

# Andhra Pradesh State Council of Higher Education

## Notations :

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

<b>Question Paper Name :</b>	Civil Engineering 08th May 2024 Shift 1
<b>Duration :</b>	180
<b>Total Marks :</b>	200
<b>Display Marks:</b>	No
<b>Share Answer Key With Delivery Engine :</b>	Yes
<b>Calculator :</b>	None
<b>Magnifying Glass Required? :</b>	No
<b>Ruler Required? :</b>	No
<b>Eraser Required? :</b>	No
<b>Scratch Pad Required? :</b>	No
<b>Rough Sketch/Notepad Required? :</b>	No
<b>Protractor Required? :</b>	No
<b>Show Watermark on Console? :</b>	Yes
<b>Highlighter :</b>	No
<b>Auto Save on Console?</b>	Yes
<b>Change Font Color :</b>	No
<b>Change Background Color :</b>	No
<b>Change Theme :</b>	No
<b>Help Button :</b>	No
<b>Show Reports :</b>	No

Show Progress Bar :	No
Is this Group for Examiner? :	No
Examiner permission :	Cant View
Show Progress Bar? :	No

## Mathematics

Section Id :	210688158
Section Number :	1
Mandatory or Optional :	Mandatory
Number of Questions :	50
Section Marks :	50
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Is Section Default? :	null

Question Number : 1 Question Id : 2106888007 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If each element of a row or column of a determinant is multiplied by a constant  $K$  then the value of the determinant is

Options :

1. ✘ Added by  $k$

2. ✔ Multiplied by  $k$

3. ✘ Subtracted by  $k$

4. ✘ Divided by k.

Question Number : 2 Question Id : 2106888008 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $A = \begin{bmatrix} 1 & 2 & 3 \\ -2 & 1 & 4 \end{bmatrix}$  and  $B = \begin{bmatrix} 2 & 3 & 1 \\ 5 & 4 & 2 \\ 1 & 5 & 3 \end{bmatrix}$  then  $AB =$

Options :

1. ✘  $\begin{bmatrix} 15 & 26 & 4 \end{bmatrix}$

2. ✔  $\begin{bmatrix} 15 & 26 & 14 \\ 5 & 18 & 12 \end{bmatrix}$

3. ✘  $\begin{bmatrix} 15 & 5 \\ 26 & 18 \\ 14 & 12 \end{bmatrix}$

4. ✘ BA

Question Number : 3 Question Id : 2106888009 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The elements on the main diagonal of a skew symmetric matrix are all

**Options :**

1. ✓ zeros

2. ✗ One's

3. ✗ Unequal

4. ✗  $>1$

**Question Number : 4 Question Id : 2106888010 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $\omega$  is one of the imaginary cube roots of unity, find the value of the determinant

$$\begin{vmatrix} 1 & \omega & \omega^2 \\ \omega & \omega^2 & 1 \\ \omega^2 & 1 & \omega \end{vmatrix} =$$

**Options :**

1. ✓ zero

2. ✗ one

3. ✗  $\omega^2$

4. ✗  $\omega$

Question Number : 5 Question Id : 2106888011 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Every square matrix can be written as the sum of

Options :

1. ✘ Diagonal matrix & square matrix
2. ✘ Two rectangular matrices
3. ✘ Square and non-square matrices
4. ✔ Symmetric and skew symmetric matrix

Question Number : 6 Question Id : 2106888012 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

An improper fraction can be reduced to proper fraction by

Options :

1. ✘ Multiplication
2. ✔ Division

3. ✘ subtraction

4. ✘ Addition

Question Number : 7 Question Id : 2106888013 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\frac{x}{(x+2)(x-3)} =$$

Options :

1. ✘ 
$$\frac{2}{5(x+2)} + \frac{3}{5(x-2)}$$

2. ✘ 
$$\frac{2}{5(x+2)} - \frac{3}{5(x-3)}$$

3. ✔ 
$$\frac{2}{5(x+2)} + \frac{3}{5(x-3)}$$

4. ✘ 
$$\frac{2}{5(x-3)} + \frac{3}{5(x+2)}$$

Question Number : 8 Question Id : 2106888014 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The value of  $\sin 210^\circ$

Options :

1. ✘  $\frac{1}{2}$

2. ✔  $-\frac{1}{2}$

3. ✘  $\frac{1}{\sqrt{2}}$

4. ✘  $-\frac{1}{\sqrt{2}}$

Question Number : 9 Question Id : 2106888015 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\cos n\pi =$$

Options :

1. ✘  $-1$

2. ✘  $-n$

3. ✔  $(-1)^n$

4. ✘  $(n)^{-1}$

Question Number : 10 Question Id : 2106888016 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$a \neq 0 \neq b, \sin x + \sin y = a, \cos x + \cos y = b$  then  $\tan \frac{x+y}{2} =$

Options :

1. ✘  $\frac{b}{a}$

2. ✔  $\frac{a}{b}$

3. ✘  $\frac{a+b}{2}$

4. ✘  $\frac{a-b}{2}$

Question Number : 11 Question Id : 2106888017 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$f(x)$  is a periodic function of period  $k$  then the period of periodic function  $f(ax+b)$  is

Options :



1. ✘  $\frac{k}{a}, a \neq 0$

2. ✘  $\frac{ak}{|b|}, b \neq 0$

3. ✘  $\frac{k+b}{a}, a \neq 0$

4. ✔  $\frac{k}{|a|}, a \neq 0$

Question Number : 12 Question Id : 2106888018 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $7\sin^2\theta + 3\cos^2\theta = 4$ , then  $\theta =$

Options :

1. ✘  $\pm \frac{\pi}{3}$

2. ✔  $\pm \frac{\pi}{6}$

3. ✘  $\pm \frac{\pi}{4}$

4. ✘  $\pm \frac{\pi}{2}$

Question Number : 13 Question Id : 2106888019 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The range of  $\cos^{-1}x$  is

Options :

1. ✓  $[0, \pi]$

2. ✗  $[-\pi, \pi]$

3. ✗  $[0, -\pi]$

4. ✗  $(0, \pi)$

Question Number : 14 Question Id : 2106888020 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Assume  $x > 0, y > 0$ . Then which one of the following is true ?

Options :

1. ✓ If  $xy < 1$  then  $\tan^{-1}x + \tan^{-1}y = \tan^{-1}\left(\frac{x+y}{1-xy}\right)$

2. ✗ If  $xy > 1$  then  $\tan^{-1}x + \tan^{-1}y = \tan^{-1}\left(\frac{x+y}{1-xy}\right)$

3. ✘ If  $xy = 1$  then  $\tan^{-1}x + \tan^{-1}y = \tan^{-1}\left(\frac{x+y}{1-xy}\right)$

4. ✘ If  $xy = 1$  then  $\tan^{-1}x - \tan^{-1}y = \tan^{-1}\left(\frac{x+y}{1-xy}\right)$

Question Number : 15 Question Id : 2106888021 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In  $\Delta ABC$   $(a+b+c)(b+c-a) = 3bc$ , then angle A =

Options :

1. ✘  $90^0$

2. ✘  $120^0$

3. ✔  $60^0$

4. ✘  $45^0$

Question Number : 16 Question Id : 2106888022 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In  $\Delta ABC$ ,  $\tan \frac{A}{2} = \frac{5}{6}$ ,  $\tan \frac{C}{2} = \frac{2}{5}$  then a,b,c are in

Options :

1. ✘ Geometric progression

2. ✔ Arithmetic progression

3. ✘ Harmonic progression

4. ✘ Arithmetico – Geometric progression

Question Number : 17 Question Id : 2106888023 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In any  $\Delta ABC$ ,  $\tan \frac{B-C}{2} =$

Options :

1. ✘  $b \pm c \cot \frac{A}{2}$

2. ✔  $\frac{b-c}{b+c} \cot \frac{A}{2}$

3. ✘  $(b - c) \tan \frac{A}{2}$

4. ✘  $\tan \frac{C}{2}$

Question Number : 18 Question Id : 2106888024 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Conjugate of  $\frac{1-i}{1+i}$  is

Options :

1. ✘  $-3i$

2. ✘  $-i$

3. ✔  $i$

4. ✘  $6i$

Question Number : 19 Question Id : 2106888025 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Standard form of  $(-1 + 2i) + \left(\frac{1}{2} - i\right)$  is

Options :

1. ✘  $\frac{1}{2} - i$

2. ✔  $-\frac{1}{2} + i$

3. ✘  $-\frac{1}{2} - i$

4. ✘  $\frac{1}{2} \pm i$

**Question Number : 20 Question Id : 2106888026 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the circle is  $x^2 + y^2 + 6x - 8y + c = 0$  has radius 6 units, Then value of c is

**Options :**

1. ✔  $-11$

2. ✘  $11$

3. ✘  $25$

4. ✘  $6$

**Question Number : 21 Question Id : 2106888027 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The equation of the parabola whose focus is (8,0) and the vertex is (0,0) is

