : Chezy's constant and  $S$  : Slope of channel bottom, then Chezy's

formula for discharge ( $Q$ ) is

Options :

1.  $Q = C\sqrt{RS}$
2.  $Q = AC\sqrt{RS}$
3.  $Q = C\sqrt{DS}$

4.  $Q = AC\sqrt{DS}$

Question Number : 191 Question Id : 67809417414 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Rabi season generally extends from

Options :

1. January to June
2. April to September
3. July to December
4. October to March

Question Number : 192 Question Id : 67809417415 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The duty of the canal is 1000 hectors/cumec for a given crop with base period of 100 days. The depth of water required will be

Options :

1. 864 cm
2. 86.4 cm
3. 8.64 cm
4. 0.864 cm

Question Number : 193 Question Id : 67809417416 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

For a given demand, the reservoir capacity is obtained from

Options :

1. Hydrograph
2. Hyetograph

3. Mass inflow curve

4. Mass outflow curve

Question Number : 194 Question Id : 67809417417 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

An accurate estimate of average rainfall in a particular catchment area can be obtained by

Options :

1. Arithmetic average method

2. Thiessen polygon method

3. Isohyetal method

4. Normal ratio method

Question Number : 195 Question Id : 67809417418 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The under sluices in diversion head works are provided

Options :

1. to prevent fish flow

2. to prevent hydraulic jump

3. to avoid parallel flow to the weir

4. to control silt entry into the channel

Question Number : 196 Question Id : 67809417419 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The difference between the top of the dam and high flood level (HFL) is known as

Options :

1. Free board

2. Safe margin



3. Wave height

4. Free flow depth

Question Number : 197 Question Id : 67809417420 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

Major resisting force against the lateral pressure in a gravity dam is

Options :

1. Self weight of dam

2. Uplift pressure

3. Wave pressure

4. Water pressure

Question Number : 198 Question Id : 67809417421 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

A rock toe filter in an earth dam is provided on

Options :

1. Upstream end of the bund

2. Downstream end of the bund

3. Under the base of the bund

4. The middle third of the base of the bund

Question Number : 199 Question Id : 67809417422 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

The flow in a chute spillway is generally

Options :

1. Critical

2. Uniform

3. Supercritical

4. Subcritical

Question Number : 200 Question Id : 67809417423 Display Question Number : Yes Single Line Question Option : No Option Orientation : Vertical

According to Lacey's theory, the Wetted Perimeter  $P$  is related to the discharge  $Q$  as

Options :

1.  $P = 4.75 Q^{1/2}$

2.  $P = 4.75 Q$

3.  $P = 4.75 Q^{3/2}$

4.  $P = 4.75 Q^{5/2}$