**Options :**

1. ✘  $y^2 = 12x$

2. ✘  $y^2 = x$

3. ✔  $y^2 = 32x$

4. ✘  $y^2 = 16x$

Question Number : 22 Question Id : 2106888028 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The eccentricity of the ellipse  $x^2 + 2y^2 = 3$  is

Options :

1. ✘  $e = \frac{3}{\sqrt{2}}$

2. ✘  $e = \frac{1}{\sqrt{3}}$

3. ✘  $e = -\frac{1}{\sqrt{2}}$

4. ✔  $e = \frac{1}{\sqrt{2}}$

Question Number : 23 Question Id : 2106888029 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In the Ellipse  $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1, a > b$  the length of the latus rectum is \_\_\_\_\_

Options :

1. ✘  $\frac{2a^2}{b}$

2. ✔  $\frac{2b^2}{a}$

3. ✘  $\frac{2a^2}{b^2}$

4. ✘  $2ab$

Question Number : 24 Question Id : 2106888030 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The equation of the Hyperbola with foci  $(\pm 2, 0)$  and eccentricity  $3/2$  is

Options :

1. ✘  $\frac{9x^2}{16^2} + \frac{9y^2}{10^2} = 1$

2. ✔



$$\frac{x^2}{16/9} - \frac{y^2}{20/9} = 1$$

3. ✘  $\frac{x^2}{16^2} - \frac{y^2}{20^2} = 1$

4. ✘  $\frac{x^2}{2^2} - \frac{y^2}{20^2} = 1$

**Question Number : 25 Question Id : 2106888031 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the coordinates at one end of a diameter of the circle  $x^2 + y^2 - 8x - 4y + c = 0$  are  $(-3, 2)$  then the coordinates at the other end are

**Options :**

1. ✘  $(5, 11)$

2. ✘  $(6, 2)$

3. ✘  $(2, 11)$

4. ✔  $(11, 2)$

**Question Number : 26 Question Id : 2106888032 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

Time : 0

If  $a > 0$ , then  $\lim_{x \rightarrow 0} \frac{a^x - 1}{x} =$

Options :

1. ✘  $\log x$

2. ✘ 1

3. ✔  $\log a$

4. ✘  $\log\left(\frac{a}{x}\right)$

Question Number : 27 Question Id : 2106888033 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Differentiation of  $\sin x^n$  with respect to  $x$ .

Options :

1. ✔  $nx^{n-1} \cos x^n$

2. ✘  $x^{n-1} \cos x^n$

3. ✘  $\cos x^n$

4. ✘

$$n \cos x^n$$

Question Number : 28 Question Id : 2106888034 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\frac{d}{dx} \left( \sin^{-1} \frac{x}{a} \right) =$$

Options :

1. ✓  $\frac{1}{\sqrt{a^2 - x^2}}$

2. ✗  $\frac{1}{\sqrt{a^2 + x^2}}$

3. ✗  $\frac{1}{\sqrt{x^2 - a^2}}$

4. ✗  $\frac{-1}{\sqrt{a^2 - x^2}}$

Question Number : 29 Question Id : 2106888035 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\frac{d}{dx} (e^{3 \log x}) =$$

Options :

1. ✘  $3x$

2. ✘  $3\log x$

3. ✘  $\log 3$

4. ✔  $3x^2$

Question Number : 30 Question Id : 2106888036 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\frac{d}{dx}[\log|x|] =$$

Options :

1. ✘  $\frac{1}{|x|}$

2. ✔  $\frac{1}{x}$

3. ✘  $|x|$

4. ✘  $x$

Question Number : 31 Question Id : 2106888037 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$y = \cos x$  then  $\frac{d^2y}{dx^2}$  is

Options :

1. ✘  $\cos x$

2. ✘  $\sin x$

3. ✔  $-\cos x$

4. ✘  $-\sin x$

Question Number : 32 Question Id : 2106888038 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The angle between the curves  $x^2 + 4y = 0, xy = 2$  is

Options :

1. ✔  $\tan^{-1} 3$

2. ✘  $\cot^{-1} 1$

3. ✘  $\tan^{-1} 4$

4. ✘  $\cot^{-1} 3$

Question Number : 33 Question Id : 2106888039 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The slope of the tangent to the curve  $y = \frac{x-1}{x+1}$  at (0,1)

Options :

1. ✘ 4

2. ✘ -2

3. ✘ 5

4. ✔ 2

Question Number : 34 Question Id : 2106888040 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If  $z = x^2 + y^2$  then  $x \frac{\partial z}{\partial y} - y \frac{\partial z}{\partial x} =$

Options :

1. ✘  $2y-2x$

2. ✘  $2x+2y$

3. ✔ 0

4. ✘  $4xy$

Question Number : 35 Question Id : 2106888041 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$z = \frac{x^3+y^3}{x+y}$ , is a homogeneous function of degree \_\_\_\_\_

Options :

1. ✔ 2

2. ✘ 3

3. ✘ 0

4. ✘ 1

Question Number : 36 Question Id : 2106888042 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\int (x^{2/3} + 1) dx =$$

Options :

1. ✓  $\frac{3}{5}x^{5/3} + x + c$

2. ✗  $\frac{5}{3}x^{5/3} + x + c$

3. ✗  $\frac{3}{5}x^{5/3} + c$

4. ✗  $\frac{3}{5}x^{3/5} + x + c$

Question Number : 37 Question Id : 2106888043 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\int \frac{dx}{x^2-16} =$$

Options :

1. ✗  $\frac{1}{16} \log \left| \frac{x-8}{x+4} \right| + c$

2. ✗  $\frac{1}{4} \log \left| \frac{x-4}{x+4} \right| + c$



3. ✓  $\frac{1}{8} \log \left| \frac{x-4}{x+4} \right| + c$

4. ✗  $\frac{1}{16} \log \left| \frac{x-4}{x+4} \right| + c$

Question Number : 38 Question Id : 2106888044 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\int \frac{\sin(\tan^{-1}x)dx}{1+x^2} =$$

Options :

1. ✗  $-\cos x + c$

2. ✓  $-\cos (\tan^{-1}x) + c$

3. ✗  $-\sin (\tan^{-1}x) + c$

4. ✗  $(\tan^{-1}x) + c$

Question Number : 39 Question Id : 2106888045 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\int \cos \frac{x}{2} dx =$$

Options :

1. ✘  $2 \cos \frac{x}{2} + c$

2. ✔  $2 \sin \frac{x}{2} + c$

3. ✘  $2 \sin 2x + c$

4. ✘  $-2 \sin \frac{x}{2} + c$

Question Number : 40 Question Id : 2106888046 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$$\int e^x \cos x dx =$$

Options :

1. ✔  $\frac{1}{2} e^x (\cos x + \sin x) + c$

2. ✘  $\frac{1}{2} e^x (\cos x - \sin x) + c$

3. ✘  $\frac{1}{2}e^x \sin x + c$

4. ✘  $\frac{1}{2}(\cos x + \sin x) + c$

**Question Number : 41 Question Id : 2106888047 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The area of the region bounded by the curve  $y = f(x)$ ,  $x$  - axis and the lines  $x = a$  and  $x = b$  ( $b > a$ ) is given by

**Options :**

1. ✘  $\int_b^a y dx$

2. ✘  $-\int_a^b y dx$

3. ✘  $\int_a^b x dy$

4. ✔  $\int_a^b y dx$

**Question Number : 42 Question Id : 2106888048 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $f(x)$  is an even function, then  $\int_{-a}^a f(x)dx =$

Options :

1. ✘  $-\int_{-a}^a f(x)dx$

2. ✘  $2\int_{-a}^a f(x)dx$

3. ✔  $2\int_0^a f(x)dx$

4. ✘  $\int_0^a f(x)dx$

Question Number : 43 Question Id : 2106888049 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Find maxima (or) minima for the curve  $y = 2x^4 - x^2$

Options :

1. ✔ 'y' is minimum at  $x = \pm\frac{1}{2}$

2. ✘ 'y' is maximum for  $x = -\frac{1}{4}$

3. ✘ 'y' is maximum for  $x = \pm \frac{1}{2}$

4. ✘ 'y' is maximum for  $x = +\frac{1}{4}$

Question Number : 44 Question Id : 2106888050 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Order of the differential equation  $\left[ \frac{d^2y}{dx^2} + \left( \frac{dy}{dx} \right)^3 \right]^{6/5} = 6y$  is

Options :

1. ✘ 3

2. ✔ 2

3. ✘ 5

4. ✘ 1

Question Number : 45 Question Id : 2106888051 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The general solution of the differential equation  $\frac{dy}{dx} = \frac{1+y^2}{1+x^2}$  is

Options :

1. ✓  $\tan^{-1}y - \tan^{-1}x = c$

2. ✘  $\tan^{-1}y + \tan^{-1}x = c$

3. ✘  $\tan^{-1}y = c$

4. ✘  $\tan^{-1}y/x = c$

Question Number : 46 Question Id : 2106888052 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The differential equation representing the family of curves  $y = mx$  where,  $m$  is arbitrary Constant is

Options :

1. ✘  $\frac{dy}{dx} - y = 0$

2. ✘  $\frac{dy}{dx} + y = 0$

3. ✓  $x \frac{dy}{dx} - y = 0$

4. ✘  $x dx - y dy = y$

**Question Number : 47 Question Id : 2106888053 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which one of the statement is true?

**Options :**

1. ✘ Order of differential equation is the order of the lowest order derivative occurring in the differential equation.

2. ✘ A function which satisfies the given differential equation is not its solution .

3. ✘ An equation involving derivatives of the dependent variable with respect to dependent variable is known as a differential equation.

4. ✔ Degree of a differential equation is defined if it is a polynomial equation in its Derivatives.

**Question Number : 48 Question Id : 2106888054 Display Question Number : Yes Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The Integrating factor of the differential equation  $x \frac{dy}{dx} + 2y = x^2 (x \neq 0)$  is

**Options :**

1. ✘  $x$

2. ✘  $\log x$

3. ✘  $x \log x$

4. ✔  $x^2$

**Question Number : 49 Question Id : 2106888055 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The linear form of  $x \log x \frac{dy}{dx} + y = 2 \log x$  is

**Options :**

1. ✘  $\frac{dy}{dx} - \frac{y}{x \log x} = \frac{1}{x}$

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



3. ✘  $\frac{dy}{dx} + \frac{y}{x \log x} = \frac{1}{x}$

4. ✘  $\frac{dy}{dx} + \frac{y}{x \log x} = 1$

Question Number : 50 Question Id : 2106888056 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The particular integral of  $\frac{d^2y}{dx^2} - 4y = e^{2x}$  is

Options :

1. ✘  $\frac{1}{4} e^{2x}$

2. ✘  $\frac{1}{4x} e^{2x}$

3. ✔  $\frac{1}{4} x e^{2x}$

4. ✘ 0

## Physics

Section Number :	2
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Is Section Default? :	null

Question Number : 51 Question Id : 2106888057 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

$\text{N Kg}^{-1}$  is the unit of

Options :

1. ✘ Velocity
2. ✔ Acceleration
3. ✘ Force
4. ✘ Momentum

Question Number : 52 Question Id : 2106888058 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

A system has basic dimensions as density 'D', velocity 'V' and area 'A'. The dimensional representation of force in this system is

**Options :**

1. ✓  $A V^2 D$

2. ✗  $A V D^2$

3. ✗  $A^2 V D$

4. ✗  $A^0 V^2 D$

**Question Number : 53 Question Id : 2106888059 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If The magnitude of vectors **A**, **B** and **C** are 5, 4 and 3 units respectively and  $\mathbf{A} = \mathbf{B} + \mathbf{C}$ , then the angle between vectors **A** and **C** is

**Options :**

1. ✗  $\text{Cos}^{-1}(4/5)$

2. ✗  $\Pi$

3. ✓  $\text{Cos}^{-1}(3/5)$

4. ✗  $\text{Sin}^{-1}(3/4)$

**Question Number : 54 Question Id : 2106888060 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the sum of two unit vectors is also a unit vector, then the magnitude of their difference is

**Options :**

1. ✘ 1

2. ✘  $\frac{1}{2}$

3. ✘  $\frac{1}{\sqrt{2}}$

4. ✔  $\sqrt{3}$

**Question Number : 55 Question Id : 2106888061 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A particle starting from rest moves in a straight line with uniform acceleration  $a$ . The average velocity of the particle in first 's' distance is

**Options :**

1. ✔  $\sqrt{\frac{as}{2}}$

2. ✘  $\sqrt{\frac{3as}{2}}$

3. ✘  $\sqrt{2as}$

4. ✘ *as*

**Question Number : 56 Question Id : 2106888062 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A projectile is thrown with speed  $u$  making angle  $\theta$  with the horizontal at  $t = 0$ . It just crosses two points of equal height at time  $t = 1\text{ s}$  and  $t = 3\text{ s}$  respectively. The maximum height attained by the projectile is (take  $g = 10\text{ ms}^{-2}$ )

**Options :**

1. ✘ 10m

2. ✔ 20m

3. ✘ 15m

4. ✘ 22m

**Question Number : 57 Question Id : 2106888063 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A body is falling from height 'H' takes time 'T' seconds to reach the ground. The time taken to cover the first half of height is

**Options :**

1. ✔

$$\frac{T}{\sqrt{2}}$$

2. ✘  $\sqrt{2} T$

3. ✘  $\sqrt{3} T$

4. ✘  $\frac{T}{\sqrt{3}}$

**Question Number : 58 Question Id : 2106888064 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A body sliding on ice with a velocity  $8 \text{ ms}^{-1}$  comes to rest after travelling 40 m. The coefficient of friction between the body and ice is ( $g = 10 \text{ ms}^{-2}$ )

**Options :**

1. ✘ 0.02

2. ✘ 0.05

3. ✔ 0.08

4. ✘ 0.2

**Question Number : 59 Question Id : 2106888065 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If a body placed on a rough inclined plane of gradient 1 in 4, just begins to slide, then coefficient of friction between the plane and body is

**Options :**

1. ✘  $\frac{2}{\sqrt{15}}$

2. ✘  $\frac{1}{\sqrt{2}}$

3. ✘  $\frac{1}{\sqrt{5}}$

4. ✔  $\frac{1}{\sqrt{15}}$

**Question Number : 60 Question Id : 2106888066 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A cube of 10 N weight rests on a rough inclined plane of slope 3 in 5. If the coefficient of friction between plane and cube is 0.6, then minimum force required to start the cube moving up the plane is

**Options :**

1. ✘ 2N

2.

✘ 6N

3. ✔ 10.8N

4. ✘ 4.5N

**Question Number : 61 Question Id : 2106888067 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A pump can take out 7200 Kg of water per hour from a 100 m deep well. If the efficiency of the pump is 50% then power of the pump is ( $g = 10 \text{ ms}^{-2}$ )

**Options :**

1. ✘ 2 KW

2. ✔ 4 KW

3. ✘ 7.2 KW

4. ✘ 3.6 KW

**Question Number : 62 Question Id : 2106888068 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



When a force  $\mathbf{F} = \mathbf{i} + 2\mathbf{j} + 3\mathbf{k}$  acts on a body to move it from  $\mathbf{r}_1 = \mathbf{i} + \mathbf{j} + \mathbf{k}$  to  $\mathbf{r}_2 = \mathbf{i} - \mathbf{j} + 2\mathbf{k}$ , then the work done by the force is

**Options :**

1. ✘ -3 J

2. ✔ -1 J

3. ✘ 2 J

4. ✘ 3 J

**Question Number : 63 Question Id : 2106888069 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The K.E. of a body moving with a speed of 10 m/s is 30 J. If its speed becomes 30 m/s, then its K.E. will be

**Options :**

1. ✘ 10 J

2. ✘ 90 J

3. ✘ 180 J

4. ✔ 270 J

**Question Number : 64 Question Id : 2106888070 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The maximum speed of a particle executing SHM is 1 m/s and maximum acceleration is  $1.57 \text{ m/s}^2$ . Its time period is

**Options :**

1. ✓ 4 sec

2. ✗ 1.57 sec

3. ✗ 2 sec

4. ✗  $\frac{1}{1.57}$

**Question Number : 65 Question Id : 2106888071 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A girl is swinging on a swing in the sitting position. If the girl stands up, the time period of the string will

**Options :**

1. ✗ Increase

2. ✓

Decrease

- 3. ✘ Remains same
- 4. ✘ Becomes erratic

**Question Number : 66 Question Id : 2106888072 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A light spring supports 200 gm weight at its lower end; it oscillates with a period of 1 sec.  
How much weight must be removed from the lower end to reduce the period to 0.5 sec?

**Options :**

- 1. ✘ 100 gm.
- 2. ✘ 50 gm.
- 3. ✔ 150 gm.
- 4. ✘ 200 gm.

**Question Number : 67 Question Id : 2106888073 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The velocity of sound in any medium depends upon

**Options :**

1. ✘ Intensity and elasticity
2. ✘ Amplitude and density
3. ✔ elasticity and density
4. ✘ Amplitude and elasticity

**Question Number : 68 Question Id : 2106888074 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The beat frequency produced by the vibrations of  $x_1 = A \sin (320\pi t)$  and  $x_2 = A \sin (326\pi t)$  is

**Options :**

1. ✘ 6
2. ✘ 4
3. ✘ 2
4. ✔ 3

Question Number : 69 Question Id : 2106888075 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The Boyle's law is stated by  $PV = C$ , C depends on

Options :

1. ✘ Nature of gas
2. ✘ Atomic weight of gas
3. ✘ Temperature of gas
4. ✔ Quantity and temperature of gas

Question Number : 70 Question Id : 2106888076 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The equation of state for 5g of oxygen( $O_2$ ) at pressure P and temperature T, when occupying a volume V, will be (R is universal gas constant)

Options :

1. ✘  $PV = 5RT$
2. ✘  $PV = \frac{5}{2} RT$
3. ✘

$$PV = \frac{5}{16} RT$$

4. ✓  $PV = \frac{5}{32} RT$

**Question Number : 71 Question Id : 2106888077 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The volume of a gas at constant pressure of  $10^3 \text{ N/m}^2$  expands by  $0.25\text{m}^3$ . The work done in this process is

**Options :**

1. ✗ 25J

2. ✗ 50J

3. ✓ 250J

4. ✗ 5J

**Question Number : 72 Question Id : 2106888078 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For an adiabatic expansion of a perfect gas the value of  $\frac{\Delta P}{P}$  is equal to

**Options :**

1. ✗

$$\frac{\Delta V}{V}$$

2. ✘  $\gamma \frac{\Delta V}{V}$

3. ✔  $-\gamma \frac{\Delta V}{V}$

4. ✘  $\gamma - \frac{\Delta V}{V}$

Question Number : 73 Question Id : 2106888079 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

First law of Thermodynamics is a special case of

Options :

1. ✘ Boyle's law

2. ✘ Charles law

3. ✘ Law of conservation of mass

4. ✔ Law of conservation of energy

**Question Number : 74 Question Id : 2106888080 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the critical angle for total internal reflection from a medium to vacuum is  $30^\circ$ , the velocity of light in the medium is

**Options :**

1. ✘  $3 \times 10^8 \text{ m/s}$
2. ✔  $1.5 \times 10^8 \text{ m/s}$
3. ✘  $\sqrt{3} \times 10^8 \text{ m/s}$
4. ✘  $2 \times 10^8 \text{ m/s}$

**Question Number : 75 Question Id : 2106888081 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Light rays of wave length  $4.36 \times 10^{-7} \text{ m}$  incident on a metal surface of work function 1.24 eV. The stopping potential required to stop the emission of photoelectrons is

**Options :**

1. ✔ 1.6 eV
2. ✘ 1.24 eV



3. ✖ 3.2 eV

4. ✖ 4.8 eV

## Chemistry

Section Id :	210688160
Section Number :	3
Mandatory or Optional :	Mandatory
Number of Questions :	25
Section Marks :	25
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Is Section Default? :	null

Question Number : 76 Question Id : 2106888082 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

According to Bohr's theory of hydrogen atom, the angular momentum of electron in fourth orbit of H-atom is equal to

Options :

1. ✖  $\frac{h}{2\pi}$

2. ✓  $\frac{2h}{\pi}$

3. ✗  $\frac{3h}{2\pi}$

4. ✗  $\frac{4h}{\pi}$

Question Number : 77 Question Id : 2106888083 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The quantum number which describes the shape of an atomic orbital is

Options :

1. ✓ Azimuthal Quantum Number

2. ✗ Principal Quantum Number

3. ✗ Spin Quantum Number

4. ✗ Magnetic Quantum Number

Question Number : 78 Question Id : 2106888084 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the element in which the ratio of s-electrons to p-electrons is 3:5

Options :

1. ✘ P

2. ✘ Al

3. ✔ S

4. ✘ K

Question Number : 79 Question Id : 2106888085 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The pair of molecules in which the central atom has octet of electrons is

Options :

1. ✘  $\text{BeCl}_2, \text{BF}_3$

2. ✘  $\text{H}_2\text{O}, \text{BeCl}_2$

3. ✓  $\text{H}_2\text{O}, \text{NH}_3$

4. ✗  $\text{NH}_3, \text{BF}_3$

**Question Number : 80 Question Id : 2106888086 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The electronic configuration of an element M is  $[\text{Ne}]3\text{S}^1$  and that of element X is  $[\text{He}]2\text{S}^22\text{P}^5$ . The type of bond present between M and X is

**Options :**

1. ✗ Covalent Bond

2. ✓ Electrovalent Bond

3. ✗ Co-ordinate Covalent Bond

4. ✗ Hydrogen Bond

**Question Number : 81 Question Id : 2106888087 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The absolute weight of one molecule of water (in g) is ( $N_A=6 \times 10^{23} \text{ mol}^{-1}$ )

**Options :**

1. ✘  $1.5 \times 10^{-23}$

2. ✔  $3.0 \times 10^{-23}$

3. ✘  $4.5 \times 10^{-23}$

4. ✘  $2.0 \times 10^{-23}$

**Question Number : 82 Question Id : 2106888088 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The weight of sodium sulphate (molar mass  $142 \text{ g mol}^{-1}$ ) required to prepare 500 ml of 0.03 M solution is

**Options :**

1. ✔ 2.13 g

2. ✘ 4.26 g

3. ✘ 1.065 g

4. ✘ 3.195 g

**Question Number : 83 Question Id : 2106888089 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The number of  $H^+$  ions present in 100 ml of 0.05 M  $H_2SO_4$  solution is ( $N_A=6 \times 10^{23} \text{ mol}^{-1}$ )

**Options :**

1. ✘  $6.0 \times 10^{24}$

2. ✘  $6.0 \times 10^{22}$

3. ✔  $6.0 \times 10^{21}$

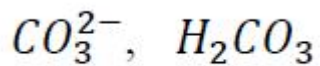
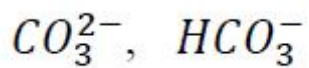
4. ✘  $3.0 \times 10^{23}$

**Question Number : 84 Question Id : 2106888090 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

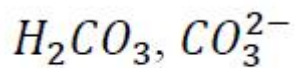
The conjugate acid and conjugate base of  $HCO_3^-$  are respectively

**Options :**

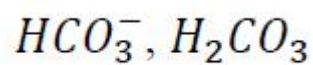
1. ✘



2. ✘



3. ✔



4. ✘

Question Number : 85 Question Id : 2106888091 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The pH of 0.005 M  $H_2SO_4$  solution will be;

Options :

5

1. ✘

2

2. ✔

3

3. ✘

4

4. ✘

Question Number : 86 Question Id : 2106888092 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In an electrochemical cell, the electrons flow from

Options :

Cathode to Anode

1. ✘

Anode to Cathode

2. ✔

Anode to Solution

3. ✘

Solution to Cathode

4. ✘

Question Number : 87 Question Id : 2106888093 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

How many faradays are required to reduce 1 mole of  $MnO_4^-$  ions to  $Mn^{2+}$  ions?

Options :

1. ✔ 5

2. ✘



2

3. ✘ 4

4. ✘ 3

**Question Number : 88 Question Id : 2106888094 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

At 298 K, the emf of the cell,  $M|M^{2+}(1M) || Cu^{2+}(1M) | Cu$  is 'x' V. If  $E_{Cu^{2+}|Cu}^0 = +0.34V$ ,

then  $E_{M^{2+}|M}^0$  (in V) is

**Options :**

1. ✘  $(x - 0.34)$

2. ✔  $(0.34 - x)$

3. ✘  $(0.34 + x)$

4. ✘  $\frac{0.34}{x}$

Question Number : 89 Question Id : 2106888095 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Identify the strongest reducing agent from the following:

Options :

1. ✓  $E_{K^+|K}^0 = -2.93 \text{ V}$

2. ✗  $E_{Al^{3+}|Al}^0 = -1.66 \text{ V}$

3. ✗  $E_{Zn^{2+}|Zn}^0 = -0.76 \text{ V}$

4. ✗  $E_{Ag^+|Ag}^0 = +0.34 \text{ V}$

Question Number : 90 Question Id : 2106888096 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The formula of Zeolite can be represented as  $Na_2Z$ . The metal atom present in Z is

Options :

1. ✗ Zn

2. ✗ Ca

3. ✘ Mg

4. ✔ Al

**Question Number : 91 Question Id : 2106888097 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following salts causes maximum hardness to water sample, when they are in equal amounts?

**Options :**

1. ✘ MgSO<sub>4</sub> (Molecular Weight = 120u)

2. ✔ MgCl<sub>2</sub> (Molecular Weight = 95u)

3. ✘ CaCl<sub>2</sub> (Molecular Weight = 111u)

4. ✘ Ca(HCO<sub>3</sub>)<sub>2</sub> (Molecular Weight = 162u)

**Question Number : 92 Question Id : 2106888098 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Permanent hardness of water cannot be removed by

Options :

1. ✓ Boiling the hard water
2. ✗ Treatment with washing soda
3. ✗ Passing through Zeolite
4. ✗ Passing through ion exchange resins

Question Number : 93 Question Id : 2106888099 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following statements is not correct about stress cells?

Options :

1. ✗ They are formed between different parts of the same metal
2. ✓ Stressed part of the metal acts as cathode
3. ✗ Stressed part of the metal acts as anode

4. ✘ Anodic part undergoes corrosion

Question Number : 94 Question Id : 2106888100 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Tarnishing of silver is due to the formation of

Options :

1. ✘  $\text{AgCl}$

2. ✘  $\text{Ag}_2\text{CO}_3$

3. ✘  $\text{Ag}_2\text{O}$

4. ✔  $\text{Ag}_2\text{S}$

Question Number : 95 Question Id : 2106888101 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is not a natural polymer?

Options :

1. ✘ Wool

2. ✘ Cellulose

3. ✘ Strach

4. ✔ Rayon

Question Number : 96 Question Id : 2106888102 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Neoprene is an example of

Options :

1. ✔ Elastomer

2. ✘ Thermoplastic Polymer

3. ✘ Thermosetting Polymer

4. ✘ Co-Polymer

Question Number : 97 Question Id : 2106888103 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction

Time : 0

The element that is added to raw rubber vulcanization is

Options :

1. ✓ S

2. ✗ Se

3. ✗ C

4. ✗ B

Question Number : 98 Question Id : 2106888104 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction

Time : 0

The major components of water gas are

Options :

1. ✓  $H_2, CO$

2. ✗  $H_2, CO_2$

3. ✗  $CO, N_2$

CO<sub>2</sub>, N<sub>2</sub>

4. ✘

Question Number : 99 Question Id : 2106888105 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Which of the following is not a greenhouse gas?

Options :

1. ✘ O<sub>3</sub>

2. ✘ CO<sub>2</sub>

3. ✘ CH<sub>4</sub>

4. ✔ N<sub>2</sub>

Question Number : 100 Question Id : 2106888106 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The acid that is believed to be mainly responsible for the damage of Taj mahal is

Options :

1. ✔ H<sub>2</sub>SO<sub>4</sub>



2. ✘ HF

3. ✘ H<sub>3</sub>PO<sub>4</sub>

4. ✘ HCl

## Civil Engineering

Section Id :	210688161
Section Number :	4
Mandatory or Optional :	Mandatory
Number of Questions :	100
Section Marks :	100
Enable Mark as Answered Mark for Review and Clear Response :	Yes
Maximum Instruction Time :	0
Is Section Default? :	null

Question Number : 101 Question Id : 2106888107 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The stress level, below which a material has a high probability of not falling under reversal of stress, is known as

Options :

1. ✘ Elastic limit

2. ✘ Tolerance limit

3. ✔ Endurance limit

4. ✘ Proportionality limit

**Question Number : 102 Question Id : 2106888108 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a material, if the modulus of elasticity is equal to twice the modulus of rigidity, then the Poisson's ratio is equal to

**Options :**

1. ✘ 0.5

2. ✘ 0.33

3. ✘ 0.25

4. ✔ 0

**Question Number : 103 Question Id : 2106888109 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A metal bar of  $10\text{ mm} \times 10\text{ mm}$  when subjected to a tensile force of  $50\text{ kN}$  gave an elongation of  $0.5\text{ mm}$  on a gauge length of  $200\text{ mm}$ . The modulus of elasticity of the metal bar will be

**Options :**

1. ✘  $200\text{ N/mm}^2$
2. ✔  $200\text{ GPa}$
3. ✘  $200 \times 10^3\text{ GPa}$
4. ✘  $2 \times 10^6\text{ GPa}$

**Question Number : 104 Question Id : 2106888110 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A solid metal bar of  $10\text{ mm}$  diameter and length  $10\text{ m}$  is hung vertically from a ceiling. If the density of the material of the bar is  $80\text{ kN/m}^3$  and modulus of elasticity is  $200\text{ GPa}$ , then the total elongation of bar due to its own weight is

**Options :**

1. ✔  $0.02\text{ mm}$
2. ✘  $0.2\text{ mm}$
3. ✘  $2\text{ mm}$

4. ✘ 20 mm

**Question Number : 105 Question Id : 2106888111 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a composite member, a solid circular bar A is kept inside of the hollow circular bar B of same length. If the composite member is subjected to an axial compressive force, then

**Options :**

1. ✘ Load carried by bar A is equal to that of bar B

2. ✘ Stress induced in bar A is equal to that of bar B

3. ✔ Strain in bar A is equal to that of bar B

4. ✘ Compression of bar A is more than that of bar B

**Question Number : 106 Question Id : 2106888112 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A cantilever AB of length 2 m carries a uniformly distributed load of 24 kN/m over a length of 1m from the free end B. Maximum bending moment at support A is

**Options :**

1. ✘ 12 kNm

2. ✘ 24 kNm

3. ✔ 36 kNm

4. ✘ 48 kNm

**Question Number : 107 Question Id : 2106888113 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The rate of change of bending moment at a section is equal to

**Options :**

1. ✔ Shear force

2. ✘ Axial force

3. ✘ Slope

4. ✘ Deflection

**Question Number : 108 Question Id : 2106888114 Display Question Number : Yes Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which of the following beams will have points of contraflexure?

**Options :**

1. ✘ Simply supported beam subjected to uniformly distributed load
2. ✘ Cantilever subjected to concentrated loads
3. ✘ Overhanging beam with loading on one side of overhang portion only
4. ✔ Propped cantilever subjected to concentrated load

**Question Number : 109 Question Id : 2106888115 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A beam ABC of length 8 m is hinged at A and roller support at B which is at a distance of 6 m from support A.

If it carries a uniformly distributed load of 24 kN/m over the overhang portion BC, then

**Options :**

1. ✔ The reaction of the support A is downward
2. ✘ The shape of bending moment diagram between A and B is parabolic
3. ✘ The shape of shear force diagram between A and B is triangle

4. ✘ Maximum bending moment occurs at midspan of AB

**Question Number : 110 Question Id : 2106888116 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A simply supported beam AB of span  $L$  is subjected to a concentrated load of  $W$  at midspan C. The area of shear force diagram between A and C is equal to

**Options :**

1. ✔ Bending moment at C

2. ✘ Shear force at C

3. ✘ Slope at C

4. ✘ Deflection at C

**Question Number : 111 Question Id : 2106888117 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Strength of beam section depends on

**Options :**

1. ✘ Nature of loading

- 2. ✘ Bending moment
- 3. ✔ Section modulus
- 4. ✘ Intensity of stress

**Question Number : 112 Question Id : 2106888118 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A simply supported beam of size 100 mm wide, 200 mm deep and span 6 m is subjected to a concentrated load of 80 kN at midspan. The maximum flexural stress induced in the beam is

**Options :**

- 1. ✘ 100 N/mm<sup>2</sup>
- 2. ✘ 150 N/mm<sup>2</sup>
- 3. ✔ 180 N/mm<sup>2</sup>
- 4. ✘ 200 N/mm<sup>2</sup>

**Question Number : 113 Question Id : 2106888119 Display Question Number : Yes Is Question**



**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The bending stress induced in a plate 100 mm wide and 12 mm thick bent into an arc of a circle is  $120 \text{ N/mm}^2$ . If the modulus of elasticity is  $2 \times 10^5 \text{ N/mm}^2$ , the radius of circular arc is

**Options :**

1. ✘ 6 m
2. ✔ 10 m
3. ✘ 12 m
4. ✘ 20 m

**Question Number : 114 Question Id : 2106888120 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Two beams made of same material and same cross sectional area, one is of circular cross section and other is of square cross section, then

**Options :**

1. ✘ Both sections are equally strong
2. ✘ Circular section is stronger than square section
3. ✔

Square section is stronger than circular section

Strength of sections depends on section type and magnitude of load

4. ✘

**Question Number : 115 Question Id : 2106888121 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a circular cross section of 100 mm diameter, the ratio of moment of inertia about the neutral axis to the section modulus of the area is

**Options :**

1. ✘ 2

2. ✘ 4

3. ✘ 25

4. ✔ 50

**Question Number : 116 Question Id : 2106888122 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The ratio of average shear stress to maximum shear stress for a circular cross section subjected to shear force is

**Options :**

1. ✘  $\frac{2}{3}$

2. ✘  $\frac{3}{2}$

3. ✔  $\frac{3}{4}$

4. ✘  $\frac{4}{3}$

**Question Number : 117 Question Id : 2106888123 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The shear stress at the neutral axis in a rectangular section of width 100 mm and depth 200 mm subjected to a shear force of 80 kN is

**Options :**

1. ✘  $4 \text{ N/mm}^2$

2. ✔  $6 \text{ N/mm}^2$

3. ✘  $8 \text{ N/mm}^2$

4. ✘  $10 \text{ N/mm}^2$

**Question Number : 118 Question Id : 2106888124 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A rectangular beam of width 100 mm and depth 200 mm supports a uniformly distributed load over span of 4 m. If the maximum bending stress induced in beam is  $24 \text{ N/mm}^2$ , the maximum load that the beam can support is

**Options :**

1. ✘ 6 kN/m

2. ✔ 8 kN/m

3. ✘ 10 kN/m

4. ✘ 12 kN/m

**Question Number : 119 Question Id : 2106888125 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A bar of uniform cross section and length 1 m extends 4 mm under the axial stress of 200

$\text{N/mm}^2$ . The modulus of resilience of the bar is

**Options :**

1. ✘ 0.2 Nmm

2. ✔ 0.4 Nmm

3. ✘ 0.8 Nmm

4. ✘ 4 Nmm

**Question Number : 120 Question Id : 2106888126 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The elongation of a bar due to self-weight depends on

**Options :**

1. ✘ Cross-sectional area

2. ✘ Poisson's ratio

3. ✘ Bulk Modulus

4. ✓ Density of the material of the bar

**Question Number : 121 Question Id : 2106888127 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A cantilever of span  $L$  and flexural rigidity  $EI$  is subjected to a uniformly distributed load of intensity  $w$  per m length. The slope of the elastic curve at the free end is

**Options :**

1. ✗  $\frac{wL^2}{8EI}$

2. ✓  $\frac{wL^3}{6EI}$

3. ✗  $\frac{wL^3}{3EI}$

4. ✗  $\frac{wL^3}{2EI}$

**Question Number : 122 Question Id : 2106888128 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A simply supported beam AB of span  $L$  and Flexural rigidity  $EI$  carries a concentrated load of  $W$  at mid span. If the span increases by 2 times, then the deflection

**Options :**

1. ✘ Decreases by 8 times

2. ✔ Increases by 8 times

3. ✘ Decreases by 16 times

4. ✘ Increases by 16 times

**Question Number : 123 Question Id : 2106888129 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A two span continuous beam ABC having equal spans each of length  $L$  is subjected to a uniformly distributed load of  $w$  per m length. The reaction of the middle support is

**Options :**

1. ✘  $\frac{5}{8}wL$

2. ✔  $\frac{5}{4}wL$

3. ✘  $\frac{5}{2}wL$

4. ✘  $wL$

Question Number : 124 Question Id : 2106888130 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Macaulay's method is used to determine

Options :

1. ✘ Shear force and bending moment

2. ✘ Bending stress and shear stress

3. ✘ Bending stress and deflection

4. ✔ Slope and deflection

Question Number : 125 Question Id : 2106888131 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

If the deflection at the free end of a cantilever of length 2 m which carries a concentrated load of  $W$  at the free end is 10 mm, then the slope at the free end is

Options :

1. ✘  $15 \times 10^{-3}$  radians



2. ✘  $10 \times 10^{-3}$  radians

3. ✔  $7.5 \times 10^{-3}$  radians

4. ✘  $5 \times 10^{-3}$  radians

**Question Number : 126 Question Id : 2106888132 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A propped cantilever of span  $L$  and flexural rigidity  $EI$  is fixed at A and propped at B carries a concentrated load of  $W$  at mid span. The ratio of vertical reaction at A to that at B is

**Options :**

1. ✔  $\frac{11}{5}$

2. ✘  $\frac{3}{5}$

3. ✘  $\frac{5}{3}$

4. ✘  $\frac{5}{11}$

**Question Number : 127 Question Id : 2106888133 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A fixed beam AB of span 6 m and flexural rigidity  $EI$  carries a uniformly distributed load of 24 kN/m over the whole span. The fixed moment at the support A is

**Options :**

1. ✘ 32 kNm

2. ✔ 72 kNm

3. ✘ 64 kNm

4. ✘ 108 kNm

**Question Number : 128 Question Id : 2106888134 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A fixed beam AB of span 8 m and flexural rigidity  $EI$  carries a concentrated load of  $W$  at C which is at a distance of 3 m from A. Which of the following statement is correct?

**Options :**

1. ✘ The maximum deflection occurs at C

2. ✘ The slope at C is equal to zero

3. ✘ The maximum deflection occurs at midspan

4. ✔ The maximum deflection occurs between midspan and C

**Question Number : 129 Question Id : 2106888135 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The deflection at the mid span of a simply supported beam of span 6 m subjected to pure bending is 18mm. The radius of curvature of the beam is

**Options :**

1. ✘ 333m

2. ✘ 108m

3. ✔ 250m

4. ✘ 300m

**Question Number : 130 Question Id : 2106888136 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If  $y$  be the deflection at a point  $x$  in a deflected beam, then the shear force is proportional to

**Options :**

1. ✘  $\frac{dy}{dx}$

2. ✘  $\frac{d^2y}{dx^2}$

3. ✔  $\frac{d^3y}{dx^3}$

4. ✘  $\frac{d^4y}{dx^4}$

**Question Number : 131 Question Id : 2106888137 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Slenderness ratio for a column is

**Options :**

1. ✘ Proportional to the least radius of gyration

2. ✔ Inversely proportional to the least radius of gyration

3. ✘ Proportional to the cross sectional area

Inversely proportional to the modulus of elasticity

4. ✘

**Question Number : 132 Question Id : 2106888138 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The buckling load for a steel column of length fixed at both ends is 400 kN. If one end of column is made free, the buckling load changes to

**Options :**

1. ✔ 25 kN

2. ✘ 50 kN

3. ✘ 200 kN

4. ✘ 400 kN

**Question Number : 133 Question Id : 2106888139 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the length of column fixed at one end and hinged at other end is 3 m, then the effective length of column is

**Options :**

1. ✘ 1.5 m

2. ✔ 2.12 m

3. ✘ 3 m

4. ✘ 6 m

**Question Number : 134 Question Id : 2106888140 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the Euler load for a steel column is 400 kN and Crushing load is 600 kN, then the Rankine's load is equal to

**Options :**

1. ✘ 1000 kN

2. ✘ 600 kN

3. ✔ 240 kN

4. ✘ 200 kN

**Question Number : 135 Question Id : 2106888141 Display Question Number : Yes Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a dam of base width  $b$  and height of storage of water  $h$ , then

**Options :**

1. ✘ Maximum stress occurs at the heel
2. ✘ Minimum stress occurs at the toe
3. ✘ Tension is developed if the eccentricity is less than  $b/6$
4. ✔ Tension is developed if the eccentricity is more than  $b/6$

**Question Number : 136 Question Id : 2106888142 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Backfill lying above the horizontal plane at the elevation of top of retaining wall is

**Options :**

1. ✔ Surcharge
2. ✘ Vertical load
3. ✘ Soil resistance

## Intensity of soil

4. ✘

**Question Number : 137 Question Id : 2106888143 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the angle of internal friction of the retaining soil is  $30^\circ$ , the coefficient of active earth pressure is

**Options :**

1. ✘  $1/4$

2. ✔  $1/3$

3. ✘  $1/2$

4. ✘  $3/4$

**Question Number : 138 Question Id : 2106888144 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A three member right angle triangular truss is hinged at A and roller support at B such that AC is perpendicular to AB. The length of members AB and AC are 4 m and 3m respectively. If a horizontal force of 100 kN is acting at C, the force in the member AC is equal to

**Options :**

1. ✘ 50 kN (Tensile)



2. ✓ 75 kN (Tensile)

3. ✗ 75 kN (Compressive)

4. ✗ 125 kN (Compressive)

**Question Number : 139 Question Id : 2106888145 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a statically determinate plane truss, the relationship between the number of joints ( $j$ ) and the number of members ( $m$ ) is

**Options :**

1. ✓  $m = 2j - 3$

2. ✗  $m = 2j + 1$

3. ✗  $m = 2j - 1$

4. ✗  $j = 2m - 3$

**Question Number : 140 Question Id : 2106888146 Display Question Number : Yes Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If a truss consists of 8 members, 6 joints and 3 reactions components, then it is

**Options :**

1. ✘ Stable
2. ✘ Determinate
3. ✔ Unstable
4. ✘ Indeterminate

**Question Number : 141 Question Id : 2106888147 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Modulus of rupture of concrete is a function of

**Options :**

1. ✘ Average compressive strength of concrete
2. ✔ Characteristic compressive strength of concrete
3. ✘ Modulus of elasticity of concrete

4. ✘ Direct tensile strength of concrete

**Question Number : 142 Question Id : 2106888148 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For M 20 grade of concrete and Fe 415 grade steel reinforcement, the balanced depth of neutral axis as per limit state method is

**Options :**

1. ✘  $0.46d$

2. ✔  $0.48d$

3. ✘  $0.53d$

4. ✘  $0.36d$

**Question Number : 143 Question Id : 2106888149 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In limit state method of design, if  $x_u$  is the depth of neutral axis, then the depth of rectangular portion of stress block is

**Options :**

1.

✓  $\frac{3}{7}x_u$

2. ✗  $\frac{4}{7}x_u$

3. ✗  $\frac{2}{7}x_u$

4. ✗  $\frac{1}{7}x_u$

Question Number : 144 Question Id : 2106888150 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

High yield deformed bars have a

Options :

1. ✗ Definite yield value

2. ✓ Percentage elongation less than that of mild steel

3. ✗ Percentage elongation more than that of mild steel

4. ✗ Less Carbon content than that of mild steel

**Question Number : 145 Question Id : 2106888151 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In limit state method of design, if  $d$  is the effective depth of the beam, then the limiting depth of neutral axis for doubly reinforced beam is

**Options :**

1. ✘ Less than that of singly reinforced beam
2. ✘ More than that of singly reinforced beam
3. ✔ Same as that of singly reinforced beam
4. ✘ Depends on the area of compression steel reinforcement

**Question Number : 146 Question Id : 2106888152 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A reinforced concrete beam is subjected to the following bending moments.

Moment due to dead load = 20 kNm

Moment due to live load = 30 kNm

Moment due to earthquake load = 20 kNm

The design bending moment for limit state of collapse is

**Options :**

- 1.

✘ 105 kNm

2. ✔ 84 kNm

3. ✘ 75 kNm

4. ✘ 60 kNm

**Question Number : 147 Question Id : 2106888153 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In an over reinforced beam

**Options :**

1. ✘ Actual depth of neutral axis is less than that of the critical depth of neutral axis

2. ✘ Moment of resistance is less than that of balanced section

3. ✔ Lever arm is less than that of balanced section

4. ✘ Steel reaches the permissible stress prior to concrete reaching permissible stress

**Question Number : 148 Question Id : 2106888154 Display Question Number : Yes Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

As per IS: 456-2000, for M 25 grade of concrete, the ratio of the flexural strength to the characteristic compressive strength of concrete is

**Options :**

1. ✓ 0.14

2. ✗ 0.33

3. ✗ 0.45

4. ✗ 0.70

**Question Number : 149 Question Id : 2106888155 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

As per limit state method, for Fe 415 grade steel reinforcement, the minimum strain at failure in the tensile reinforcement of reinforced concrete beam is

**Options :**

1. ✗ 0.002

2. ✗ 0.0028

3. ✗ 0.0035

4. ✓ 0.0038

**Question Number : 150 Question Id : 2106888156 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A three span continuous beam is supporting a monolithic reinforced concrete slab. The end beam is designed as

**Options :**

1. ✗ T beam throughout its span
2. ✗ L beam throughout its span
3. ✗ T beam for span moments and as a rectangular beam for support moments
4. ✓ L beam for span moments and as a rectangular beam for support moments

**Question Number : 151 Question Id : 2106888157 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a reinforced rectangular beam, the nominal shear stress is  $2.8 \text{ N/mm}^2$  and shear strength of concrete is  $0.5 \text{ N/mm}^2$ . If the permissible shear stress in concrete is  $2.5 \text{ N/mm}^2$ , then

**Options :**

1. ✓ The beam is to be revised



2. ✘ Minimum shear reinforcement need to be provided for beam

3. ✘ Design shear reinforcement need to be provided for beam

4. ✘ Design shear reinforcement along with side face reinforcement is to be provided

**Question Number : 152 Question Id : 2106888158 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The anchorage value of a standard hook of a reinforcement bar of 20 mm diameter is

**Options :**

1. ✘ 160 mm

2. ✘ 200 mm

3. ✘ 240 mm

4. ✔ 320 mm

**Question Number : 153 Question Id : 2106888159 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The bond between steel and concrete in a RC member is due to

**Options :**

1. ✓ Mechanical resistance and Frictional resistance
2. ✗ Mechanical resistance and cohesive resistance
3. ✗ Frictional resistance and cohesive resistance
4. ✗ Cohesive resistance and adhesive resistance

**Question Number : 154 Question Id : 2106888160 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For the two way interior slab, the torsional reinforcement to be provided at the corner of slab is equal to

**Options :**

1. ✓ Zero
2. ✗ 0.75 times the area of steel provided at midspan in the same direction
3. ✗ 0.35 times the area of steel provided at mid span in the same direction
4. ✗ 0.15% of the cross sectional area

**Question Number : 155 Question Id : 2106888161 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a reinforced concrete, Pedestal is defined as compression member whose effective length is

**Options :**

1. ✓ Less than 3 times the least lateral dimension
2. ✗ More than 3 times the least lateral dimension
3. ✗ More than 8 times the least lateral dimension
4. ✗ Less than 8 times the least lateral dimension

**Question Number : 156 Question Id : 2106888162 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A circular column of 400 mm diameter is reinforced longitudinally using 4 bars of 25 mm

$\phi$  and 4 bars of 16 mm  $\phi$  with suitable lateral ties. The pitch of lateral ties shall not be more than

**Options :**

1. ✗ 280 mm
2. ✗ 260 mm

3. ✓ 250 mm

4. ✗ 300 mm

**Question Number : 157 Question Id : 2106888163 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

An axially loaded column is of size 300 mm×300 mm with an effective length of 3 m. The minimum eccentricity of the axial load for column is

**Options :**

1. ✓ 20 mm

2. ✗ 16 mm

3. ✗ 10 mm

4. ✗ 0

**Question Number : 158 Question Id : 2106888164 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

An isolated footing is to be designed to carry a working load of 200 kN through the square column.

As per the limit state method, the minimum area for the isolated footing to be constructed over the soil of bearing capacity 800 kN/m<sup>2</sup> is

**Options :**

1. ✘ 4 m<sup>2</sup>

2. ✘ 4.4 m<sup>2</sup>

3. ✘ 6 m<sup>2</sup>

4. ✔ 6.6 m<sup>2</sup>

**Question Number : 159 Question Id : 2106888165 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A stair turning through one right angle is known as

**Options :**

1. ✔ Quarter turn stair

2. ✘ Half turn stair

3. ✘ Dog-legged stair

Open newel stair

4. ✘

**Question Number : 160 Question Id : 2106888166 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A reinforced rectangular beam of size  $230 \times 500$  mm is reinforced with compression and tensile steel located at a distance of 35 mm and 550 mm from the top fibre respectively. If the depth of neutral axis for balanced section is 175 mm, the strain in compression steel reinforcement is equal to

**Options :**

1. ✘ 0.0015

2. ✘ 0.002

3. ✔ 0.0028

4. ✘ 0.0035

**Question Number : 161 Question Id : 2106888167 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The obstacle which obstructs vision but not chaining is

**Options :**

1. ✓ Hill

2. ✗ River

3. ✗ Pond

4. ✗ Marshy Land

**Question Number : 162 Question Id : 2106888168 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The length of a line measured with 20 m chain was found to be 200 m. It was observed that the chain is 5 cm too short. The true length of line is

**Options :**

1. ✗ 199 m

2. ✓ 199.5 m

3. ✗ 200.5 m

4. ✗ 201 m

**Question Number : 163 Question Id : 2106888169 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Reduced bearing of a line is

**Options :**

1. ✘ Always measured from north
2. ✘ Always measured in clockwise direction
3. ✘ Always measured in anti-clockwise direction
4. ✔ Measured either clockwise or anti-clockwise direction depending on quadrant

**Question Number : 164 Question Id : 2106888170 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The deflection angle in a traverse is equal to

**Options :**

1. ✘ Sum of included angle and  $180^0$
2. ✘ Difference between the included angle and  $90^0$



3. ✓ Difference between the included angle and  $180^{\circ}$

4. ✗ Difference between  $360^{\circ}$  and included angle

**Question Number : 165 Question Id : 2106888171 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The magnetic bearing of a line PQ measured as  $72^{\circ}30'$  when magnetic declination was  $1^{\circ}30'E$ .

If the present magnetic bearing of a line PQ is  $76^{\circ}30'$ , then the magnetic declination is

**Options :**

1. ✗  $4^{\circ}0'E$

2. ✓  $2^{\circ}30'W$

3. ✗  $2^{\circ}30'E$

4. ✗  $1^{\circ}0'W$

**Question Number : 166 Question Id : 2106888172 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

On a turning point in levelling

**Options :**

1. ✘ Only Back sight is taken
2. ✘ Only Fore sight is taken
3. ✘ Only intermediate sight is taken
4. ✔ Both Fore sight and Back sight are taken

**Question Number : 167 Question Id : 2106888173 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a one meter length of an ordinary levelling staff, the number of divisions are

**Options :**

1. ✘ 500
2. ✘ 400
3. ✔ 200
4. ✘ 400

**Question Number : 168 Question Id : 2106888174 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The summation of all rises and summation of all falls in a differential levelling are 8.490 m and 11.825 m respectively. If the RL of last point is 105.675, then RL of first point where the staff is held will be

**Options :**

1. ✘ 114.165

2. ✔ 109.010

3. ✘ 102.340

4. ✘ 97.185

**Question Number : 169 Question Id : 2106888175 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A series of straight parallel and widely spaced contours represents

**Options :**

1. ✘ Curved surface

2. ✔

Inclined flat surface

3. ✘ Steep surface

4. ✘ Horizontal flat surface

**Question Number : 170 Question Id : 2106888176 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The line of collimation of a theodolite is

**Options :**

1. ✘ Parallel to vertical axis

2. ✔ Parallel to horizontal axis

3. ✘ Parallel to axis of plate levels

4. ✘ Perpendicular to vertical axis

**Question Number : 171 Question Id : 2106888177 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The screw used in a theodolite while taking back sight is

**Options :**

1. ✘ Upper clamp
2. ✔ Lower clamp
3. ✘ Upper tangent
4. ✘ Lower tangent

**Question Number : 172 Question Id : 2106888178 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The coordinates of two points A and B of a traverse line AB are:

$$x_a = 100 \text{ m}, x_b = 200 \text{ m}, y_a = 100 \text{ m}, y_b = 200 \text{ m}$$

The bearing of the line BA is

**Options :**

1. ✘  $45^\circ 0' 0''$
2. ✘ N  $45^\circ 0' 0''$  E
3. ✘ S  $180^\circ 0' 0''$  E

4. ✓ S 45° 0' 0" W

**Question Number : 173 Question Id : 2106888179 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The additive and multiplying constants for a tacheometer equipped with an analytic lens are respectively

**Options :**

1. ✗ 0, 0

2. ✓ 0, 100

3. ✗ 100, 0

4. ✗ 100, 100

**Question Number : 174 Question Id : 2106888180 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Using the tachometer fitted with anallactic lens, if the intercept on a vertical staff is observed as 0.85, then the distance between the tachometer and staff station is

**Options :**

1. ✗ 8.5 m

2. ✘ 17.0 m

3. ✘ 34.0 m

4. ✔ 85 m

**Question Number : 175 Question Id : 2106888181 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Which segment of GPS consists of Satellite?

**Options :**

1. ✘ User

2. ✘ Control

3. ✔ Space

4. ✘ Navigation

**Question Number : 176 Question Id : 2106888182 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

**Time : 0**

The property of a fluid by which molecules of the same liquid are attracted towards each other is known as

**Options :**

1. ✘ Viscosity

2. ✘ Attraction

3. ✔ Cohesion

4. ✘ Adhesion

**Question Number : 177 Question Id : 2106888183 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A Rectangular tank 5 m long, 4 m wide contains water upto a depth of 3 m. If the acceleration due to gravity is  $10 \text{ m/sec}^2$ , the intensity of pressure at the bottom of wall is

**Options :**

1. ✘  $50 \text{ kN/m}^2$

2. ✘  $40 \text{ kN/m}^2$

3. ✔  $30 \text{ kN/m}^2$



4. ✘  $20 \text{ kN/m}^2$

**Question Number : 178 Question Id : 2106888184 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A U-tube differential manometer is used to measure

**Options :**

1. ✘ Pressure at a point

2. ✘ Atmospheric pressure

3. ✘ Pressure at two different points

4. ✔ Pressure difference between two points

**Question Number : 179 Question Id : 2106888185 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If a piece of material weighing 4 kg in air was found to be 3 kg when submerged in water, then the specific gravity of the material is

**Options :**

1. ✘ 3

2. ✓ 4

3. ✗ 5

4. ✗ 7

**Question Number : 180 Question Id : 2106888186 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The principle of conservation of mass is used in fluid mechanics to derive

**Options :**

1. ✓ Continuity equation

2. ✗ Bernoulli's equation

3. ✗ Momentum equation

4. ✗ Poisselli's equation

**Question Number : 181 Question Id : 2106888187 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

In a steady flow through pipe at a particular section, the pressure head, potential head and velocity head are 1.0 m, 2.0 m and 3.0 m respectively. The height of hydraulic gradient line at the section is

**Options :**

1. ✘ 1.0 m

2. ✔ 3.0 m

3. ✘ 4.0 m

4. ✘ 6.0 m

**Question Number : 182 Question Id : 2106888188 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the installation of a venturimeter is changed from horizontal to inclined axis in a pipe line, then the discharge

**Options :**

1. ✘ Increased

2. ✘ Decreased

3. ✔ Remains same

4. ✘ dependent on inclination of pipe axis

**Question Number : 183 Question Id : 2106888189 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the head of water flowing through orifice is 5 m and the acceleration due to gravity is

$10 \text{ m/s}^2$ , the theoretical velocity of jet is

**Options :**

1. ✘ 20 m/s

2. ✔ 10 m/s

3. ✘ 7.5 m/s

4. ✘ 5 m/s

**Question Number : 184 Question Id : 2106888190 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Vena contracta is a point at which

**Options :**

1. ✘ The velocity of flow is minimum

2. ✓ The velocity of flow is maximum

3. ✗ The velocity of flow is average

4. ✗ The velocity of flow is constant for any head

**Question Number : 185 Question Id : 2106888191 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If a pipe line is laid for a length of 1 km with available head of 2 m, the hydraulic gradient of flow is

**Options :**

1. ✗ 1:250

2. ✓ 1:500

3. ✗ 1:1000

4. ✗ 1:2000

**Question Number : 186 Question Id : 2106888192 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Two pipes are connected in series and are used for carrying water. The diameter of pipe A and pipe B are 100 mm and 20 mm respectively. If the velocity of flow through pipe A is 1 m/s, then the velocity of flow through pipe B is

**Options :**

1. ✘ 1 m/s

2. ✘ 4 m/s

3. ✘ 16 m/s

4. ✔ 25 m/s

**Question Number : 187 Question Id : 2106888193 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For laminar flow through the circular pipes, if the Reynolds number is 1600, then the

Darcy's friction factor  $f$  is equal to

**Options :**

1. ✘ 0.08

2. ✔ 0.04

3. ✘ 0.02

4. ✘ 0.01

**Question Number : 188 Question Id : 2106888194 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The velocity distribution in turbulent flow follows a

**Options :**

1. ✘ Parabolic law

2. ✔ Logarithmic law

3. ✘ Linear law

4. ✘ Hyperbolic law

**Question Number : 189 Question Id : 2106888195 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For an open channel section, the condition for most economical section is

**Options :**

1. ✘ Wetted area is maximum

2.

✘ Wetted area is minimum

3. ✔ Wetted perimeter is minimum

4. ✘ Wetted perimeter is maximum

**Question Number : 190 Question Id : 2106888196 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Reaction turbine is used for

**Options :**

1. ✔ Low head and high discharge

2. ✘ Low head and low discharge

3. ✘ High head and high discharge

4. ✘ High head and low discharge

**Question Number : 191 Question Id : 2106888197 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**



Kharif season is generally extends from

**Options :**

1. ✘ January-July
2. ✘ March-August
3. ✘ October-March
4. ✔ June-October

**Question Number : 192 Question Id : 2106888198 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

If the Delta for a crop having base period of 100 days is 43.2 cm, then the duty of crop in hectares/cumec is

**Options :**

1. ✘ 20,000
2. ✔ 2,000
3. ✘ 200
4. ✘ 20

**Question Number : 193 Question Id : 2106888199 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

For a continuous storm, the rainfall in 20 minutes is 40 mm. The intensity of rainfall is

**Options :**

1. ✓ 120 mm/hour
2. ✗ 800 mm/hour
3. ✗ 120 mm/minute
4. ✗ 40 mm/minute

**Question Number : 194 Question Id : 2106888200 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

Theissen polygon method is used for computing the

**Options :**

1. ✓ Average rainfall
2. ✗ Average infiltration

3. ✘ Depth of runoff

4. ✘ Volume of runoff

**Question Number : 195 Question Id : 2106888201 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The precipitation due to 1 hour storm over a catchment area of  $100 \text{ km}^2$  is 80 mm. The volume of rainfall is

**Options :**

1. ✘  $8000 \text{ mm}^3$

2. ✘  $8000 \text{ m}^3$

3. ✔  $8 \times 10^6 \text{ m}^3$

4. ✘  $8 \times 10^6 \text{ mm}^3$

**Question Number : 196 Question Id : 2106888202 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

The under sluices in diversion head works are provided to

**Options :**

1.

✓ Control silt entry into the channel

2. ✘ Avoid parallel flow to the weir

3. ✘ Prevent hydraulic jump

4. ✘ Prevent fish flow

**Question Number : 197 Question Id : 2106888203 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

A gravity dam of base width 10 m is designed as an elementary profile ignoring the uplift pressure. If the specific gravity of the material of the dam is 2.56, the allowable height of the dam is

**Options :**

1. ✘ 5 m

2. ✘ 8 m

3. ✘ 10 m

4. ✓ 16 m

Question Number : 198 Question Id : 2106888204 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Lacey's silt factor for average silt grain size of 0.16 mm is

Options :

1. ✘ 0.281

2. ✘ 0.48

3. ✔ 0.704

4. ✘ 1.32

Question Number : 199 Question Id : 2106888205 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

In an Ogee spillway, if the operating head is less than the design head, then

Options :

1. ✘ Pressure at the crest will be zero

2. ✔ Pressure on the crest will be positive

3. ✘ Pressure on the crest will be negative causing cavitation

4. ✘ Coefficient of discharge will be more than the design coefficient discharge

Question Number : 200 Question Id : 2106888206 Display Question Number : Yes Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

The function of Canal drop is

Options :

1. ✘ Control of discharge

2. ✘ Control of full supply level

3. ✔ Control of bed grade

4. ✘ Control of flow depth